Talkgroups – on Hotspots using different Networks

So, you have your Hotspot. The next issue is which Talkgroups or Reflectors do you use? Obviously, this will be to some extent a personal decision. However, depending on which Network you pick, the choice may make all the difference to your DMR experience. Of the two principal UK Networks, Brandmeister offers the most Talkgroups and, with the Brandmeister API installed, the most control. Phoenix is more UK centric but has limited Talkgroup controls. FreeDMR is the new kid on the block. If you only want to use one Network then select that as DMR Master; otherwise, you will have to use DMRGateway as the Master. This readily supports Brandmeister and DMR+ (Phoenix etc) but not FreeDMR.

Talkgroups – The Basics

In order to use a particular Talkgroup you need to do three things. You first need to define Group Call Digital Contact IDs for each of the Talkgroups you wish to access. There then needs to be channels in your Code Plug set to use the Hotspot frequencies and colour code and with the appropriate Talkgroup or Digital Contact ID, set. Then with the correct Network enabled on the Hotspot simply keying up the Channel will activate the Talkgroup. Note – you may need to key it up before you hear anything.

Changing channels to a different Talkgroup and keying that up will switch to that one instead. Except things are never that straight forward on DMR – it depends which Network you are on! The Hotspot is treated like a Repeater by the Networks, particularly by Phoenix. This means that Talkgroups may be timed out by the Network. For instance, listening to TG840 on Phoenix will necessitate keying it up at least every 15 minutes; this is different behaviour to RF repeaters that have defined Static Talkgroups (including 840 in East Anglia). The different Networks discussed in this document all act differently in respect to keeping Talkgroups active on Hotspots:

Talkgroups can be either Static – available all the time, or Dynamic – non-static for a period available after you have used it, or perhaps remaining as pseudo-static until you chose another non-static one.

- Brandmeister has configurable Statics, as well as dynamic and pseudo-statics.
- Phoenix and FreeDMR have fixed Statics and User Activated (dynamic) Talkgroups.

It is good practice not to 'rag-chew' on the calling or primary channels. Once a contact has been established (QSO) you should change Talkgroup (QSY) to one of the chat or tactical Talkgroups. However, a short 'over' is permissible. The problem is the wider the coverage of a Static Talkgroup, the more repeaters you use; blocking their use by other people. It only takes one irresponsible operator to chat to people on World Wide 1 to effectively bring down the entire Phoenix repeater base in the UK.

Talkgroups – Brandmeister

This network is the most comprehensive, with around 1573 Talkgroups. For a full list go to https://www.pistar.uk/dmr_bm_talkgroups.php

Talkgroups can be set to Static using the controls added to the dashboard using the Brandmeister GUI. This lists the active Talkgroups and allows you to change them. The Brandmeister support for Reflectors is going to be discontinued; Talkgroup 9 will then be spare.

On a Simplex Hotspot keying up a non-static Talkgroup will make it pseudo-static, sort of an extra Static one. If you then key up another non-static Talkgroup this takes the place of the pseudo-static one; which then becomes Dynamic for a period of time. You can still use Talkgroup 4000 to disconnect the current Talkgroup if sent as a private call.

DMR uses 2 Time Slots. Brandmeister uses whichever Time Slot the repeater keeper has set, or either on a Duplex Hotspot. Simplex Hotspots only have Time Slot 2.

My recommended Talkgroups are as follows:
1 World Wide English, 2 EU W, 235 UK W, 2351 UK Talk 1 – 2353 UK Talk 3, 23515 East Anglia, 310–319 Tac1 – Tac 10, 3100 USA, 31001 USA Net 1, 31002 USA Net 2, 31000 Echo, 4000 Disconnect, 9 Local (Reflectors), 91 World Wide, 92 EU Wide, 93 Nth America, 94 Asia, 95 Australia / NZ.

Talkgroups – Phoenix

This network is particularly strong in the UK with 52 Talk Groups, but does have international coverage and it is linked to the 228 DMR+ ones. (In fact, access to Phoenix from a Hotspot is set via the DMR+ Network option; confused?

For Phoenix Talkgroups go to http://www.dmr-uk.net/index.php/layout/
For DMR+ go to https://www.pistar.uk/dmr_dmr+_talkgroups.php

On the Repeater Network, Phoenix Talkgroups are either Static or User Activated (aka Dynamic). Static Talkgroups are always on, User Activated will not be heard until keyed up. They then become 'Static' for 15 minutes after each outgoing transmission from the Hotspot or Repeater. Make sure you key up before they time out if you are only listening, or are on a protracted Net. In the list below Static Talkgroups on Repeaters are in **BOLD**. Also, Phoenix defines particular Time Slots on repeaters for particular Talkgroups.

Hotspot Networks and Talkgroups

The Phoenix Network treats Hotspots differently in that no Talkgroups are Static and on a Simplex Hotspot everything is on Time Slot 2 regardless. On a Duplex Hotspot either Time Slot can be used, providing you are not running DMRGateway.

Unlike Brandmeister, there are no controls on the dashboard to control Talkgroups. There is, however, an Options field in the DMR+ Configuration section. Left blank the default contents of this are: *StartRef=4000;ReLinkTime=60;UserLink=1; TS2_1=9;* This takes some explaining. When the Pi-star starts up it read this line and does the following:

- *StartRef=4000;* This is the Reflector to use. 4000 means disconnect.
- *ReLinkTime=60;* If the user changes the reflector from the initial one, restore it after 60 minutes.
- *UserLink=1;* Allows the user to change the reflector. Set it to '0' to inhibit.
- *TS2_1=9;* Sets Talkgroup 9 as static. You can set up to 5 static Talkgroups per Timeslot (TS2_2=840; say)

On a Duplex Hotspot there are two Time Slots. So, in the above Option field TS1_1= Time Slot 1 and TS2_1 = Time Slot 2. Time Slot 1 only works on a Duplex Hotspot running DMR+; and not if it is running DMRGateway (as the default Talkgroup Rewrite rules routes all traffic over Time Slot 2 for DMR+ Talkgroups, but this can be changed)

If you use the Options field to set things it may be lost if you subsequently change other settings. There is no way of inhibiting individual Talkgroups set using this command. This means if you set a busy Talkgroup you will not be able to switch away from it whilst busy.

My recommended Talkgroups are as follows (use Hubnet 23536 at your own peril):
Time Slot 1: **1World Wide**, **13 WW English**, 113 WW English, 119 WW, 123 WW English, 129 WW, **235 UK Wide**, 80 UK Wide 1 – 84 UK Wide 5, **9 Local**
Time Slot 2: 840 East Anglia, 841 Suffolk Coastal, **9 Local**, 9990 Echo (Regional Talkgroups are Static in their own area and User Activated everywhere else)

Talkgroups – FreeDMR

This network has 28 UK Talkgroups, some of which allow additional regional sub groups. It also allows direct access to 15 of the Phoenix Talkgroups. In addition, there are over 700 worldwide groups available. FreeDMR also supports Reflector working to TG9.

For FreeDMR Talkgroups go to http://www.freedmr.uk/

Talkgroups – DMR2YSF

You can use a Hotspot and a DMR radio to access Yaesu System Fusion Reflectors by selecting DMR2YSF as the DMR Master. Or by enabling DMR2YSF in the MMDVM Host

Hotspot Networks and Talkgroups

Configuration section, using DMRGateway and adding '70' in front of the 5-digit Reflector IDs.

For YSF Reflectors and Pi-star Talkgroups go to YSF Reflector List - pistar.uk

Suggested reflectors are YSF55772 Suffolk and YSF97658 Ipswich (7055772 and 7097658 via DMRGateway)

Switching Networks within Pi-star using DMR Gateway

DMR Gateway allows you to connect to multiple DMR Networks at the same time but requires additional work; both in the Pi-star configuration and in the Code Plug for your radio. This is to allow the Hotspot to determine which DMR Network you are trying to access from your radio. By default, almost all traffic will be routed over the Brandmeister Network. However, for other Networks to work, you have to use redirect statements in the Pi-star configuration and have an extra set of Talkgroups for these through the Hotspot.

Whilst running DMR Gateway you can enable and disable Brandmeister and Phoenix from the Configuration menu on the web interface. Just scroll down to the DMR Configuration section. Move the slider to disable either Brandmeister or DMR+ to disable Brandmeister or Phoenix respectively. Then click on Apply Changes.

Changing the Status of the FreeDMR server is a bit more difficult. To access this network within DMR Gateway you have to manually add it to the DMR GW configuration file. Instructions can be found on the FreeDMR web site. Once added you can enable it by editing the file. Click on Configuration> Expert on the Pi-star tool bar and then under Full Edit DMR GW. Scroll down to the [DMR Network 4] section. Change the line Enabled=1 to Enabled=0 to turn it off, and from 0 to 1 to turn it on. Click on Apply Changes.

If you use the dashboard to turn on a specific Network, by turning off the ones you don't want, you can listen to one Network at a time. Just make sure your radio and Hotspot agree otherwise you may get nowhere. Which also happens if the Hotspot is receiving traffic on a different Talkgroup to the one your radio is set to.

Phoenix Talkgroup Redirects

In order to get Phoenix to co-exist with Brandmeister (or any other DMR Networks for that matter) using DMRGateway you need to ensure there is no overlap in Talkgroup IDs. The way to do this is to add additional Talkgroup IDs to your radio, prefixing each existing Phoenix ID with an'8' and as many leading '0's as required to make them 6 digits long.

For instance, TG 235 becomes TG 800235, TG 840 becomes TG 800840, etc. These new Talkgroups do not replace the Repeater originals and are only used to create Channels assigned to a Hotspot in DMRGateway mode.

Having done this, you then need to change the Pi-star configuration file to suit. It is always good practice to back up your configuration before making major changes! From the Dashboard you need to select 'Configuration', 'Expert' and then in the Full Edit: section select 'DMR GW'. In the [DMR Network 2] section replace all the existing TGRewrite and PCRewrite lines with the following:

```
TGRewrite0=2,8,2,9,1
TGRewrite1=2,800505,2,505,1
TGRewrite2=2,800800,2,800,100
TGRewrite3=2,803801,2,3801,8
TGRewrite4=2,823531,2,23531,1
TGRewrite5=2,809990,2,9990,1
TGRewrite6=2,800001,1,1,9999
TGRewrite7=2,800001,2,1,9999
PCRewrite0=2,804000,2,4000,1001
```

Select the "Apply Changes" button and wait for the Hotspot to restart. Then when you transmit on a channel with a modified Phoenix Talkgroup ID, this lookup table ensures the call is routed to the Phoenix Network. If using a Duplex Hotspot, they prevent the use of Time Slot1 for the Phoenix Network, everything works on Time Slot 2.

Monitoring Concurrent Networks – A Warning

If you run DMRGateway and have multiple Networks active at the same time you may experience problems with Static Talkgroups.

Perhaps you are listening to BM 3100 USA. If during a quite period a QSO is started on a Talkgroup on a different Network that is also Static, say Phoenix 840 East Anglia, this will become the current Talkgroup being handled by your Hotspot. The chances are you won't hear this because you are focused on the original Talkgroup (unless you are running promiscuous mode on Talkgroups of course – never a good idea in my mind)

More importantly you would have no way of 'killing' the unwanted QSO and returning to your original QSO! The Brandmeister API allows you to drop Static and Dynamic

Talkgroups from your Pi-star dashboard. However, if you have used the Options field to set Static Talkgroups on Phoenix you will be unable to clear them without clearing the Options filed and restarting the Pi-star; and that doesn't always work straight away.

If you set a busy Talkgroup as Static you may not be able to change Talkgroups at all until there is a big enough gap in the QSO to break away – it has been known for users to be stuck on Hubnet against their will! If you are going to be on a Net, say, you would need to use the different Network's controls to remove all the other Statics before you start.

If you really must be able to use multiple Networks concurrently ideally you need a Duplex Hotspot. These are more difficult to set up (perhaps requiring additional channels in your Code Plug for the different Timeslot and different redirect statements) but allow you to use different Timeslots for different Networks. For example, have Timeslot 1 for Phoenix and Timeslot 2 for Brandmeister. This will allow you to select the Network of interest or, even, run two radios one on each Timeslot.

Reflectors – The Basics

Before Talkgroups there were, Reflectors on some Networks (such as Phoenix and FeeDMR) A Reflector is effectively a User Activated Talkgroup. There are many more Reflectors on some Networks then there are Talkgroups. They tend to give access to specialist groups, such as 'Hunting and Fishing' and 'Astronomy'. At the time of writing there are 92 (and 1481 Talkgroups) on Brandmeister, 374 on DMR+ and 18 on Phoenix (all linking to existing Phoenix Talkgroups) Reflectors all start with a '4' and are four digits long. Brandmeister Reflectors are listed at www.pistar.uk/dmr_bm_talkgroups.php. DMR+ Reflectors can be found on the same site. If you are using DMRGateway all Reflector set-up calls are routed over the Brandmeister Network; assuming you are using the standard Talkgroup redirects.

The way to operate using a Reflector is as follows:

- Put a Private Call out using the 4-digit ID of the Reflector, eg 4513, Hunting and Fishing.
- Switch your radio to Talkgroup 9. This is where the audio will be. If you are quick enough you may hear a connected announcement.
- When you have finished your QSO you should disconnect by making a Private Call to 4000. Listening on Talkgroup 9 you should hear a disconnect message.
- If you don't send a disconnect the Reflector (on a Repeater) will time out after 15 minutes.

Interestingly, if you really want to, this also works on Phoenix RF Repeaters. If you make a Private Call to 4400 on Time Slot 2, the Repeater will map the Local Talkgroup 9 on to

Hotspot Networks and Talkgroups

Talkgroup 235 on Time Slot 1. Any transmissions then made on 9 Local TS2 will appear on 235 UKW on TS1. On all the idle UK Repeaters!

Oddly on a Phoenix RF Repeater, if you make a Private Call to 4504 you connect 9 local TS2 to Oost Nederland which is on Brandmeister Reflector 4504 (and Talkgroup 2044); not DMR+ 4504 which is listed as 'Satellites'. However, if you Private Call 4850 you connect to DMR+ Reflector 4850 (New Zealand). It does seem to be a bit hit and miss as to which Network will carry a Reflector.

Probably best to avoid Reflectors to start with. There are plenty of Talkgroups across all the Networks to pick from!

To give you some idea of all this, here is my list of Talkgroups in my Code Plug:

A List of the Talkgroups I use on my Hotspots

Phoenix	
1	1 WW
113	113 WW Eng
119	119 WW
123	123 WW Eng
129	129 WW Eng
13	13 WW Eng
2	2 EUW
235	235 UKW
23526	23526 Hubnet
23531	23531 RAYNET
5	5 Aus
5057	APRS Walking
80	80 UKW 1
81	81 UKW 2
82	82 UKW 3
83	83 UKW 4
84	84 UKW 5
801	801 South East
810	810 South West
820	820 North West
830	830 Midlands
840	840 East
841	841 MK+DS+AL
850	850 Scotland
860	860 North East
870	870 Wales
880	880 NI
9	9 Local
9990	9990 Echo

Brandmeister	
2350	2350 UK BM
2351	2351 CHAT BM
2352	2352 CHAT BM
2353	2353 CHAT BM
23526	23526 Hubnet BM
23531	23531 RAYNET BM
23580	23580 MID BM
23590	23590 EMID BM
23515	23515 East BM
234999	APRS BM
310	310 TAC1 BM

311	311 TAC2 BM
312	312 TAC3 BM
313	313 TAC4 BM
314	314 TAC5 BM
315	315 TAC6 BM
316	316 TAC7 BM
317	317 TAC8 BM
318	318 TAC9 BM
319	319 TAC10 BM
3100	3100 US BM
31000	31000 ECHO BM
31001	31001 NET 1BM
31002	31002 NET 2BM
4000	4000 CLEAR BM
5054	5054 AUS BM
91	91 WW BM
92	92 EU BM
93	93 N-USA BM
94	94 Asia BM
95	95 Aus/NZ BM
923	923 EU BM

Pi-star Phoenix	
800001	g1 WW
800113	g113 WW Eng
800119	g119 WW
800123	g123 WW Eng
800129	g129 WW Eng
800013	g13 WW Eng
800002	g2 EUW
800235	g235 UKW
823531	g23531 RAY
800005	g5 Aus
800080	g80 UKW 1
800081	g81 UKW 2
800082	g82 UKW 3
800083	g83 UKW 4
800084	g84 UKW 5
800801	g801 South East
800810	g810 South West
800820	g820 North West
800830	g830 Midlands
800840	g840 East
800841	g841 MK+DS+AL

800850	g850 Scotland
800860	g860 North East
800870	g870 Wales
800880	g880 NI
804000	g4000 Clear
809990	g9990 Echo

DMR2YSF	
7023501	GB-CQ-UK-YCS
7041729	YSF-CQ-WIRES-X
7055772	YSF-IPSWICH
7057727	YSF-HUBNET
7097658	YSF-SUFFOLK
7099999	YSF-PARROT