Timeslots and Talkgroups

Newsletter of DMR-UK & the Yorkshire DMR Group

DMR in Amateur Radio — Ofcom awfully impressed!

DMR features:

* Two "timeslots" within one 12.5 kHz frequency allocation

* Permanent network links with selectable talkgroups to allow local, area, national or international QSOs

* Affordable commercial quality gear

* Simple, straightforward digital technology

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20th January and a unique opportunity to push DMR forward was taken to the max by Denis, G00LX.

Following a Notice of Variation application for his own DMR repeater and routine contact with Ofcom, the licensing authority expressed an interest in looking in more detail at how DMR works in amateur radio and asked Denis if he would oblige. Three officials attended Denis's workshop in Northfleet, Kent and were treated to a full demonstration, including UK wide and international contacts and the real time "Last Heard" webpage, which was projected onto a screen.

'As well as the repeater, I was able to demonstrate various types of equipment, both mobile and hand-portable, from a range of manufacturers and show them that it isn't limited to a single brand' said Denis .

'The various functions were highlighted and I was able to show them how the basic parameters of time slots, colour codes, individual identities and varying talkgroups enable selective interconnection between different regions of the UK and across the world. The three Ofcom guys were amazed at the quality of the audio and

how straightforward and secure the system is in operation.

'Having suitably impressed them with the system itself, we then went on to discuss licensing matters and the way that the MoD influences 70cm license applications. Encouragingly, it seems that the NOV process might be about to speed up. Ofcom told me to "watch this space" so fingers crossed!'

In the days following Denis's demo, a whole batch of NOVs was issued, including one for his own repeater, GB7NS, proving Ofcom's positive impressions of the DMR-MARC system.

Everyone involved should say a big "thank-you" to Denis for his invaluable work and commitment to promoting DMR's future in amateur radio.

Denis's website, which contains full information on developments in his area, both digital and analogue, can be found at www.gb3ns.com

Digital Voice — the basics

Almost all of us use DV mode virtually every day of our lives. In fact, to many, it *is* their life! Mobile phones use advanced digital voice modes and the older 2G networks use a version of TDMA very similar to our own.

All digital voice standards use encode/decode software called "codecs", which can be proprietary, as in the case of D-Star, or open source, as in the case of DMR. DMR

uses a form of FSK or "frequency shift key" known as C4FM—four level FSK constant envelope modulation. The voice is encoded/modulated, transmitted as a stream of data, then decoded by the receiver. The advantages of DV include easy IP distribution, excellent bandwidth efficiency and high quality audio.

DMR applies a channel access protocol known as "Time Division Multiple Ac-

cess" to allow two timeslots or voice channels within a single 12.5khz frequency allocation. Conventionally, the timing algorithm for this is controlled by the repeater but the latest Motorola radios such as the 4000 series can also provide the facility.

DMR terminology decoded

DMR—Digital Mobile Radio. An international digital standard for voice communication

TDMA—Time Division Multiple Access. A channel access protocol allowing two voice channels per 12.5khz allocation

Timeslot—half of the transmitted data making up one voice channel

Talkgroup—self explanatory. A software routing programmed in to your radio to enable QSOs between others on the same group

Colour-Code—the digital equivalent of CTCSS. But in the MOTOTRBO world, a repeater will inhibit you from transmitting through it if you're on the wrong colour-code

User ID—the individual ID allocated to you by the network that enables you to access the worldwide DMR-MARC system

DMR-MARC—an international network of Motorola digital repeaters

At the time of writing, there are five live DMR repeaters, located in Wakefield, Huddersfield, Keighley, Hope Mountain in North Wales and Caterham in Surrey.

The type of internet connection varies between them.

Located in Wakefield, GB7TD, the UK's first DMR repeater, uses a 3G router into a mobile network. This has proved to be very stable (even though it's in a barn!) with only the occasional lock-up that a remote reset normally sorts out. TD will soon

Internetworking—system connectivity

be upgraded to 4G.

Using a similar 3G connection GB7HX suffered a little latency that a recent upgrade to 4G seems to have cured.

GB7TP in Keighley has a microwave connection into broadband at another location.

GB7HM in North Wales has a fibre broadband connection.

What's best? Well, it's a case of what's available and affordable.

Clearly, running a dedicated fibre connection just for repeater use is possibly impractical and expensive. A microwave connection needs, errm, connections. So most future projects will probably utilise 3G or 4G.

Recent experience in Yorkshire suggests 4G is a good compromise for coverage and cost. 3G works well, but the recent upgrade to HX has resulted in a faster connection and improved audio. Network connectivity should not pose a problem, wherever the location.

Current talkgroup configuration

Slot One - International
Channel 1 - Talkgroup 3 America and English speaking countries (see note 1)
Channel 3 - Talkgroup 1 Worldwide Network all connected repeaters (279 repeaters at 08/02/2014)
Channel 5 - Talkgroup 2, European countries.
Slot one fall over channels
Channel 7 - Talkgroup 9 Local repeater
Channel 8 - Talkgroup 235 UK wide
Only for intra-UK use when timeslot 2 channels are busy
Please QSY to slot 2 ASAP

Slot Two – UK, Local, Regional and UK wide
Channel 2 - Talkgroup 9 Local repeater only. (see note 1)
Channel 4 - Talkgroup 235 UK wide all uk connected repeaters.
Channel 6 - Talkgroup 8 . All regional connected repeaters, for example 3 London repeaters will be connected on this talk group to allow roaming between repeaters.

All other talk groups in the slot will be received - if you return the call within 3 seconds you will connect to the received talk group . When making a call, it's good practice to announce the talkgroup you are working through, e.g. "G0SJB calling and listening on talkgroup 8".

GB4DMR/m

DMR-UK has received Ofcom authorisation for a Special Event Station and, subject to confirmation, will be demonstrating the DMR system with a live repeater at the following rallies and events;

16 February 2014 – Radio Active Rally, Nantwich

6 April 2014 - 51st NARSA Exhibition, Blackpool

4 May 2014 – Dambusters' Hamfest, Coningsby, Lincs

8 June 2014 – 13th Junction 28 QRP Rally, Alfreton Leisure Centre

27 July 2014 – Horncastle Summer Rally

26 & 27 September 2014 – National Hamfest, Newark

6 October 2014 – 24th Great Northern Hamfest, Barnsley

An appeal to your pocket...

Amateur repeaters of all types take commitment from their local groups to install and maintain and DMR is no different. In fact modern commercial quality equipment such as our mainly Motorola gear comes at something of a premium.

Where the DMR system differs significantly however is in the ongoing cost of maintaining server space and internet bandwidth. In the spirit of amateur radio, it would be unthinkable to deny anyone use of the system without payment. But if you do use and enjoy DMR, please consider supporting your local group with a regular donation—most repeater groups can survive happily on as little as £1 per month for membership. But if you are able to donate more than that, it will allow the DMR system to grow and be available more widely throughout the UK.

Don't forget, your repeater group has already made a major financial outlay to provide the facility. Please support them by contributing as much as you can, as often as possible. Thanks.