DMR and Amateur Radio - A Beginners Guide

A Presentation by a beginner - Jordan 2E0WLQ

What is DMR

Digital Mobile Radio (DMR) is a digital voice standard, under ETSI (European Telecommunications Standards Institute) published in 2005 (Tier 1 & 2, Tier 3 in 2012)

Developed for professional communication technology, and provides a better use of the radio spectrum, with greater flexibility in transmission modes (Voice, Text, Position, Job Cards etc)

Sometimes known as Mototrbo (Motorola's brand name for their DMR range)

Amateur usage began with DMR-MARC (Motorola Amateur Radio Club) and has developed since then, into what we use today

Digital Voice Modes

3 main digital voice modes in Amateur Radio

- Digital Mobile Radio
- D-Star
- Yaesu System Fusion (Wires-X)

DMR is a professional communications standard made to fit Amateur Radio

D-Star was developed for Amateur Radio by JARL (Japanese Amateur Radio League) and is an open standard (Icom & Kenwood manufacture radios for this mode)

YSF developed by Yaesu and is ‘locked’ to their equipment. Sort of...

How Does It Work?

Different ‘Tiers’. Tier 1 is dPMR446, Tier 2 for Repeater usage, Tier 3 for Trunking.

Amateur usage uses Tier 2 equipment.

Split into ‘Timeslots’

Uses the DSVI AMBE+2™ vocoder. Only by agreement of manufacturers, not part of the ETSI standard

Uses FSK (Frequency Shift Keying) to transmit the data stream

What is a Timeslot?

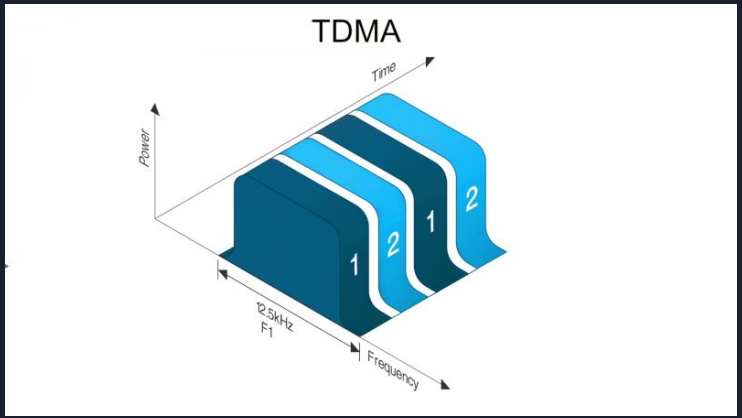
DMR can have 2 data streams in one 12.5kHz section using TDMA (Time Division Multiple Access)

One 12.5kHz ‘channel’ is split in to 2 ‘timeslots’

Timeslot’s are 30mS data streams on one frequency

TS1 transmits for 30mS and stops for 30mS, TS2 stops for 30mS and transmits for 30mS

Radio power usage is less due to half of your ‘key down’ time, the radio is not transmitting



Other DMR Terminology

Colour Codes - Best explained as a digital version of CTCSS or DCS CC0 to CC15. No colour is involved.

Talkgroups - A ‘chatroom’ essentially, within each TS can be a Talkgroup. Knows as rooms, reflectors etc on other modes. Different talkgroups over different networks.

Channel - A frequency, timeslot, colour code, talk group combination programmed to the radio

Zone - A memory bank containing Channels

Codeplug - A fancy name for the radio configuration file. Made using the CPS for your radio

DMR ID - A unique number relating to your callsign, coordinated worldwide

Contact - A data set programmed to your radio, to show Callsign, location etc from the DMR ID

DMR Networks

Amateur DMR is in different networks. Some worldwide, some local.

All use the internet to communicate with one another

Common ones are Brandmeister and Phoenix UK

Clusters are a group of repeaters covering a geographical area. SW Cluster, SALOP and Northern DMR to name a few

How do I start?

Get your DMR ID from https://register.ham-digital.org/. It can take a few days, you will need to send your licence details.

Buy a radio! Lots available from many manufacturers. Some can be used for amateur radio easier than others. What is important to you?

Write your codeplug, or modify a ready made one

Program radio with a codeplug and downloadable contacts list https://ham-digital.org/status/

Transmit in to GB7EW or a hotspot...

Hotspot? Not another thing to remember!

A hotspot is an internet connected radio, with a low TX power, typically around 10mW

Connects to DMR networks, most are Multi-Mode so can be used on D-Star and YSF, among other modes

Can be purchased from ~£70 or make your own from ~£30.

DIY versions make use of Raspberry Pi and MMDVM add on board

Lots of support on the web

Cross mode possibility, TX in DMR, and the hotspot can convert to YSF.

GB7EW and the South West Cluster

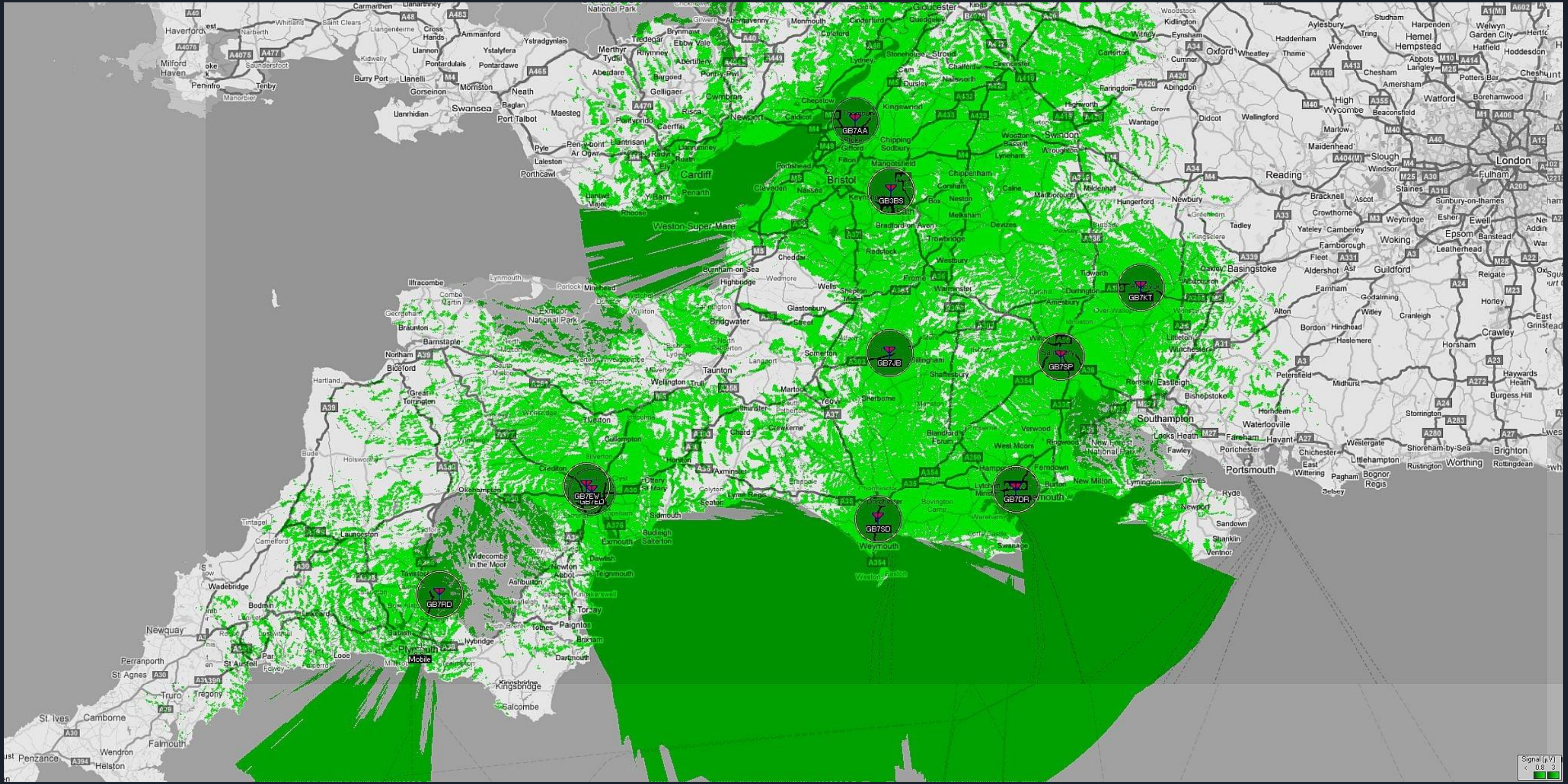
The South West Cluster is a group of repeaters connected via the internet to provide area coverage.

Repeaters are programmed TS1 on Talkgroup 9 for local, single repeater TX,
TS2 is Talkgroup 950 and links all repeaters together

SWC is not connected to any other network, and can't be accessed with a hotspot

GB7AA, GB7BS, GB7DR, GB7JB, GB7KT, GB7SD, GB7SP currently active

GB7EW (Exeter) & GB7RD (Yelverton) will soon be connected and GB7YS will come back online when it finds a new site


GB7AA
GB3BS
GB7JB
GB7KT
GB7SP
GB7EW
GB7ED
GB7SD
GB7DR
GB7RD
Mobile
Signal (µV)

GB7EW

GB7EW is located on the same site at GB3EW, the 2m repeater

Transmits on 439.5250, Receives on 430.5250. Colour Code 3. TS1 is on TG9, TS2 is on TG950

Keeper - Ivor G6ATJ with Pete G3ZVI & John G8XQQ maintaining the clever side of things!

Motorola DR3000 - 10w RF Power - Jaybeam Omni Antenna 9m AGL - Site 159m ASL

Questions???

Now you know more, you probably wish you knew less!

I’m happy to listen to any questions, but I can’t promise I know the answer!