

THE BRISTOL 70cms REPEATER GROUP

GB3BS & GB7BS

NEWSLETTER 2015

RU68 - 430.850MHz - TONE J: 118.8Hz.

DVU13 - 439.6126MHz - Colour Code 3.

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Welcome to the 2015

Edition of the Bristol 70cms Repeater Group Newsletter.

Welcome indeed, another successful rotation of our host star since we last spoke!

This year we are bringing you this newsletter primarily in electronic format although it is possible that by the time we go to press (so to speak) one or two individuals may have been identified as not having email access or we have been requested to send out a printed version, the printed version WILL be in Black and White only.

Why have we moved to the electronic format?

Firstly my personal work circumstances have changed (not through choice) and as a result I no longer have access to certain facilities. My new employment along with its extended travel time, distance and work loads also impacts on my time available to layout, publish and print the newsletter and then fold, stuff envelopes and attach stamps and finally posting the newsletters out.

Secondly and more importantly for the Repeater Group, it will be a massive reduction in costs. At the time of writing, 2nd class postage is £0.54 and currently we have 63 active members, that's £34.02 just in postage stamps (remember you have to buy books of stamps) on top of that there is paper, printing and envelope costs. Not including Mark and my own time to write, check and re-edit.

There is also the environmental impact of the newsletter to consider. Last year we produced 70 copies of the newsletter (62 Members and 8 complimentary copies for our donators who did not wish to join the Repeater Group). It was 24 pages of double side print (12 paper sheets) that consumed 840 sheets of paper alone, £4.56 in total paper. So we want to do our part and reduce waste both in paper and printer consumables.

Finally, our desire to produce a more inclusive newsletter. We have noticed that some of our members struggle with the size of fonts used (the size is selected, for best layout and page count). As we all get older our eye sight starts to struggle (mine does for sure, especially trying to read Semiconductor part numbers). Moving to electronic format helps this, as you can zoom in and out of a page as much as you personally require and of course you can always print a copy off yourself should you wish.

So with the above comments I hope you will agree, moving to the electronic format is a win for all of us! However, if you still want a hard copy version we can produce this for you but it will not be in full colour!

This will be the first time my introduction spreads across two pages! I felt I/we had to explain in full our decision to go electronic. With that now out of the way lets summarise what else is in this edition of our newsletter.

GB3BS continues to perform well, without too many gremlins getting into the works. Down time has probably been less than 5hrs in the last 12 months (Total).

GB7BS has been available for local use for 100% of the time it has been in operation, 95% of this total time it has been connected to the South West Cluster (SWC).

Both repeaters generally needed little or no maintenance this year, other than routine health checks on the repeater systems, the feeder system and antenna checks.

The site has also been a low(ish) maintenance burden this year with only a few visits required for a bit of pruning of surrounding trees, drainage maintenance , the installation of MB7VV and of course the work at the start of the year to move from 2.4GHz to 5GHz for our back haul network link to site.

Our hosts continue to be welcoming in many ways, although we are surprised not to have heard from our other neighbours, that of RAYNET. Right back when we first moved to Lansdown Raynet was interested in our repeater due to its excellent coverage on UHF FM. I am sure RAYNET are also aware of the South West Cluster and what that can offer in the way of a Regional communication network.

Moving back to this years Newsletter, here what is ahead in this addition.

- Technical Report of GB3BS.
- Technical Report of GB7BS.
- What is MB7VV?
- Site Report.
- The 5GHz Link, moving into the quite zone.
- Site activity and Maintenance.
- Rally report. A summery of rallies attended in 2015.
- Membership and why people assume repeaters are free.
- The South West Cluster.
- Sunday net on GB3BS hosted by North Bristol ARC.
- Potential Southwest Wide Sunday net.

Without further a do, lets get started with a technical report of our repeater systems from Mark G4SDR with the occasional input from me.

For now,

73

G7FBD//KG7FBD

P.S. This is for the first time, an interactive newsletter with clickable pictures and links.
Have fun finding them .



Technical Reports

by G4SDR & G7FBD.

GB3BS.

GB3BS has, as usual, been working away during the past year without any real trouble since having the main site antenna replaced, just over a year ago now.

Maintenance checks were carried out in July this year where everything was found to be in order and did not require any intervention.

All in all a very uneventful year for the repeater which was a good thing as valuable spare time was needed to progress with the DMR Repeater project, but more on that later.



Logic lock up's.

Our long established analogue repeater GB3BS has been working well without any real outages apart from the few occasions when the repeater controller logic, the Arcom RC210, crashed and became unresponsive.

It would appear that on these occasions the memory area that holds the configuration gets overwritten and corrupted. This has been a long standing bug and is one that we have spent much time investigating possible causes. We have been in regular contact with the manufacturer in an attempt to find a solution.

Thoughts that our GPS System Clock was in some way sending corrupt time information to the controller was investigated, but this has now been ruled out. However, our latest theory is now making us look at the repeater controller not “waking up” in time to receive the clock update data.

This problem is still bewildering as the memory area that is being corrupted is a “protected area” and should not get overwritten unless it is deliberately unlocked and written too.

However, we have been given a new release of firmware for the controller which is currently undergoing some bench testing on our test logic. Once we are happy with it we will be loading this new version onto the controller of GB3BS.

There will be approximately a 15-20 minute outage while this work is undertaken. We will give announcements via our usual platforms when this is planned to happen.

May we remind users of GB3BS that while any apparent crash of the repeater logic is ongoing it is completely futile for users to continue to attempt access or talk through the repeater; you won't fix it by doing this! **PLEASE** refrain from transmitting through the repeater until it is clearly operational again, we appreciate that this may be frustrating to users but it also hinders us trying to fix it.



Stations should also refrain from transmitting on the output of the repeater in an attempt to communicate with stations as this very quickly confuses people and again, hinders attempts to restore the repeater to normal operation.

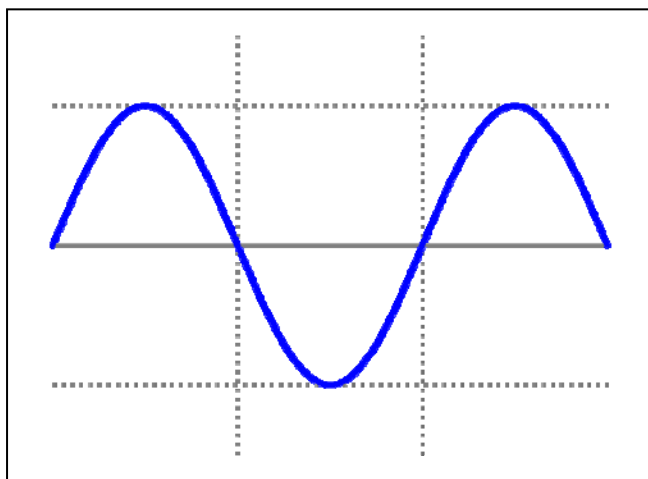
Wait for the “pips”, revisited.

It's been over a year now since the “pips” on GB3BS were changed, making them closer together and operation through the repeater a bit slicker.

However, even the well established user of GB3BS can still get it wrong!

As a reminder, you must wait for **two** pips between over's. This allows for any new station to break in and join the QSO. This action, at times, confuses people as to when they should continue with the QSO, “do I wait for another pip” or “do I wait for another two pips”?

If there is any interruption to the QSO you still must wait for two pips before continuing. REMEMBER, the Time Out timer will only be reset after the second pip. If this is not done then you stand a chance of timing out the repeater, which by the way is set at 4 minutes.



1750Hz Tone Access.

Just a reminder that Tone Burst access to the repeater has been turned off permanently. Access to the repeater is now only by using CTCSS.

Since this was implemented around a year ago we have not had any reports of problems and at the same time prevented false accesses. With CTCSS only access the signal being received by the repeater must be of a reasonable quality before the CTCSS tone is detected.

While on the subject of CTCSS, below are the specifications as set for GB3BS access.

Your Rigs CTCSS tone should conform to the following:-

Tone freq: 118.8 Hz.

Tone distortion: <2.5%.

Tone frequency error: Minimum ± 2 Hz, Maximum ± 4 Hz.

Max Deviation 500Hz.

GB7BS.

The repeater has now been in service for just over 12 months now following a delayed start due to the main site antenna having a fault last summer.

The repeater itself has operated continuously over that time without any down time, which I guess you should expect from a commercial piece of equipment. Only a few minor changes have been made to its configuration so as to allow for better performance and integration to the South West Cluster network, which at that time seemed a distant thing!



Accessing the repeater.

Being DMR brings with it a new set of parameters which if are **not** adhered too correctly can create problems. These problems are not just your problems but can reflect on others that use the repeater either for local use or when working the South West Cluster (SWC).

Before attempting to access the repeater please be sure that you have the following set up correctly. Transmit and Receive frequencies, the correct Colour Code, the correct Time Slot and Talk Group that you plan to use. Make sure that the setting commonly called the "Admit Criteria" is set to Colour Code Free. This impacts on both you and others if its not set correctly.

Also, please check that ANY settings that refer to Emergency Calls, Man Down or Lone Working are turned off or disabled at all times.

A lot of this information, and more, is available on our web site. There are also Question & Answer pages that may also help you. If there is anything you are not sure of, or just wish to ask us a question, then please feel free to email us or use our on-line contact page and we will do our best to help you. Above all, **PLEASE DO NOT** just "Poke and Hope" as it can cause problems for you and other users out there.

Correct use of Talk Group & Time Slots.

When using GB7BS there are **only** two Talk Groups in use. If you just want to talk to other stations within the coverage area of the repeater then you should be operating on Time Slot 1 and only using Talk Group 9. All other Talk Groups on this time slot are not valid and you may not be heard.

If you wish to talk through the South-West Cluster (SWC) network then you will need to use Time Slot 2 and Talk Group 950. Again, if you do not keep to this then you may not be heard. Remember, your QSO is now being transmitted out through **all** the repeaters that are connected to the SWC network.

So, if you can and it's practical, move your QSO to Slot 1 Talk Group 9.

Please DO NOT use any of the Talk Groups that are assigned to the DMR-Marc Network as they don't work, they will not get you anywhere and will potentially disrupt the SWC network and block access to a time slot currently in use by a legitimate Talk Group.

Unfortunately many suppliers of equipment program and dispatch them programmed to primarily work on the DMR-Marc Network, which is fine, but is useless for the SWC network. However, some suppliers are now supplying equipment which have added the Talk Groups as used on the SWC. Please ask your supplier or check that the correct talk groups for the SWC have been included.

Time Out.

We are often asked if the repeater has a Time Out, the simple answer is yes!

However, it should be remembered that virtually all the traditional functions of a repeater has now been passed to the user's equipment. A time out timer can be set on a user's radio to what ever you prefer; this is normally on a channel by channel basis.

On the repeater there is a time out timer which is set for 4 minutes. So any transmission lasting longer will be unceremoniously dropped without any warning.



Roaming.

Many people have asked about roaming, what is it, what does it do, how does it work and what's its purpose? Roaming should not be confused with a typical Scan function.

Although this topic was very briefly covered in our 2014 Newsletter we thought that a more in-depth description of its workings would be of interest,...so here goes!

Briefly put, roaming allows a radio (which has the roaming facility) to automatically select the best repeater within a given network area without the user having to manually change channel.

So, how does it work? A radio, providing it has the roaming function, will or should have been programmed with what is called a Roam Group that contains all the repeater channels that make up the network, like the repeaters within the South West Cluster.

Once the radio is turned on and the Roam Group has been selected (some radio's can be made to auto-roam) then the radio will very quickly search all the channels in that roam group for a signal coming from the repeater or repeaters. The radio will quickly decide on which is the best repeater for service and automatically change channel to it.

Now if you make a call or are monitoring the network you will be routed to the repeater that is best for you at that time and location. Remember, while the radio itself is in use, you may even be having a QSO, the decision making of the roam function is always working to find you the best repeater. Your radio will change channel without your intervention so that you are kept in range of the network.

Settings within the radio's programming (Code Plug) can be adjusted to make the Roam function act differently before it decides to change channel, such as changing when the signal level from the repeater is getting too low or the bit error rate is climbing.

With roaming, your radio does not just perform a signal strength evaluation. Your radio looks at both the signal strength and the digital errors it counts on the transmission from the repeater. The more the bit errors the less likely it will use that repeater.

If a radio that is roaming cannot find a usable repeater at all, and after a set time, then usually the radio will report to the user that he or she is not within the coverage area of the selected network, this is usually accompanied by a flashing LED.

So, the radio searches for the best repeater and tunes itself to it, all fine so far! But supposing there is no activity on the South West Cluster, how does the radio now work out which is the best repeater to use? The answer is that when the repeaters are not in use they will all send a Digital Beacon at a regular interval, this is then used by the radio to determine the best repeater to use.

This digital beacon is transmitted by all Cluster Repeaters, all at the same time. The beacon is transmitted currently every 6 minutes and is synchronised by the master which is GB7BS.

Again, if a radio cannot hear one of these beacons then it informs the user that they are not within the usable coverage area of the selected network.

So, that's a brief explanation of Roaming. Remember, for roaming to work the radio needs to have several values programmed into it. These values will ultimately determine how smooth or seamless roaming is in switching between repeaters. Also, these values will usually need to be different for a mobile and a hand portable.

Talking of Beacons.

Following on from the item above and the mention of a digital beacon, there is also a standard CW beacon transmitted by the repeater every 15 minutes. This is to comply with our NoV and good old Ofcom.

It should be noted that this beacon is transmitted in FM and is CW. The repeater will automatically switch itself into analogue mode and send out the beacon. While the repeater is doing this it **cannot** be accessed in digital mode, so any attempts by users to access or use the repeater will be denied. If a DMR QSO is ongoing then the beacon will be delayed in its sending until the repeater is no longer in use.

What is "Admit Criteria" all about?

Yes, this is yet another setting in your DMR radio that needs to be selected correctly.

The admit criteria is a setting that determines when or if your DMR radio will transmit or be allowed to transmit when you press the PTT! It is set usually on a channel by channel basis.

In the real world of DMR a radio will only be allowed to transmit once the input channel of the repeater is clear. In brief, while the repeater input is busy there is an indication that it is busy by sending out a message to tell all other radio's you cannot transmit as the input to the repeater is busy.

This facility prevents two, or more, stations transmitting at the same time. Only when the repeater tells all the radio's that the input is clear does it then allow stations to transmit, on a first come first served type basis.

For this facility to function it really needs two things, firstly it needs a radio that is compatible and can correctly handle this function. Secondly, the Admit Criteria setting is set correctly.



Unfortunately some radio's, while having this setting in their code plug, do not handle the function correctly. This is usually where slight incompatibility issues arise from the Mototrbo standard are seen.

The correct setting for the Admit Criteria is "Colour Code Free". Some radios also have a second setting called In Call Criteria; this should be set to "Follow Admit Criteria". Some of these phrases may be slightly different depending on the manufacturer.

If these settings are correct then while a QSO is ongoing on a repeater you should **not** be able to transmit until he or she has stopped their over.

To check that you have this setting set correctly, or to prove that your radio is fully compatible with this facility you can attempt to briefly transmit while a QSO is ongoing. If your radio emits a "Fail" tone and/or flashes a Red LED (manufacturer dependant) and you can still hear the QSO while your PTT is still pressed then your radio is working correctly.

If you can transmit then your radio is ether not set up correctly or it is unable to correctly make use of the function and so maybe an issue with Mototrbo compatibility.

As a final note on this topic, when using the radio on Simplex channels, the admit criteria should be set to "Always".



Over – I can't hear you unless you say Over!

One of the great advantages of DMR is the high signal to noise ratio of the received audio. However, this can cause confusion for some people especially when stations just simply drop their PTT at the end of their over.

This has the effect that the replying station or stations do not know if the person has stopped transmitting or simply dropped out of the repeater.

This can then have the knock on effect with people all transmitting at the same time and then complaining that they are not being heard and so

something must be wrong with the repeater or the network [*toys out of pram mode*].

It is useful to indicate, in some way, to others that you are ending your transmission, either by giving your callsign or just saying Over, Back to You etc etc!

Polite Requests.

With the amount of users coming onto GB7BS and the growth within the Cluster, we have seen a sharp rise in people simply "blipping" the repeater, some things never change be it with Analogue or Digital repeaters. Please, if you are just testing your radio then of course put a test call through, but correctly identify yourself with your callsign.

Although not quite so relevant are calls that are made between two users, these are called Private or Point to Point calls. Generally speaking these types of call should not be made. The DMR-Marc network is quite strict about this and is a big no no with them.

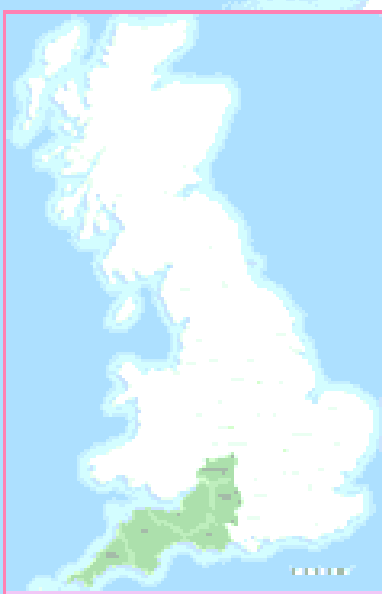
Making such calls on GB7BS and via the South West Cluster network should be avoided as these types of calls make the repeater or network busy and so cannot be used by others during that time. Besides, it's not in the spirit of Amateur Radio.

We do not want to turn this function off as it may have its uses in the future.

Such calls, in fact all calls, are logged by the system. While we do not want to set any real hard and fast rules for using the system, we do simply ask for thought and consideration for all other users out there.

South West Cluster Repeater's.

Currently we have a good number of repeaters connected to the SWC and also a number that are currently in the planning stage or who are getting an Internet connection installed. There are a few other repeater groups who have expressed their interest to maybe join our network in the future.



The list of repeaters either currently connected to the SWC or who are planning too are as follows:-

GB7AA – Almondsbury.
GB7BS – Bristol.
GB7CW – Bridgend.
GB7DR – Bournemouth.
GB7ED – Exeter.
GB7FI – Cheddar.
GB7JB – Wincanton.
GB7KT – Andover.
GB7MJ – Romsey.
GB7SD – Weymouth.
GB7TC – Swindon.

With that in mind, the BS Repeater Group is not responsible for any of the other repeaters. All faults, problems and the day to day running of each of the repeaters is down to that Repeater Group, so if there are issues or problems with any of the repeaters on the SWC then please direct your enquiry to the Repeater Group concerned.

As you can appreciate, there are times when faults occur and this can unknowingly impact on the users out there as there is no direct indication to users if a repeaters connection to the SWC is down.

Currently, we do our best to post repeater status reports on the BS Repeater Groups Facebook page (<https://www.facebook.com/groups/gb3bs>) and in the near future this will appear on our main web site.

Obviously we cannot monitor the SWC Network on a 24/7 basis, we all have other things to do, but we do our best to check for any alarms or faults usually first thing in the morning or throughout the day, time permitting. You, as a user, may notice a problem before we do – so please email us or use the Contact Us page on our web site to let us know. We will endeavour to take a look and onward notify the appropriate repeater group concerned if necessary. Of course if you are sure of a particular repeater having a problem then please contact that Repeater Group directly.

Please also remember that each of the Repeater Groups is independent for funding. If you use the SWC Network then please consider supporting the repeater group that provides you with your local access.

Site Maintenance.

This past year has, as you can read, been a busy one; with a lot of work going on with regard to GB7BS and the South West Cluster Network.

But during this time we have done the usual bit of House Keeping, trying to keep the building in a reasonable state, both to the interior and exterior. Some of these tasks have been the clearing of the roof of tree debris and trimming back some of the overhanging tree growth. Clearing the gutters and unblocking the rain water soak away!

Unfortunately our plans to refurbish the Generator room has yet again been put back, mainly due to all our spare time being put into the Cluster project. Ultimately our plans are to give this room a good clean and a fresh coat of paint to the walls and ceiling not forgetting the floor, hopefully to bring it up to the same standard as the main repeater room.

The generator itself, although in full working order, is also due a bit of a makeover. It needs a good steam clean and clearing some of the rust that has accumulated. Then it would be great if we could give it a good coat of original paint. This generator has seen a lot of neglect, but it is a great asset to the group, so a bit of TLC would not go amiss as it does run well and provides us with emergency mains power.

And while talking of standby power, we recently carried out a full generator load test since the fitment of our main site UPS system, which provides uninterrupted mains for essential equipment such as the 5GHZ microwave link, Cisco Switch and two computer servers. During this load test our nice new UPS kept telling us that the generator's 240v AC supply was a bit high in frequency at 51.8Hz rather than the usual 50Hz.



Obviously the UPS, which is also a power conditioner, was doing its job. Probably without it we would not have been quite so aware of this problem.

So, out with the a can of WD40 and spanners to make some adjustments to the generators governor control mechanism. We got the generator on load and up to a proper running temperature followed by a nice and strategically placed squirt of WD40 on the adjustment nuts

After a bit of swearing (good job we could not be heard over the din of the diesel engine) and bruised

knuckles, the locking nuts were freed. After some careful adjustments and time to let the engine stabilise to give 50Hz, all was good and the UPS gave us the Green light, literally.

Job done! Time for a cuppa and a biscuit or two.

One area that will, in the near future, require attention and yes, you guessed it, the spending of money, is that of the main doors. Inspection of one of the outer doors show signs of wood rot, not surprising really given their age and again – neglect over the years! These main doors usually take a good battering from any rain that the site endures. Although not urgent at this time it will need work done on them, probably complete replacement would be the better solution rather than patching them up.

Hopefully they will last a bit while longer so we can look at some options on their replacement and costing.

Finally, site insurance costs themselves remain the same. However, as we now have two repeaters our insurance costs have doubled as insurance is now calculated on the number of repeaters that are on a site, irrespective if it's on the same site or in the same building, even if it's using the same antenna!

Mat has arranged insurance cover independently for his APRS equipment as the project is separate to that of the Repeater Group.

Obviously this is important to be “squeaky clean” as we of course need to be fully covered in the unthinkable event such as something coming off the tower and injuring people or damaging property.



Some Pictures found on the Internet of the types of things that could go wrong. Thankfully the UK regulations reduce the risk. But you cannot eliminate it completely. Besides we all need to keep the insurance brokers employed.

Membership.

Membership over the past year has been reasonably stable averaging around 60 members.

As most of you are aware now, our membership fee increased by £2 taking it to £8 a year. The year 2014/2015 has been a costly period, some of which was explained in our 2014 Newsletter.

At the very start of 2015 we encountered problems with our 2.4GHz Microwave Link up to the repeater site.

The Microwave link is primarily used for Internet connectivity allowing GB7BS to host all the repeaters that are on the SWC Network. It was (fortunately) quickly found that the existing, second hand, link equipment was not suitable for our linking purposes and so a brand new 5GHz Microwave Link system had to be promptly purchased and installed, more on this later.

So, over a full 12 month period we had to buy a new main site antenna, pay for professional riggers to get it installed, decommission our 2.4GHz link, buy a new 5GHz link and get it installed and commissioned, plus on top of all that – purchase the Motorola DR3000 Repeater for GB7BS.

Obviously this decimated our funds. Fortunately we had some great supporters who rallied around and generously gave donations. Without which would of meant that GB7BS coming on air would have been delayed even further and the possibility that GB3BS would have to shut down while a new antenna and its installation could be funded.

As things stand now, we are recovering, slowly! However, the partial cost of the DR3000 (GB7BS) is still one that has to ultimately be repaid, in what was, and is effectively an interest free loan to the Repeater Group.

As we have said so many times, if it were not for our members, supporters and those that donate money to the repeater group we would not have the repeater systems that we do have. They would cease to exist. While on the subject of “money”, we are sometimes asked by a few if their membership or donation can be for a specific repeater. While to some degree we understand why this maybe preferred, we believe it best that all monies received should go into one “pot” which is then used to support the Group and its running costs as a whole, wherever it’s needed, especially if it’s an emergency such as a main site antenna needed attention or replacing.

However, and unfortunately, there are those who regularly use GB3BS and or GB7BS and now of course, the South West Cluster network, who for what ever reason, or belief they hold, do not contribute or support the repeaters upkeep. Maybe they are not aware of the real costs, maybe they hold some sort of ill will towards repeaters or maybe they just want a freebie after spending hundreds of pounds on a nice new rig or two to work the repeaters! Support is essential to the survival of repeaters.

Please help us by informing those people (especially newcomers to the hobby and repeaters), that use the repeaters and who maybe not aware of our existence and how to support us.



Membership List.

Towards the end of this Newsletter is a list of current members, (as of December 18th, 2015). As we say each year, if your Callsign is **NOT** on this list then your membership has probably lapsed and you will not receive any future Newsletters (*this does not include those who have made donations over the past year*). But please check our web site for an up-to-date membership list.

If you think there is a problem regarding your membership then please do get in touch with us and we will endeavour to check it. Also, **PLEASE** let us know if anything changes such as your Callsign, Name, Address and/or preferred Email address. We aim to email every member a month in advance who's membership is about to expire.

Finally, our sincere thanks to **EVERYONE** who has helped and supported us over the past year, it is very much appreciated. Rest assured that every penny goes into supporting the repeaters upkeep.

Web Pages & Email.

Since the launch of our new look web site, we have made it easier to join or renew your membership. Currently Pay Pal is the most favoured method by people. Over the last eight months we have had to move to a new internet hosting site. This has given us much more room to expand the content of our web site and at the same time improve on things like Pay Pal transactions.

The new web pages should support Mobile Platforms although there have been a few teething problems which are mainly down to

the hosting companies web designer application. Some users who wish to browse our web site via a mobile device may find that going to www.gb7bs.com may provide a better "experience", as they say!

As our web pages are now hosted by a new company we have the opportunity to move over to a secure Https service. We are yet to decide if there is any benefit to us doing so. However, we are considering adding a "Members Only" area where this may be beneficial.

It should be noted that renewing your membership or making a donation via the Pay Pal service already on our web site uses secure and encrypted pages.

We have also had a few problems with Email with some reports that either we have not replied to their email or that it had bounced back to them. We have been aware that there was a problem with our mail forwarding service and that this should now have been fixed.

But if anyone has sent us an email and had it bounced back or has not received a replay within 5 days then do please let us know. Besides sending us email you can of course contact us by using the web based contact form on our web site. Please be assured that we will always respond to any communication that we receive.

Don't forget, we also have a presence on Facebook (www.facebook.com/groups/gb3bs) which is very active and has some of the latest news and comments. And of course we are also on Twitter (<https://twitter.com/gb3bs>).

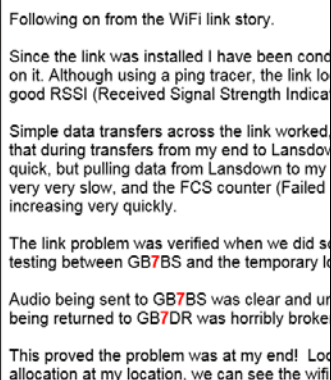
Repeater	CT	CT Freq	Mode	Frequency	Status
GB3BS	CT	118.8Hz	RUGB	430.850MHz	OPERATIONAL
GB7BS	C	Code 3	DVU13	438.1625MHz	OPERATIONAL
MB7VV	—	—	APRS	144.800MHz	OPERATIONAL

Motorway Coverage.
The repeater provides excellent unbroken coverage of the following Motorway network.

- M32 into Bristol.
- M48 Old Severn Bridge crossing.
- M49 Between Avonmouth and Pining.
- M4 West past Cardiff, as far as junction 33 including the A48(M) into Cardiff city.
- M4 East towards Swindon junctions 16 & 15.
- M5 North to the outskirts of Gloucester at junction 12.
- M5 South to Weston-Super-Mare at junction 21.

Towns & Villages with good mobile coverage.
Chippenham, Corsham, Box, Swindon (west), Hullavington, Malmesbury, Sopworth, Cirencester, Charlton, Nailsworth, Cricklade, Calne, Melksham, Sherston, Devizes, Trowbridge, Westbury, Wootton Bassett, Lyneham, Tetbury, Witney, Didmarton, Shepton Mallet, Radstock, Midsomer Norton, Pensford, Ubley, Churchill, Nailsea, Clevedon, Portishead, Magor, Penoylan, Caldicot, Rogiet, Chepstow, Cardiff, Lydney, Berkeley.

Ubiquiti 5GHz Link Installation.



Although previous test proved that there was no faults with the equipment hardware, the noise floor at the “B” end of the link, Matt – G7FBD’s QTH, was too high and the receiver was being swamped with local residential WiFi causing random packet drops.



Fortunately we were given permission to mount the new Dish and supporting steelwork at just over half way up the tower, which had a convenient rest platform to work at where all steelwork could be installed without any need to climb outside of the tower structure itself.



Mark – G4SDR made the ascent carrying the rope, pulley block and tools up to the rest platform. After much panting and catching of breath the now defunct 2.4GHz link equipment was soon unbolted from the tower and lowered to the ground where Matt untied it and then began to assemble the new 5GHz transceiver to the dish and the fitting of the Raydome. Time for Mark to admire the view and record some more video footage of the great ascent!

The new 5GHz transceiver and dish were then carefully hoisted up the tower and landed onto the supporting steelwork. While Mat held the weight with the rope I proceeded to secure and tighten up the steel clamps that held the Dish to the tower mount, so far so good!

The next step was to remove the redundant CAT5 cable used for the old 2.4GHz link from the tower cable run. This was soon done and was used to pull up the new upgraded cable to the new dish position which had already been terminated and tested ready for installation.



Connection to the new dish was made while Mat carried out some checks on the ground to make sure that he could communicate with the new 5GHz transceiver and to confirm the correct channel, Rx noise floor level and Tx power of the link. During this time adjustments to the dish's alignment were made to insure we were firing at the right bearing and down tilt.



All looked good and results were within 1db of our prediction calculations, we were well happy! As the sun started to go down and things by this time were getting really cold it was decided to call it a day. All that was left to do was to secure the new CAT5 cable to the tower cable tray while I descended the tower, after which a much welcome cup of Tea and Biscuits was consumed!

Following some long term soak testing of the link, it returned us an error free service with a data throughput of some 81 Mbits and a 99.1% availability figure. The link itself has a RF TX output power currently set to 2.5mW (4dbm) into a 400mm prime focus dish giving 25 dbi of gain, which overall gives an EIRP of 0.79 Watts (29dbm). The received signal level we are getting (at both ends) is -70dbm. At this signal level we could survive a 24db fade due to weather, ..not bad at all!!

See the full Video of the installation at www.youtube.com/watch?v=awpPXk4-GGw



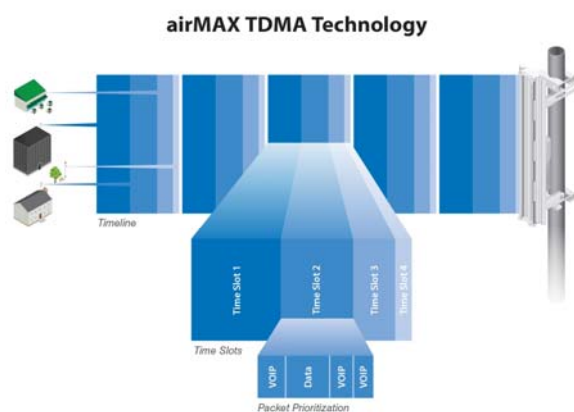
Completed installation of the small 5GHz Dish at the Lansdown Repeater site.

This is known as the “A” End of the Link.



Picture of the 5 GHz Dish on the side of Matt – G7FBD’s house pointing at Lansdown.

This is known as the “B” End of the Link.



Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.



The South West Cluster.

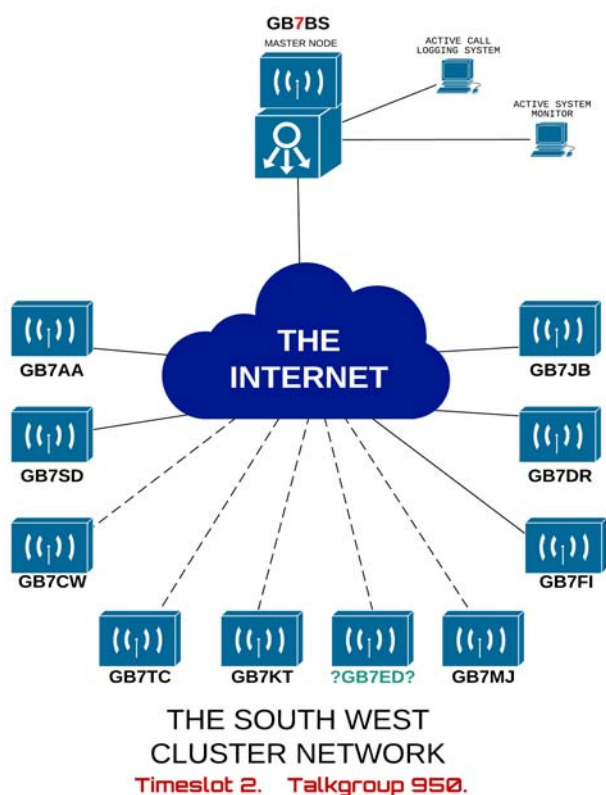
A full 12 months has not yet passed since the South West Cluster (SWC) was born. At the time Tony G4CJZ had GB7AA up and running then shortly after GB7BS came on air after a delay getting the site antenna problems sorted.

With the BS Repeater site now connected with Broad Band we were able to quickly link **GB7AA** and **GB7BS** together, thus forming the SWC. Other repeaters such as **GB7DR**, **GB7SD** & **GB7JB** soon followed over the coming months.

During 2015 more repeaters were planned by other repeater groups to ultimately join the SWC, such as **GB7CW**, **GB7TC**, **GB7KT** and **GB7FI** and still more are in the pipe-line!

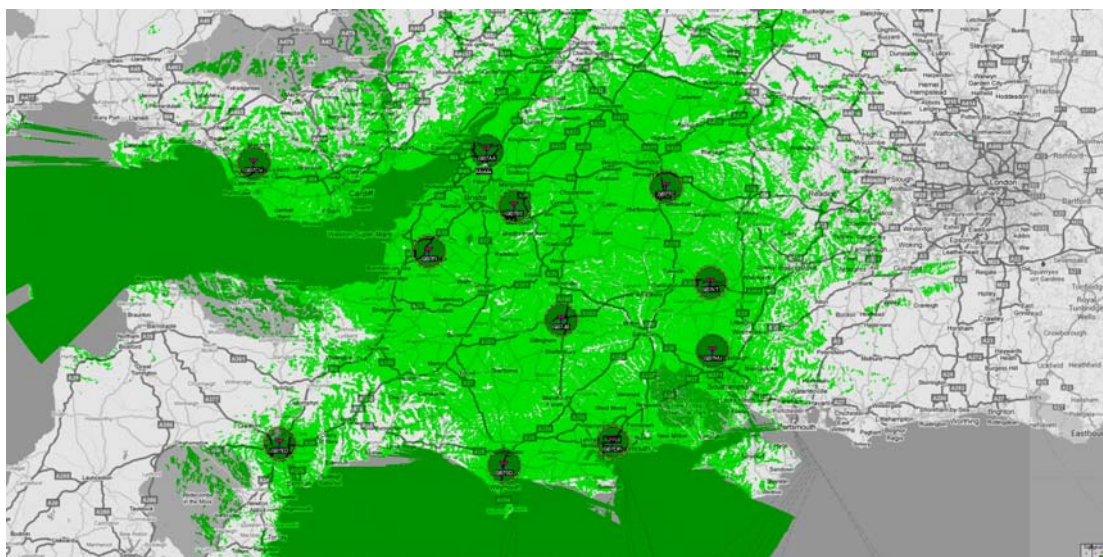
So what about the future?

The future of the SWC is, to a degree, an open book. The current technical restraints of the hardware limit the number of repeaters we can currently manage. This is purely a Motorola limitation and will become an important break point for us if repeater growth on the SWC continues.



DRAWN BY G7FBD/KG7FBD MAT

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Several trains of thought are being investigated as to how we, that is the SWC Repeater Keepers, can expand, if that is what everyone concerned decides. Together with what equipment will be needed to facilitate any expansion, not forgetting potential costs of additional hardware.

One concept we are actively looking at is the installation of a **C-Bridge** which will, basically, take over the full management of all the repeaters on the SWC, allow for additional repeaters to join the SWC beyond that of the Motorola limit and have the potential to route not only Time Slots and Talk Groups within the SWC but to have the additional ability to import and export other or existing Talk Groups to other networks if needed.

Mat – G7FBD is currently talking to the manufactures to determine our exact requirements, its functions, facilities and what hardware we will need. Current information suggests we would set up a master **C-Bridge** at the GB7BS repeater site as it has all the facilities to support it on a 24/7 basis.

Then a second **C-Bridge** will be installed at a different site (yet to be decided), but will probably not be at a repeater site itself, which will take control and act as a hot standby should the main bridge fail for any reason.

Which ever way we go, to expand on what we already have, will mean a basic network change to how all the repeaters are connected to each other. So that is our “potential” future and which has yet to be decided, by all keepers of the SWC.



Monitoring the Mesh!

Within the SWC Network GB7BS is what is termed as the Master repeater. The job of the master is to ensure all repeaters connected to the SWC are allowed to be connected, remain synchronised for roaming and pass network management messages out to all other repeaters.

So the master repeater has a fairly important role, but the beauty of this network is that it is called a “Meshed” network. Briefly speaking, every repeater on the SWC Network knows of all the others, so in the event of one repeater, or more, failing; then the remaining repeaters on the network will continue to function and provide a service.

Should the master repeater, GB7BS, fail for any reason then the SWC will continue to function without it. However, in this situation any new repeaters, or others that have dropped off the network, will themselves not be able to rejoin the Mesh until the master repeater has been restored.

Status	Radio Name	Service	State	Channel Type	IP Site Connect	RX Alarm	TX Alarm	Temp Alarm	AC Power Alarm	Fan Alarm	VSWR Alarm
Green	GB7BS	Master	Enabled	Digital	Slot 1 & Slot 2	Green	Green	Green	Green	Green	Green
Green	GB7AA	Peer	Enabled	Digital	Slot 2	Green	Green	Green	Green	Green	Green
Green	GB7SD	Peer	Enabled	Digital	Slot 2	Green	Green	Green	Green	Green	Green
Green	GB7FI	Peer	Enabled	Digital	Slot 2	Green	Green	Green	Green	Green	Green
Green	GB7DR	Peer	Enabled	Digital	Slot 2	Green	Green	Green	Green	Green	Green
Yellow	GB7JB	Peer	Enabled	Digital	Slot 2	Green	Yellow	Yellow	Yellow	Yellow	Green
Red	GB7CV	Peer	Enabled	Digital	Slot 2	Red	Red	Red	Red	Red	Red
Red	GB7TC	Peer	Enabled	Digital	Slot 2	Red	Red	Red	Red	Red	Red
Red	GB7KT	Peer	Enabled	Digital	Slot 2	Red	Red	Red	Red	Red	Red
Red	GB7MJ	Peer	Enabled	Digital	Slot 2	Red	Red	Red	Red	Red	Red

The SWC also has a facility to monitor individual repeaters connected to it and their health. This checks and monitors for any events ranging from a high VSWR to the cooling fans have a problem.

If any serious problems arise then we do our best to inform the Repeater Keeper as soon as we can. Likewise, if you spot anything then contact the Repeater Group responsible, I am sure they will be grateful to know of any issues.

The other tool is the logging of all call data (Meta data) made either through individual repeaters or via the SWC. The logs contain all the usual information you would expect, like what ID made a Group Call and on which repeater did the call come in on and at what time etc etc.

This is especially useful to identify problems, such as incorrect or duplicate ID's operating on the system. Or frequent users using the wrong Talk Group or Time Slot.

If, for example, a persistent user is using a duplicate ID or a wrong ID then this can be blocked by the system until such time as it's resolved.

Some of this is semi-automated but there is no person actively monitoring all this on a 24/7 basis, we all have other things to do. However, the logs are routinely looked at for any problems that get highlighted or if any issues are reported to us.

Users should remember, this is Amateur Radio, and as such if faults or problems do occur then please be patient. Sometimes a fix or a repair may take hours, days or weeks even; it depends on that repeater group's man power and spare time to rectify problems.

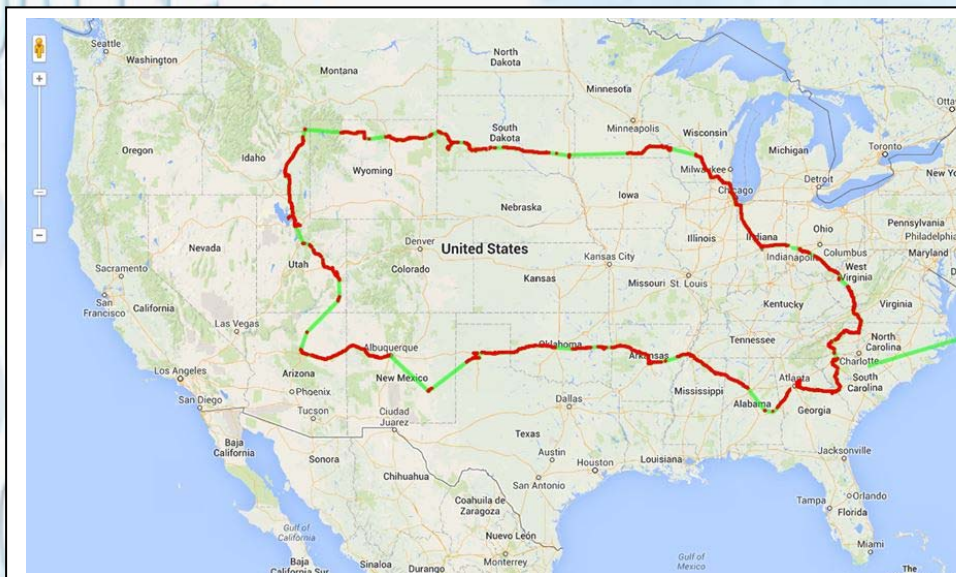
MB7VV? what's that?

In the early part of 2014, possibly as a result of the planned launch of a DIGITAL repeater (GB7BS) I found myself reviving my interests in Packet Radio, or more specifically the AX25 Protocol set. I am not sure how many of you, if any, remember I used to operate in the early 90's G5FS-2 (Europa) a packet repeater based at Brunel Technical College (as it was called then) and YES that is the same G5FS as I now operate as for my contesting interests, but that's a whole different conversation.

This is where my interests in the method of sending digital data via radio grew. For a short while I ran a packet BBS system, however by the end of the 90's packet radio was all but dead with the launch of home broadband. Although there were a few people out there to try to keep this mode operating.

As I was first mentioning, in the early part of 2014 my interests were aroused again with the planning of GB7BS. While driving to work in the mornings using GB3BS, the conversation mentioned positional information of a few of the participants to the net. I learned this reporting system was called APRS (Automatic Position Reporting System). At first, the simplest way to get involved with APRS was a APP on your smart phone, it used the GPS system in the phone to gather your position, it would then (using your phone data connection) transmit this information to a central server which would then show your position graphically on a freely accessible map resource on the internet. As I investigated APRS further I quickly learned that it was not just bound to a mobile phone, in fact the mobile phone solution had come along way after the primary application APRS used, that of AX25 or packet based radio (sounds familiar?).

After a lot more research into this (APRS) implementation, I found how big its usage was. Not just in Bristol, but throughout the UK and the world. On my trip to the USA in May 2014 for example I used the phone based APRS to track my transit around the states. At one stage I understand I was being tracked back here in Bristol. The map shown is an actual screenshot from the free to use internet resource showing my path around the USA.



By July 2014 I had dug out my old packet radio terminals (post GB7FBD). These were in a very sorry state; they had been stored since 1996 and mostly had been forgotten about and a few parts robbed for other projects. One had been badly stripped of parts (my definition of a few parts eh?), the other's Lithium battery had leaked over the PCB and had badly damaged it (Basically re-etched the circuit board for me). I basically ended up stripping any useful parts of the two units as they were way passed the point of trying to fix them.

I had already been in conversation with Mark G8PKY who was already running a APRS repeater system MB7UFP. He was using a Polish designed all in one packet repeater system, all he had to do is add power and a radio.



That was the next step in the birth of MB7VV. I purchased one of these WX3IN1 boxes, and on the bench it's fantastic! It does everything. It is programmable from both the USB connector and the built in Ethernet connector. It supports weather stations, temperature probes and is able to measure its own supply voltages. It also has a built-in web service that allows you to forward information on to other nodes and servers using the internet. It also allows data to flow from the internet into the unit and onwards to the RF. Of course it is also an APRS R.F. repeater!

After a conversation with Mark about the possibilities of me installing a APRS repeater at the GB3/7BS repeater site where we both explored both the positives and a couple of negatives of installing it on site, eventually it was agreed. One of the negatives I took away was housing, where were we going to put it. I contacted the company who helped us with the rack for GB3BS, and was grateful they offered to donate a 42u rack. The problem was they were not working in the area and could not deliver it. BUT if we wanted to collect it we were more than welcome too, from there head office.

That was the housing sorted out, next it was building the solution from an interconnected "lump" on my bench to something I could rack mount and integrate into the Lansdown site.

I purchased a 19" shelf, some aluminium bars, and machine screws. Mark G4SDR donated a Motorola GM360 2M Mobile radio and a Tait Power supply (The same type we use with GB3BS). I built a racking frame to mount the Power supply into, so it can be removed and replaced if needed. I also built a small interface box so I could transformer isolate the audio between the Rig and the WX3IN1. Mounting the radio and the modem were fairly simple. When I created the power loom I installed a 5 way Power Pole home brew connector block. This allowed me to connect everything simply into the DC power supply and making it ultimately easy to replace if I needed to.



Checking potential coverage predictions it was clear, if I put a 2m Co-linear on the tower it would create coverage WAY too big an area and could cause potential problems with the existing APRS network.

Calculations were then produced with the antenna 4m off the ground. This produced a more realistic and required coverage area. I then proceeded to purchase an antenna, coax and TK brackets.

Mark G4SDR was kind enough to help fit the antenna and feeder run. Although being hit in the head by a large power drill that was used to drill the fixings, when it became jammed, did slow the installation. (Thankfully the drill was okay).



Once the new rack was installed at site MB7VV was installed. After some testing to make sure everything was in order, it was connected to the internet and was activated.

MB7VV is now operational as an APRS repeater. Unfortunately it is restricted by its licence terms not to relay internet traffic onto the RF network. However there is no such restriction on the reception of RF traffic and then forward that traffic onto the internet. MB7VV receives RF traffic, analyses it and evaluates if the received data needs to be simply repeated back out on the RF network, if it should be repeated onto the internet or simply the received packet has already been forward by the internet or by RF in this case it just ignores it and effectively drops the packet.

So this is MB7VV. It has no connection to the repeater group, other than it is located at Lansdown. It has not been funded in anyway by the repeater group. But it does keep my interest in AX25 alive and does provide an interesting service to Amateur Radio stations as they transit through the coverage area. Talking of coverage area, APRS is actually a pro-active dynamic system. Even though a mobile station maybe less than a mile away from MB7VV it might not be VV that processes the radio traffic, if another station receives and processes the APRS data before VV then VV realises this and ignores the traffic, likewise, if the station is near another repeater, it might be VV that processes the packets first. It all depends on quality of data received, and evaluations if the data received is a duplicate.

The actual mechanics behind AX25 is a subject in its own right as well as the technical background on APRS. I am under the impression that in 2016 a technical talk will be taking place at North Bristol ARC.



The late night trip to Hemel Hempstead.

Almost forgot about this. Well it was a bit strange, two men, a dark transit van and a DMR radio.

Due to my late arrival home from my old day job (no longer working for that bunch) we were late leaving Bristol. A fairly straight forward drive up to Hemel Hempstead, although at night a city which I thought I knew from my time installing a Laser Game test site in looked completely different than it did in daylight.

When we finally arrived (According to the GPS) on a dark quiet country road with no lights on, finding the gateway to the business estate took a couple of U – Turns and re-tracing our path. Finally we found the place. It too was dimly lit, but true to their word, outside the Industrial Unit stood a 42U cabinet.

Thankfully it was simple enough to disassemble and carefully load into the van. It would have looked so dodgy to anyone observing us. Soon as I text my contact in the company (the Director) we were on our way back home. The following evening we delivered the cabinet to Lansdown.

I forgot to mention on route we did try to call into the DMR-Marc network while going around the M25. I know for sure my radio is programmed correctly but the QSO already on the net reported it as "Cross Talk" from the south west cluster. I guess that's one problem with having a Bristolian accent. But to be honest the QSO was really thrilling.

This years Rally Visits.

Again this year The Bristol 70cms Repeater Group was invited along to a couple of rallies in our region. The first was the "WEST RALLY" at the cheese and grain in Frome. A lot of the visitors to our stand were mostly interested in asking questions about the South West Cluster and how to program their radios. On reflection I think this may have been a result of Robbie (who's call escapes me being present) and selling DMR radios at



the rally. I guess people were buying them and then making a B line for the repeater groups as it was a roaring time for all the Repeater Groups. A Big thank you to those who renewed their membership at Frome and also to those who, although they did not want to become a member of the group, did want to show their support for us by making a donation!

The second rally (once we found it) was the Neston Micro Rally. Again a good turn out and lots of people asking us about DMR and how to program their radios.

I think this may again had something to do with Robbie as he was present too :). What do I mean by "Once we found it" Well, it was a WHOLE year since I last attended and I am sure they moved the roads around! .



Both Mark and I enjoyed both Rallies and our thanks go to the organisers!! Well done guys!



The Sunday Net (part 1)

North Bristol A.R.C. hold a 'open house' net on a Sunday evening from 19:00 – 20:00. It is an **Everyone is welcome** event and not just for NBARC club members. The Goal is to build activity on 70cms, as well as provide a means for new licence holders to gain experience. So whatever you're level feel free to come and join in

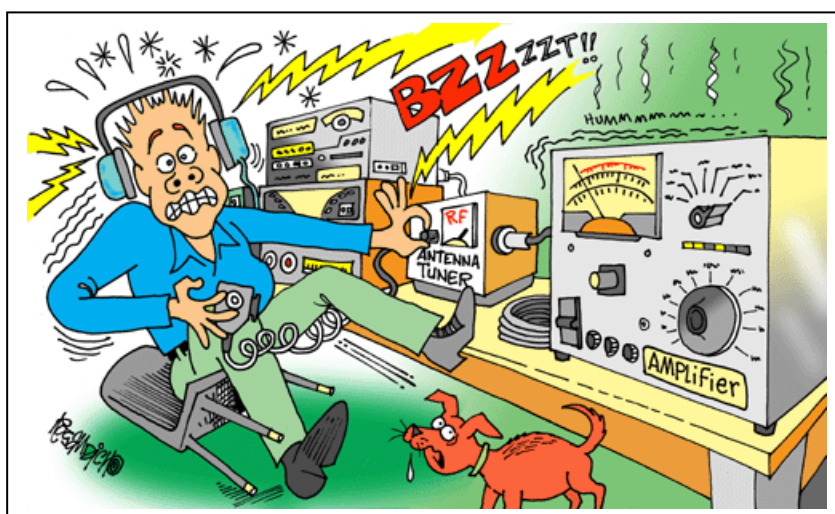
Similar to NBARC Sunday net. G7FBD has been busy drumming up the Cluster Keepers to form a Sunday DMR net, nick named. The 950net. Unlike DMR-Marc's Monday net, we are not approaching this like a military operation. There is not going to be



a Roll Call at the start, but there will be plenty of gaps to allow new participants to call in to the net, or indeed leave the net. The format is loosely based on the success of the NBARC format. Which a chair person who controls the net, and a central point for operators to hand back to, this saves lots and lots of problems. The subject matter will be fully open, but must comply to the terms of our licences :).

As yet a start time has not been put in place as it is still at an advanced planning stage, but it is hoped to get the word out via social media and via the cluster itself, so there will be plenty of notice. Again this idea is to encourage a more active cluster and get people on the band at the same time as it has been noted by several people (keepers and users) that people put a call out several times, do not get a reply and QSY. Then most of the time, someone else does the same thing within seconds. But the first station has already gone! This at times is quite amusing, but I know it's frustrating for those who expect to be able to talk to someone.

So that the 950net. Coming soon (ish) I hope!



The next couple of pages are a re-print of last years DMR terminology guide, as we know there are some new members to the repeater group who may not have seen this, so your eyes are not deceiving you, you may have already seen this before.

Abbreviations and Qualifiers used within DMR technology.

All Call – This has a fixed ID of 16777215 (value is not editable). Similar to a Group Call.

BER – Bit Error Rate. Indicates the quality of the bit stream.
Eg. 1×10^6 is better than 1×10^3 bit errors.

Call ID – See Radio ID.

Code Plug – (*Motorola*) A CPS file that contains all the programmable variables and channels for a radio.

Colour Code – Is analogous to the sub-audible tones (CTCSS) used by analogue radios.
Value 0 to 15.

CPS – Customer Programming Software.

Downlink – The radio path between the Repeater and a mobile station.

Group – A dynamic area set aside for radio's who all wish to communicate with each other.

Group Call – A transmission made to either start a new Group or join an existing one.

Group Call Hang Time – The time a radio keeps the current Group active.
(Should be set the same as Repeater timer).

Group ID – The number given to a Group.

ID Range – 1 to 16776415.

Impolite Transmission – Allow a mobile to Transmit at any time, even if someone is already talking.

LBT – Listen Before Transmit. An automatic check to see if a mobile is in range of a repeater, if configured to do so.

Over-The-Air-Programming – Allows the radio to be re-programmed remotely.

Point 2 Point – A private radio conversation between 2 radios.

Polite Transmission – The mobile station will only be allowed to transmit when the active Talk Group is free.

Private Call – A private radio conversation between 2 or more radios.

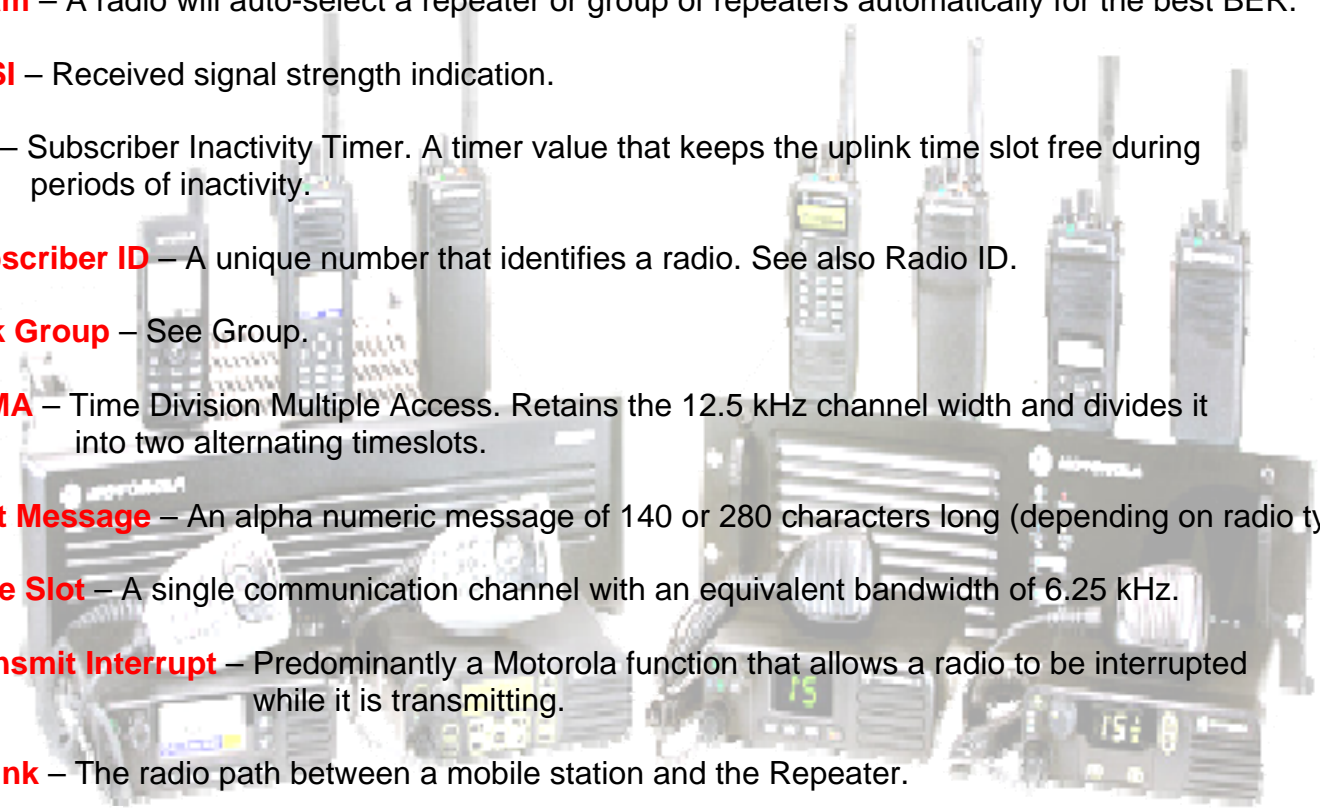
Radio Check – Silently check to see if a radio is currently switched on and subscribed to a repeater or network.

Radio ID – Sets an individual ID that uniquely identifies the radio. This ID is used by other calling radios when addressing the radio.

Radio Inhibit – Remotely inhibit a radio from working.

Radio Name – The name of the radio (alpha numeric entry). Eg: "My Radio".

Abbreviations and Qualifiers used within DMR technology.

- 
- Receive Group** – A single Group or multiple Groups that can be simultaneously monitored.
- Roam** – A radio will auto-select a repeater or group of repeaters automatically for the best BER.
- RSSI** – Received signal strength indication.
- SIT** – Subscriber Inactivity Timer. A timer value that keeps the uplink time slot free during periods of inactivity.
- Subscriber ID** – A unique number that identifies a radio. See also Radio ID.
- Talk Group** – See Group.
- TDMA** – Time Division Multiple Access. Retains the 12.5 kHz channel width and divides it into two alternating timeslots.
- Text Message** – An alpha numeric message of 140 or 280 characters long (depending on radio type).
- Time Slot** – A single communication channel with an equivalent bandwidth of 6.25 kHz.
- Transmit Interrupt** – Predominantly a Motorola function that allows a radio to be interrupted while it is transmitting.
- Uplink** – The radio path between a mobile station and the Repeater.
- Zone** – A group of RF memory channels that maybe scanned.
Can be a mixture of either Analogue or Digital.

Well, this is the end of this, our first electronic edition of our newsletter.

We hope you have enjoyed it.

If you have got any comments about this Newsletter or indeed anything related to the Repeater Group, good or bad, we would like to hear from you.

Please email us at info@gb7bs.com or use the web mail form on our “Contact Us” page at our main web site www.gb3bs.co.uk.

All that is left for us to say is, please have a relaxing and safe Christmas and a Happy New Year from the Bristol 70cms Repeater Group and lets all look forward to some great activity on the Repeaters.

See you in the 2016 edition.



Membership as of the 18th December 2015.

2E0BKS	G1FUA	G4OJI	G7KNA	M0HBT	M0WYB	M6MGE
2E0EOL	G2BAR	G4OTJ	G7NSY	M0HDJ	M0XMM	M6OJI
2E0JWJ	G3LZN	G4SDR	G8CKK	M0HTB	M1BGB	M6ZSY
2E0PGS	G3XED	G4SNU	G8NQO	M0KEE	M1CWA	MW6DWA
2E0ZAW	G3XOB	G4TAH	G8PKY	M0LHS	M3IZB	
G0ECM	G4EJH	G6GVH	G8YMM	M0LJT	M6BJL	
G0GRI	G4HCW	G6LLP	GW1MCD	M0MGT	M6FUA	
G0GZW	G4JQX	G7BYN	GW4GUG	M0MSZ	M6GFM	
G0RMA	G4KUQ	G7FBD	M0AKF	M0PRJ	M6IOK	
G0XAY	G4MCQ	G7ITD	M0GTT	M0TPW	M6LFA	
Membership about to expire						

Please check our web site www.gb3bs.co.uk for an up-to-date list.

MUGS FOR SALE

If anyone is interested, we now have a VERY limited stock of ONE OFF GB7BS Mugs. Never to be re-produced!

If you would like to own one and relax like the Repeater Group with a cup of Tea and a Biscuit.

Then please email info@gb7bs.com with the subject YOU MUG.
(All profits go to supporting the Repeater Group).

The Cost is £13.49 including P&P

THEY ARE A ONE OFF DESIGN!



THE BRISTOL 70cms REPEATER GROUP.

GB3BS GB7BS

Website: www.gb3bs.co.uk Email: info@gb3bs.co.uk

If you use the Repeaters, GB3BS or GB7BS and would like to support the group then all you need to do is fill out this form and part with £8.00p. Your details and membership fee will then be passed to our treasurer. You can also subscribe using Paypal™ (also supports Credit/Debit card payment). See “Membership” on our website for detail. 100% of your membership goes towards looking after both repeaters and the site in which they are located.

PLEASE REMEMBER

Repeaters do cost money to run.

Without members the repeaters GB3BS and GB7BS would cease to exist.

Please help support what you use.

Please make cheques payable to “Bristol 70cms Repeater Group”



Please tick appropriate boxes and print clearly – Thank you.

☐

£8.00 Membership

☐

Donation Amount £_____

I am paying by **CHEQUE / CASH** Please delete the appropriate.

Callsign: _____

Email: _____

Name: _____

Address: _____

Postcode _____

Please email info@gb3bs.co.uk for postal address details to send in your subscription if paying by Cheque.

PLEASE NOTE: Membership is based on a yearly subscription (from the date processed). Although we can process advance yearly membership we would discourage this method. At present we DO NOT have a “Family” membership, or any other concessions. Please also note ALL membership fees and donations are NON refundable. We recommend you do not send cash through the postal system. The Bristol 70cms Repeater Group cannot be held responsible for lost or missing payments. Being listed on our website is conformation of membership. No receipts are issued unless a stamped address envelope has been provided. Membership is used for the upkeep of BOTH Repeaters.

Any information/data provided will ONLY be used to mail or email you our newsletter and send membership reminders. Data will be deleted 6 Months after the laps of any membership. Reminders of pending membership laps will be sent via email where possible one month before the expiration date. The membership section of our website also reflects this information.