

# THE BRISTOL 70cms REPEATER GROUP

## GB3BS & GB7BS

### NEWSLETTER 2018

RU68 - 430.850MHz - TONE J: 118.8Hz.

DVU13 - 439.6126MHz - Colour Code 3.

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Welcome to the 2018 Bristol 70cms Repeater Group Newsletter, or as Mark and I call it, 'the Newsletter'

As I write this introduction I have episode 12 ("The Psychobombs") of the 1970's Sci-fi show UFO on in the background, and a steady stream of job alerts popping into my email in-box. Yep the long awaited termination of my job has finally happened and the job search is well under way.

Why am I sharing this with you? Well it's probably the most exciting thing that has happened this year, except for a recent loss of internet connectivity to the site (more on that further down).

No seriously, the repeaters have all been performing very well this year with minimal onsite time and maintenance work. This does lead to a slightly shorter Newsletter, sorry about this. *(This is actually not so true now as we have updated the update on the microwave link – see Stop Press - Ed)*

We do have the normal technical reports of all the repeaters as per normal and a roundup of other work and items from the world of The Bristol 70cms Repeater Group.

We (the Repeater Group) would also like to welcome both new and returning members who have chosen to support the repeater and thank-you to everyone who help to keep the repeaters on the air.

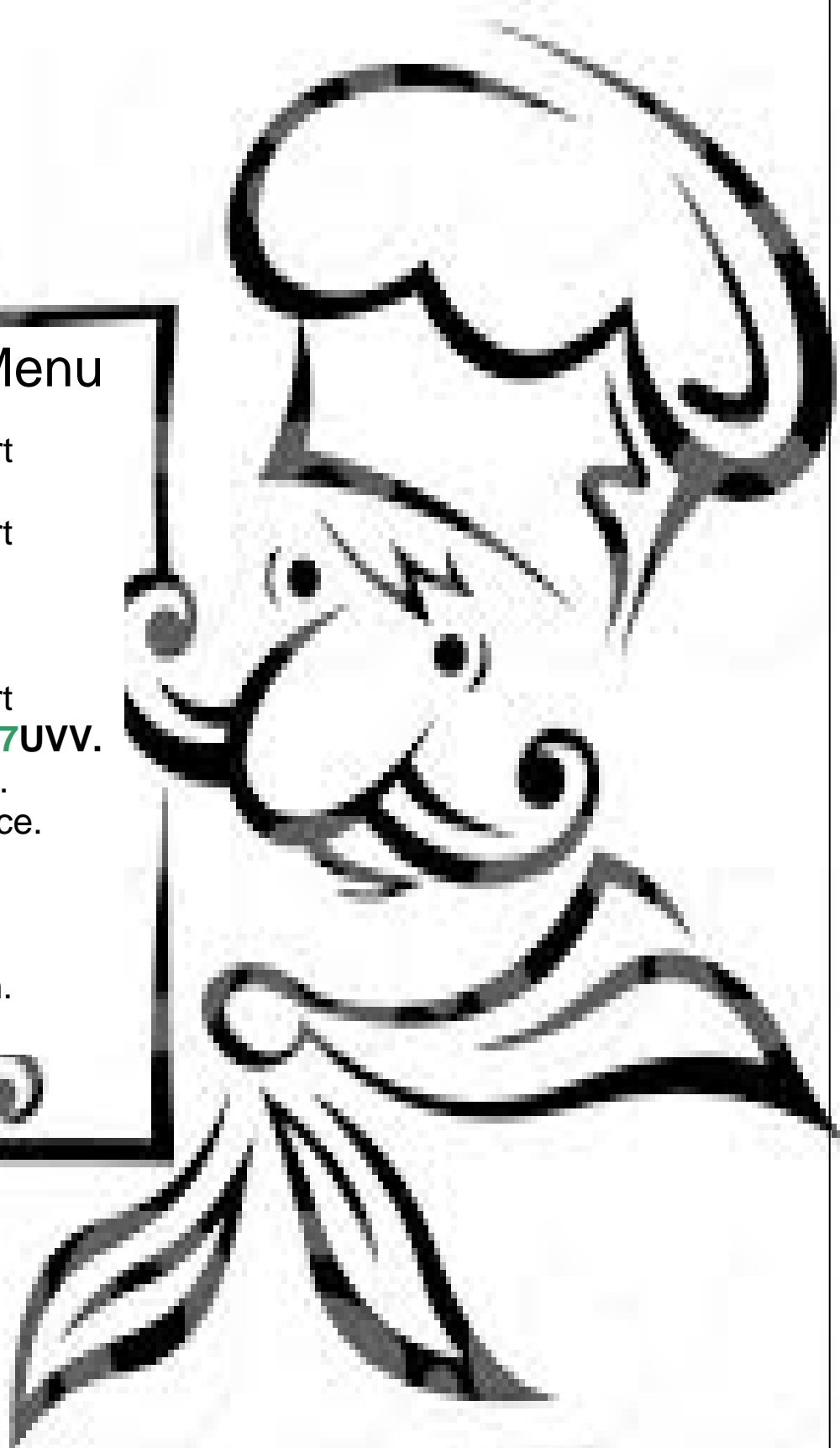
For those who have just lapsed or who openly choose not to support the repeaters, then we request that you are NOT one of the ones who complain the hobby is in decline!

Mat

G7FBD/KG7FBD

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# GB3BS Technical Report.

Greetings all. Here we are with another year almost gone.

GB3BS has remained fully operational and without any down time that I can remember during 2017/2018, apart from the odd (famous) logic crash, which has now been fixed, more on this from Mat later.

## RC210 Repeater Controller.

As we mentioned in last year's newsletter, the Arcom RC210 Repeater Controller has had a processor makeover by the manufacturer. In short, the processor itself has become end-of-life and has been replaced with a new directly compatible package.

This new processor has more memory, is faster and expands the functionality of the Repeater Controller.



However, configuration files have to be rewritten for the new processor as Macro function calls have been rearrange so as to make room for the additional functions.

We have purchased two new processors to replace the two we currently use, one for the main operational controller and the second for the standby Controller. At this time our standby Controller has been upgraded to use the new processor and has had the configuration file converted and modified to the new processors macro call list. This work is about 90% complete with only a few changes to be made. So far, testing of the new processor and the new configuration file has been successful. All that now remains to be done is a few tweaks to the macro calls, setting up of the audio levels and some bench simulation testing.

Once testing has been completed we will swap over the Repeater Controller on site for this new one. Users should not see any changes and repeater functions will remain as they are now.

If all goes to plan the old Controller will undergo its own makeover and have the new processor installed. Once this has been completed it will then become the standby Controller.

It is hoped that this work will be completed within the next 3 to 4 months, time permitting of course. This work is important to GB3BS and will ensure that the Repeater Controllers we have are semi future proof and that they will be compatible with any future software updates by the manufactures, Arcom.

### **Remote Access.**

Last year we implemented a facility to fully control and program the RC210 Repeater Controller remotely. This has saved us a lot of time and trips to site, especially when the Controller would crash on occasions!

This facility has proved very successful and can be operated from anywhere via the Internet and by using a suitable App via a smart phone.

Remote control also allows similar control and monitoring of GB7BS and MB7VV. Additional plans are maybe to allow remote control of the on site generator, but this does need investigating a bit further due to health & safety considerations.

Other features may include automatic reporting by way of email, text messaging etc of problems, alarms and faults with equipment on site. We have the facilities to do this sort of thing but we often ask ourselves "how far do we go with it".

### **GB3BS Maintenance.**

During July of 2018 GB3BS underwent a full check-over and maintenance.

As in previous years, only a few minor tweaks were necessary on GB3BS. The equipment is so reliable & stable it requires very little maintenance (famous last words). But I have found that it makes good sense to keep checks on it and not to become complacent, prevention being better than cure, as they say!

Standby back-up batteries were tested and float charge levels checked, all seems good and would provide around 5 to 6 hours of use should the sites generator fail to start.

The antenna duplexing system has also been checked. Remember, this handles both the Tx/Rx duplexing for both GB3BS & GB7BS so that they both can make simultaneous use of the main antenna.

I was expecting to see some small changes in the tuning of the cavities due to site temperature changes over the year, but was pleasantly surprised that there was very little. Bearing in mind that the sites room temperature can range from around 6 degrees in the winter and go to 30 plus degrees in the summer months.

One of our outstanding little jobs is to install an extractor fan so that air within the equipment room can circulate better and extract the sometimes very warm air. Currently there is no such system and so there is nowhere for the warm room air to be circulated, apart from the odd air brick.

## **CTCSS, Pip's & Timeout Timer.**

### **CTCSS & Pip's**

This is always a favourite topic for the Newsletter. It should be remembered that the repeater can **ONLY** be accessed using CTCSS. The older method of using a Tone Burst of 1750Hz has been permanently disabled on the repeater.

The CTCSS tone must be present during normal transmissions through the repeater. On GB3BS there are two methods of monitoring the quality of incoming signal. The first and obvious one is the Squelch level. The second and slightly more important one is the CTCSS decoder.

The repeater will continually monitor both Squelch & CTCSS quality. Usually, on mobile stations, it is the CTCSS decoder that will signal to the Repeater Controller that the quality of the CTCSS Tone is becoming poor as the mobile station becomes weaker or is suffering "mobile flutter", but the station may still be above the Squelch threshold.

The difference between these two points (Squelch & CTCSS) have been set to be very close together. Loss of CTCSS will immediately mute the through audio and delay the repeater in sending the first "pip". Usually the Squelch gate will shut very close behind and thus allow the Controller to send the customary "pip".

So, it is important that any CTCSS Tone is being sent correctly. The Tone should obviously be set to 118.8 Hz, but more importantly the Tone level should be set as close as can be to the following:-

Tone freq: 118.8 Hz

Tone distortion: <2.5 %

Tone frequency error: Minimum +/- 2Hz, Maximum +/- 4Hz.

Max Deviation: 500Hz.

### **Timeout Timer.**

The Repeaters Time Out timer is normally set for 4 minutes. However, due to the GPS Clock issue we had, this timer would at times get overwritten to a random value, and when things got really bad, the Repeater Controller would crash, big time, and we have all heard that!



I can now report that since the GPS Clock overwriting of the Controller's memory problem has been permanently fixed, the Repeaters Time Out period is now securely fixed at 4 minutes.

Remember, you must wait for the Second Pip to ensure the Time Out timer has been reset; otherwise you are sure to time out.

## GB7BS Technical Report.

The Repeater GB7BS has been operational throughout the past year without any down time apart from a maintenance check. Being a commercial piece of repeater equipment I should not expect anything less!

Repeater activity has grown during the past 12 months as more stations take up DMR. This take up has certainly had an impact on the South West Cluster, Slot 2, Talk Group 950 which has been great to see.



### GB7BS Maintenance.

Just like GB3BS, GB7BS was given a maintenance check to ensure everything was running as it should.

The DMR Repeater is a Motorola DR3000 and as such does not need much attention;-

it just gets on with the job! Besides, there is very little to adjust, mostly it's just a frequency and power check and cleaning the cooling fan filters. With the DMR Repeater there are no audio levels to adjust or check.

The backup battery was also checked. This battery keeps the Repeater operational for around 5 or 6 hours should the site generator fail to start during a mains failure.

The antenna diplexing system was also checked as it forms part of the combining of both GB3BS & GB7BS (as described above) so that they can make use of the single antenna on the tower.

# The Southwest Cluster.

There are signs that the DMR Boom (as it were) is slowing. Even the world-wide networks are suffering from growing periods of inactivity and with some users being put off by the programming of radio's, the growing complexity and rules to correctly make use of the many Talk Groups, it's probably not surprising.

This, to a degree, is why the SWC is sometimes preferred as there are no complicated Talk Groups to negotiate, Rules on switching Talk Groups and limits to talk time. The SWC also supports full Roaming abilities.

The South West Cluster (SWC) has been working away very successfully for the past year and we have seen activity slowly growing, but there is still plenty of room for growth.

Our most annoying issue is usually with the back haul links to the Repeaters, 'the Internet'. Several of the repeaters make use of 3G/4G Modems and these seem to give the most problems, usually down to, in some cases, poor 3G or 4G signals.

The last year has seen a few changes. GB7JB has moved site and is connected to a stable mains supply and has moved its Internet connection over to a hard wired ISP rather than a 3G/4G Modem. This has much improved its reliability.

**GB7AA** has been working without any issues. There have been the occasional "peering" issue where it will only relay stations using GB7BS, or, at times, other random SWC Repeaters. We are attempting to investigate this issue further.

**GB7DR's** Internet connectivity through a commercial IT Firewall & network has been working without any issues since Jon G7ICH liaised with the companies IT staff on site to get us a proper un-restricted Internet feed.

**GB7SD** has unfortunately encountered problems with its tower. Severe damage was caused to the tower by a third party. As a result of this damage the antennas for the repeater are much lower and pointing at a different angle than originally. Consequently this has dramatically affected coverage.

However, we understand that repairs/replacement will be undertaken in due course.

We have also heard that the Internet feed for the Repeater will be moved over from a 3G/4G Modem to a microwave link and then into a fixed IT network. This hopefully will also improve connectivity to the SWC.

**GB7KT** has been working extremely well with only a few brief outages caused by mains failures at site. Like with GB7DR, its Internet feed was linked into the companies IT infrastructure with the help of their IT staff and has proved to be very reliable.

**GB7MJ** remains in Standalone Mode at this time. As far as we understand, it is awaiting an equipment change to a Motorola DR3000 and a Internet feed into the site owners IT system. Thereafter it should be connected to the SWC.

**GB7YS** in Yeovil has had several issues, which started when it lost the site at Yeovil College due to health & safety issues regarding the building.

Dave G3ZXX was very quick to find a new site and only a short distance away. Site predictions also looked good. GB7YS became operational from the new site for a relatively short time and was plagued with an intermittent Internet feed. This required a lot of time by Dave attending site to investigate and apply several changes with the site owner's permission.

Unfortunately this site was also lost due to non-technical issues.

Currently GB7YS is off air while Dave G3ZXX investigates a new site. I am in no doubt that one will be found and the Repeater back on the SWC before too long.

**GB7SP** is a new Repeater located on Salisbury Hospital and probably by the time you read this it will be operational. I have heard that the intention is for this repeater to join the SWC. We of course welcome them, should they wish to do so. The Repeaters details are as follows:-

Output frequency: 439.7500 MHz  
Input Frequency: 430.7500 MHz  
Colour Code: 3

The keeper for GB7SP is Frank G8PCB.

Please remember that the SWC group of repeaters have always agreed that repeaters are free to leave the network at any time, it is always their decision.

As I have said before, I do try to keep people informed as to what is going on and this is usually done through our groups Facebook page,  
[www.facebook.com/groups/gb3bs](http://www.facebook.com/groups/gb3bs).

Please feel free to join the group as it is a quick and easy way to keep informed or for you to comment on things.

It should be remembered that the Bristol 70cms Repeater Group is only directly involved with the repeaters GB3BS & GB7BS along with MB7VV.



If anyone has a question or a report about any of the other repeaters on the SWC then do please contact the relevant repeater Group/Keeper.

As a last resort we will do our best to answer your questions or put you in contact with the respective group. Please use our "Contact Us" page on the GB3BS web site.

A reminder to everyone that there is a DMR Net on most Saturday evenings on TG950 between 19:00 and 20:00 local. This net has no formal format, and is a good chance to natter and dare I say it, ask technical questions (Not always DMR related!). The regularity of the net does give newbie's, or people wanting to check their radios or even their code plugs a chance to "join and have a go". You will not be chastised for having or doing something wrong. Although problems are pointed out! so please do not be offended by the help or advice offered.

The Andover club also hold a net on TG950 starting at 20:00. This net is open to all, and is held on the second Tuesday of the Month (and Tuesdays when there is no club meeting). For more information check <http://www.arac.org.uk/index.html>



## Technical report MB7VV & MB7UVV.

Both MB7VV and MB7UVV (the evil twins) continue to be available as normal. Although MB7VV was rebooted on the 24th October as part of chasing a strange lag I was seeing between VV and UVV. Unfortunately I never got to the bottom of it. The reboot did not fix the issue. I don't believe there was a ISP issue as both units share a common connection to the internet. So, the only thing left is the APRS internet service itself. The fault cleared within about 6hrs of me noticing it without a further intervention.

Other than the occasional loss of power here at Mat HQ (Yes. this year our old friend the Brownout has returned) no other issues exist.

Oh, I had the now normal rubbish to go through at the very end of last year, and have experience problems with the ETCC renewing the NoV for the boxes this year. It appears that we, as amateurs are not capable of calculating and then quoting EIRP, driving their new online form system, or able to identify to them that M6LFA is indeed over the age of 18. I will leave it there as I know I am not alone facing these kinds of issues.

# Retiming 'Time'.

It's been just over 11 years since the very first GPS Clock was attached to GB3BS. The 'MK I' was a vero-board construction using an off the shelf GPS module and some basic 'C' code on a PIC16C84. This provided raw UTC updates once an hour to re-synchronise the repeaters own internal clock. It was simple but it worked!

However, (and I accept this) it caused a number of complaints from users of the repeater, as time updates were transmitted in UTC and not in local time. This was simply because the first iteration of the software on the processor was basic, mainly because I am not a programmer and my argument at the time was that we use UTC on our logs so why not via a repeater?

By the time we moved to Lansdown in 2009, I had developed a full PCB for the clock, moved to a relatively more powerful microprocessor and re-wrote the firmware. This new clock 'The MK II' offered more updates per-hour, Date information and tracking of daylight saving time. The latter meant that GB3BS could transmit local time, tracking automatically between UTC and BST. It could also cope with leap years.

There was one thing that the RC210 had been doing from day one, and that was at very random times it would simply lock up and do some very strange things (Those who have heard it will know of the repeated time out alerts).

Initially as the random crashes we experienced while at Cosham were put down to unstable (documented) firmware releases. Something the repeater group and Arcom (the manufacture of the repeater logic) worked on very hard as we were one of the first groups in the UK to adopt the RC210 logic.

Credit to Ken from Arcom, he did work on Bugs and issues we found with the firmware and the quirks that were unique to the UK market. Concept of timeouts being something that jumps to mind.

Shortly after moving to Lansdown a major firmware update from Arcom was issued. Initially this fixed a high number of the Bugs we had been reporting. But randomly (although appearing to be more towards the start of the month) the repeater would lock up and crash, needing a site visit and the configuration loading back onto the logic. A major scratching of head event.

We continued to work with Ken, reporting these crashes. A few late night calls to Oregon (USA) were made. Other bugs came to light but not the constant crashing.

It was initially thought the clock might be dropping data randomly causing rubbish to be sent to the Repeater. A simple wire tap on the RS232 communications line,

feeding the data into a simple DOS script that dumped the data transmissions into a text file. This generated a months worth of logs, showing every transmission from the clock to the repeater. No data loss was noted, so the clock was ruled out at this point. Yet the crashes continued.

In the meantime I developed the 'MKIII' clock (see [www.technoloya.co.uk](http://www.technoloya.co.uk)) which was a dabble into the commercial world to see if there was interest.

The first two queries made (both from the USA) were positive, and I shipped two clocks at cost as samples. The feedback was positive generally. One of the cases got cracked in transit. Both were connected to repeaters in the US, and as far as I am aware are still in production. The 'Mk III' clock hardware is a re-design of the 'MK II', the major change was a move to Surface Mount components to reduce the size of the PCB and allow the new clock to fit into a nice custom laser cut case. The CPU and firmware were the same as the production unit connected to GB3BS.

A duplicate of the 'MKII' clock connected to GB3BS was shipped to a repeater keeper in Scotland (he too was involved in working on Bugs with Ken). Unfortunately the keeper found it difficult to make the correct data cables. He still has the clock unit and we have not really heard anything more from him.

A minor software change was made to the GPS clock in the form of adding Long/Lat information on the local display (a request made by Mark). The same firmware continued to run into this year. Yet the crashes continued.

Late last year, Mark did question my implementation of the RS232 on the clock. As I explained to him, I followed Ken's timing and protocol information, but agreed data was being dropped. Several months of logging, checking and analysing of crash times and dates were carried out. Tests were also done late at night sending known data packets manually into the repeater, then sending specific deliberately corrupted data versions of the packets. The latter occasionally causing a system crash. The corrupted data was narrowed down to a specific set of commands.

```
if(year % 400 == 0)
{ dayspermonth[2]=29;}
else if(year % 100 == 0)
{ dayspermonth[2]=28;}
else if(year % 4 == 0)
{ dayspermonth[2]=29;}
else
{ dayspermonth[2]=28;}

...
if(utc_direction==PLUS)
{
    hours=hours+utc_offset;
```

These commands were very similar to the time commands, except one single byte being changed. We know from previous tests that the commands being sent from the clock were being correctly sent, but somewhere data corruption was taking place. The only place this could be is within the Repeaters own firmware, some how the system was starting to receive data from the clock, yet a single byte of data in the middle of the transmission was being dropped, this byte was key to the repeater interpreting the data not as a time update, but another system setting. It would then receive the rest of the data (Hours Minutes etc) and then load the data into a part of the system memory, too small to handle such a large number as 1859 (18:59 UTC)

for example. This large number caused memory overwrites and cause the Repeater to crash.

Once we understood what was happening, it was still a head scratching moment, The clock was sending the correct data, we were capturing this data on a separate computer as it was being transmitted, so we knew the data was good, and the RS232 was working as we were seeing the data. So again the problem was with the repeater. Mark suggested slowing the symbol rate, something I argued against, pointing out I was already complying with Ken's specifications on the protocol and speeds. I carried on testing the RS232 transmissions on the live Repeater, reliably crashing the thing "on command" almost. Mark kept pushing for a slower symbol rate, which out of desperation I revisited the code and added a 5ms inter-character delay into the RS232 data stream. A site visit was required to physically update the CPU within the clock. While we were on site, an additional hardware modification was done to the repeater as part of our drive to increase our remote operations of the repeater.

Loaded with the new code the repeater was placed back on air. We remained on site for over two hours making sure updates were being sent to the repeater, once happy we left site and entered a month long monitoring of the repeater. With the modification to the hardware in place we were able to remotely check daily the configuration of the repeater, checking for overwrites of memory that we now knew had been taking place. Over the month we did not record any configuration overwrites of the repeater memory. At this point the Firmware update for the clock was officially released and copies sent to Tony G4CJZ (GB3AA) and the two US repeater keepers (we still have not received any reports of repeater crashes by these guys).

To date, The Repeater Group are happy to report, that since the Clock firmware was updated, no further crashes have been experienced. A note of the timing fix was sent to Ken for his information; no comments have been received back. We have put our software change down to 'another work-around'.

While I was working on updating the clock firmware, I observed that the CPU I was using had gone end of life, so getting hold of the processor would slowly become more and more of a problem, along with the inevitable price increase of any surplus stock. So for the last month or so, I have been experimenting with new hardware. New GPS unit, new CPU, new development system, a real learning curve. Thankfully as I code in a computer language called 'C', so most of the original clock code transferred over with no modification. Leaving only the specific hardware changes to re-write. The differences between the two CPU's are many port changes and 4x time amount of available memory. This increase of memory has allowed me to move away from physical dip-switches to set up time zones and daylight saving information, to a software menu system. Firmware updates can be uploaded via USB so no off board chip programming. Although this re-design is aimed more to help me learn the new CPU. It will, ultimately end up as a new piece of hardware 'the *Mk IV* Clock', if anything it will save me getting my ear bent from my XYL for having a mass of wires lying on the desk in the office.

# Site Maintenance.

There was very little actual site maintenance done this year as our remote control facility has reduced the site visits needed. We have really only been on site to either make hardware changes to the GPS Clock, run the standby Generator and checking the Specific Gravity of the starter batteries.

However, we have noticed that one of the outer side doors to the building is showing signs of rot! This door gets a real hammering from the weather and has been on there since the building was extended which is over 35 years ago.

Looking at this problem it became apparent that the door is not really worth repairing and is simply better to be replaced. This we feel needs to be done sometime in 2019 so that the building can remain weather proof and dry.

We have recently sourced a replacement new door at a good price however we do not want to order it until we are ready to fit it. So, currently we are looking for someone who is good at fitting semi commercial type doors, or is willing to give us some help and guidance. If you can help, then drop us an email.

Some people may remember when we first moved in at Lansdown that the roof was leaking and all the electrics needed urgent attention before we could really operate equipment from the site. Those same people will remember that we very quickly had the old roof cleared away and a nice new roof covering installed.

The new roof was painted with a reflective aluminium paint to help reduce sun damage and keep the covering sealed. Fortunately this protective covering has lasted well, but it does now require a new coat so that the roof fabric is protected. We have already sourced the paint so during the summer of 2019 (if we have one) we will be on the roof giving it a well earned clean and a new coat of aluminium paint,...I am sure it will be a messy job!

As already mentioned in this Newsletter, we also plan to install an extractor fan so as to help keep the temperature down in the repeater equipment room during the summer. Temperatures in the summer months can easily push 30 plus degrees as there is currently no ventilation in the room. Fitting a fan will at least force the hot air to be vented outside.



# Rally Report.

This year the Repeater Group decided to step back from attending any local rallies. For the last few years we have seen a slow decline in numbers attending the rally, and in particular the number of visitors stopping by our stand, although, oddly our sweet supplies still go down!

On top of this, the rally date change of the West Rally now clashes with the RSGB 50MHz trophy, something I and the G5FS contest group have been taking part in for many years. Not wishing to get into the politics of the Rally, We as a Repeater Group have heard many grumblings about the date change, but that is between those individuals and the Rally committee.

Next year? Not sure. If the West Rally again falls on the weekend of the 50MHz Trophy I will not be attending, I cannot speak for Mark, but I am pretty sure he will not want to lump our rally stand around on his own.

## Social Media

The repeater group have 3 main social media channels that maybe of interest to our members.



Facebook: Here you can find snippets about all the repeaters, along with photos and comments from the Facebook page members. The page not only covers the core repeaters of the Bristol 70cms repeater group, but information and operational states of our fellow repeaters who are members of the South West Cluster.

<https://www.facebook.com/groups/gb3bs/>



Twitter: Following our group @gb3bs, Mat @g7fbd or Mark @g4sdr is a good source of live, last minute and often urgent matters directly impacting repeater services.

<https://twitter.com>



YouTube: This is a two level video channel. Some of the videos are of actual work being conducted on site and others are a lighter side to the Group.

<https://www.youtube.com/channel/UC60SToaIWdwe7J61vZK8Nkg/videos>

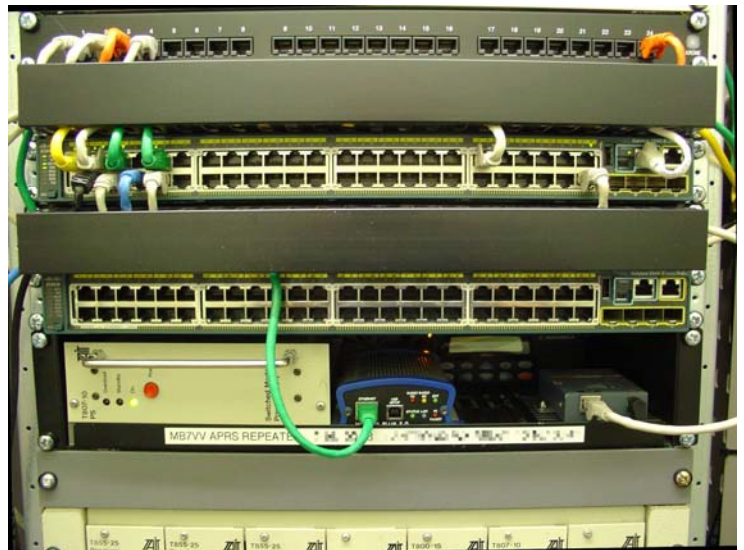
# 5GHz Microwave Link #fail

At 9:16 on Saturday 24th November the automatic monitoring systems utilised by the Repeater Group to monitor the repeater systems reported that it had lost contact with the Lansdown Site taking all our remote access and GB7BS's Cluster connection off line.

Mark called me shortly after to notify me of this fact. I carried out some basic network checks here at my QTH, and could see both sides of the link to Lansdown, but not the Lansdown site itself.

Puzzled I attended site, expecting to find our main network switch on site had failed (The Power supply or LAN ASIC etc).

On arrival the switch was still powered on. Logging onto the switch showed no errors in the system logs, and all ports reported healthy. Not believing the port self test and still seeing the network connection to the microwave showing down, I moved the microwave link to a known working port. The new port also stayed in a non working state so clearly it was not the switch at fault, but just for good measure I connected a working



device to the original microwave port, and as I expected this worked just fine.

The problem was with the microwave system which is made up of a patch cable to a power injector (It introduces 24v onto the cable that is sent up the tower to power the transceiver on the dish), the cable that runs up the tower, and to the microwave dish itself.

I replaced the patch cable with a tested working cable, no change.

The injector was showing it was powered on. However I had no spare injector on site to swap out and retest. So a conversation with Mark discussing that I suspected the problem was with the dish rather than the injector by virtue that I could see the Lansdown dish via the RF link from my home (Remember I checked this before I left for site).





He also then attended site, bringing with him a spare "microwave horn" and a spare power injector.

Connecting the spare horn to our power injector and network connection brought the switch port on line, which proved we had either a cable fault on the tower, or more likely the microwave horn on the tower had a fault with its network interface connection.

The cable up the tower was still carrying power as again the RF link was operational, which added to the cable being okay.

Ether-way access to the dish was going to be required.

This is something that cannot simply take place; our hosts have strict rules on accessing the tower. Although our climb is only to the rest platform at the half way point, something they are happy to allow us, or rather Mark to do. He still has to have the correct climbing & safety gear. If the climb was to the main antenna at the top of the tower, this would need a fully qualified 3rd party rigging company as they have to climb outside of the tower structure to gain access.

Mark has to show the climbing equipment is certified and in date. We, for our own safety will only climb when conditions are dry, and not windy (at the 25m mark a gentle breeze at ground level can be very strong) and at a weekend when we know the staff car park is mostly empty (Stray bolts from 25m can do a LOT of damage).

So at the time of writing this item for the newsletter, we are go for a climb with our hosts, and waiting for a weekend where the conditions are right.

Just to re-cap, currently we have switched over to our backup system which allows us to quickly shut down the repeaters if so ordered to do so.

GB7BS is on air, but in stand alone mode and not connected to the cluster.

We have moved our spare Motorola Turbo repeater and connected to the internet at my QTH where it is helping warm the office ☺. It is driving into a dummy load and its power has been changed to the lowest setting the repeater can run. Because it is connected to the Internet it is still providing the service of being the MASTER repeater thus allowing our network peers to re-associate with the network, if in the unlikely case, they have to re-set their network connections. A peer being able to register with the Master repeater allows the Master to then update the cluster with any new peer information.

Progress of the repair and other updates will be posted on our Facebook page, and via Twitter.



## Microwave and the furry animal.

So, following on from our microwave link failure, a couple of strange things happened on site.

The First was our backup mobile phone signal had dropped in signal strength. We put this down to the loss of a nearby cell tower. The phone thankfully still works providing our backup repeater control.

The second was noticing that GB3BS's onboard clock was drifting. This clock should be in sympathy with GPS time, which meant only one thing; the GPS Clock was not updating time. A late evening visit to site showed the GPS clock was reporting it could not see any satellites.

I did report to Mark I felt un-easy about the fact that we lost the 5GHz link, then the Phone signal and now the GPS Clock, things don't just happen in three's! The GPS clock was removed from site and tested on the bench. As suspected it worked just fine, so this pointed to the antenna.

All eyes moved back to the 5GHz link and getting that re-established before Christmas, the show stopper there was the weather. A tower climb could only really take place on a weekend, a weekend that was dry, and a weekend with low wind speeds, or gusts!

Sunday the 9th of December looked to be a suitable day, although when we arrived on site the wind was higher than we liked, so the climb was delayed. This gave time for the GPS clock to be re-mounted in the rack, Mark to harness up and the equipment made ready to cope with all aspects of the climb. The 5GHz Link cable was tested in situ, the results showed something on the end of the cable (the microwave horn), and although the readings looked a bit odd, I put them down to a potential failed electronic device.

The Plan was to reach the microwave dish assembly and disconnect the network cable feeding it. The cable tester dangle would then be connected and a full end-to-end cable test would then take place using known good test equipment. The dangle was tested and proved the meter was good.

The climb was delayed for another 20 minutes or so, in which time the wind died off. The climb was on!

Once the network cable was disconnected from the microwave dish and the cable test dangle attached, the cable was fully tested. The detail of the tests the meter can do is fantastic, and in the past got me out of so much trouble chasing down thin Ethernet faults, it was worth every penny when I bought it. However the test results were NOT what one would expect to see on a good cable. I was seeing a pair (of the 4 pair cable) showing open circuit - - yikes!



Another pair was slightly high on impedance. The fault was also showing as being only 3m from the test meter. Cable map testing confirmed the distance to fault, and also the total length of the cable run (29m).

I radioed this information to Mark up on the tower (Now we would not be radio amateurs if we did not use radio to communicate!). He removed the dongle and re-fitted the dish, a re-test confirmed the results from the first test. The fault was not at the dish end but somewhere around the transition point between the inside and outside of the building.

Mark climbed up to the cable portal outside the building and called me out. Presenting me with a pair of chewed cables that were the cables connecting to the outside GPS and Cellular antennas.



He then reported that the external grade shielded Ethernet cable for the 5GHz Link had also been badly chewed. As we were losing light, several pictures were taken of the area so we could closely inspect the damage.

Indeed some furry creature had decided to have UV grade Polyethylene meal with a side order of foil and copper.

The Ethernet cable was re-terminated and connected to a Ethernet coupler then attached



to a pre-made standard drop cable. The new cable connection was tested and bingo, our link was re-established. Outside lashings of Denso tape was applied to water proof the work around and the cable portal temporarily blocked to stop the return of our diner.

At least in the short term we had Lansdown connected back to the internet. The GPS system is still inoperable at the moment, but hopefully later this week, and maybe before the publication of this Newsletter we would have returned to site to replace the feeders to the GPS & Phone antennas. This as normal is dependent, no so much on the weather now, but availability of Myself and Mark.

The only saving grace to the Clock stability of GB3BS is that we can now remote on to it a couple of times in the week and sync the clock manually until we fix the feeder.

Where does all this leave us? Going forward parts will be ordered to allow us to replace the standard UTP coupler used now with the proper Shielded STP coupler, the internal cable replaced with STP (Shielded Twisted Pair) and the drain wires bonded correctly. This, like the GPS clock, depends on availability. Thankfully we have the funds to repair the fault properly.



# MEMBERSHIP

Our newsletter would not be complete with out a snapshot look at our membership state; this snapshot was taken on the 14th December.

Currently we have 44 active members. For those keeping tabs on the numbers, this is a reduction of two from this time last year (2017) and a whopping drop of 20 since 2015. (*Please remember to keep us informed of any changes to your email address*).

Some of the reduction maybe just natural losses as people loose interest in the hobby, or moving to armchair operations via their own Internet hotspot, others may have simply forgotten to renew their support.

The important thing, and we know it comes up time after time, is that without the support of **YOU**, our members and supporters, the repeaters would not be on air. So I will echo comments made in the introduction and say Thank-you again for your support.

<b>2E0EOL</b> DEC 19	<b>2E0GRB</b> FEB 19	<b>2E0PGS</b> JAN 19	<b>2W0CGM</b> FEB 19	<b>G0GZW</b> JLY 19
<b>G0IUE</b> FEB 19	<b>G0IWT</b> AUG 19	<b>G1FUA</b> NOV 19	<b>G3LZN</b> LIFE MEMBER	<b>G3XED</b> JAN 19
<b>G3XOB</b> DEC 19	<b>G4EJH</b> JAN 19	<b>G4FUA</b> NOV 19	<b>G4GUG</b> NOV 19	<b>G4KQU</b> SEP 19
<b>G4OPQ</b> OCT 19	<b>G4OTJ</b> DEC 19	<b>G4SDR</b> OCT 19	<b>G4TAH</b> NOV 19	<b>G4WOD</b> APR 19
<b>G6YNL</b> FEB 19	<b>G7BYN</b> NOV 19	<b>G7FBD</b> JUN 19	<b>G7KNA</b> DEC 18	<b>G7NSY</b> JLY 19
<b>G8CKK</b> JUN 19	<b>G8NQO</b> APR 19	<b>G8YMM</b> JAN 19	<b>GW1LOR</b> FEB 19	<b>M0HDJ</b> JUN 19
<b>M0HTB</b> MAR 19	<b>M0LHS</b> OCT 19	<b>M0LTJ</b> NOV 19	<b>M0MGT</b> DEC 18	<b>M0PRJ</b> JUN 19
<b>M0WYB</b> NOV 19	<b>M0XMM</b> JUN 19	<b>M0ZLI</b> FEB 19	<b>M1CEL</b> JUN 19	<b>M3JDK</b> APR 19
<b>M6FUA</b> NOV 19	<b>M6GFM</b> DEC 19	<b>M6NQJ</b> OCT 19	<b>M6OJI</b> JAN 19	

MEMBERS ACTIVE <b>44</b>	MEMBERS With less than 1 month remaining	MEMBERS with less that 2 months remaining	MEMBERS with over 2 months remaining
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If in doubt, please check your membership status using the link below:-

<http://gb7bs.com/membership/check%20your%20membership.html>

**NOTE:** If you have received this newsletter via email but do not see your callsign listed in the table above then this means your membership has now expired (you would have received an invitation to renew on the 1st day of the month you expire). The Repeater Group would welcome you to re-join, but if that is not to be, then we would like to take this opportunity to thank-you for your past support and inform you that no further Newsletters will be sent to you.





# Merry Christmas and a Happy New Year

To All our Members and your families,  
we wish you a safe and enjoyable  
Christmas and a Happy New Year with  
lots of DX in 2019.

73' From

Mat – G7FBD/KG7FBD.  
&  
Mark – G4SDR.



# THE BRISTOL 70cms REPEATER GROUP.

## GB3BS / GB7BS

🌐 Website: [www.gb3bs.co.uk](http://www.gb3bs.co.uk) ✉ Email: [info@gb3bs.co.uk](mailto: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<sup>™</sup> (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 contact us for our postal address if sending Cheques by post. Thank you.**

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 is stored in line with the 2018 GDPR rules. Your information will **ONLY** be used to mail or email you our newsletter, important repeater group bulletins or membership reminders. Data will be deleted 6 Months after the laps of any membership. Reminders of membership expiring will be sent via email where possible one month before the expiration date. The membership section of our website also reflects this information. Please email '[info@gb3bs.com](mailto:info@gb3bs.com)' if you do not wish the repeater group to hold your information and therefore forfeiting **ANY** communications from the Repeater Group. Data is stored encrypted on a non internet connected computer and is only accessible by one person.