An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Low-cost Microwave Operating - with a Learning Bonus

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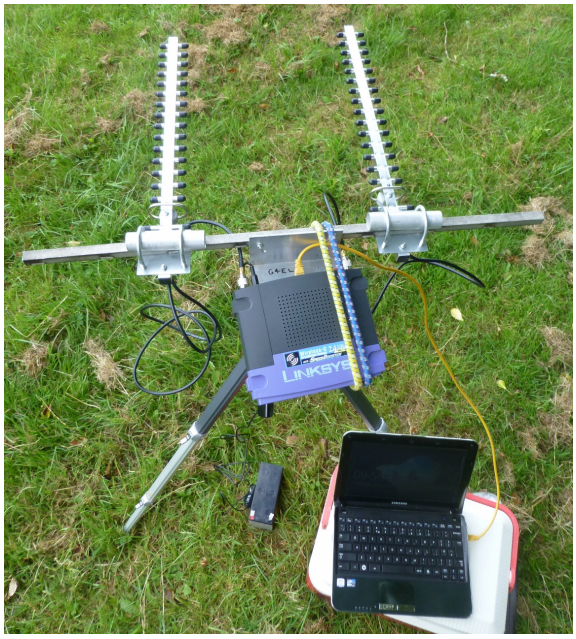
By E. R. Jewell, G4ELM



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Loan Equipment

Don't forget, UKµG has loan kit in the form of portable transceivers available to members for use on the following bands:

5.7GHz 10GHz 76GHz

Contact John G4BAO for more information.

Subscription Information

The following subscription rates apply.

UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership**. For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via the Yahoo group and/or Dropbox. Also, free access to the Chip Bank.

Please make sure that you pay the stated amounts when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

You will have to make a quick check with the membership secretary if you have forgotten the renewal date. Please try to renew in good time so that continuity of newsletter issues is maintained.

Put a **renewal date reminder** somewhere prominent in your shack.

Please also note the payment methods and be meticulous with PayPal and cheque details.

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

or a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary (or, as a last resort, by cash sent to the Treasurer!)

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome.

Please send them to

editor@microwavers.org

The CLOSING date is the FIRST day of the month

if you want your material to be published in the next issue.

Please submit your articles in any of the following formats:

Text: txt, rtf, rtfd, doc, docx, odt, Pages

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

I can extract text and pictures from pdf files but tables can be a bit of a problem so please send these as separate files in one of the above formats.

Thank you for you co-operation.

Martin G8BHC

Reproducing articles from Scatterpoint

If you plan to reproduce an article exactly as in Scatterpoint then please contact the Editor – otherwise you need to seek permission from the original source/author.

You may not reproduce articles for profit or other commercial purpose.

You may not publish Scatterpoint on a website or other document server.

UKµG Chip Bank – A free service for members

The catalogue is now on the UKµG web site at www.microwavers.org/chipbank.htm

Non members can join the UKuG by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of a component on the site will not be a guarantee of availability of that component. The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage.

Minimum quantity of small components supplied is 10. Some people have ordered a single smd resistor!

The service may be withdrawn at the discretion of the committee if abuse such as reselling of components is suspected.

There is an order form on the website with an address label which will slightly reduce what I have to do in dealing with orders so please could you use it. Also, as many of the components are from unknown sources, if you have the facility to check the value, particularly unmarked items such as capacitors, do so, and let me know if any items have been mislabelled. G4HUP's Inductance/ capacitance meter with SM probes is ideal for this (Unsolicited testimonial!)

Don't forget it is completely free, you don't even have to pay postage!

I have just updated the Inductor file and the ATC file in the chipbank catalogue on the website to reflect some acquisitions at Finningley, and to make a few corrections and clarifications.

Mike G3LYP

UKµG Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UKuG has a considerable pool of knowledge and experience available, and now we can financially support worthy projects to a modest degree.

Note that this is essentially a small scale grant scheme, based on 'cash-on-results'. We are unable to provide ongoing financial support for running costs – it is important that such issues are understood at the early stages along with site clearances/licensing, etc.

The application form has a number of guidance tips on it – or just ask us if in doubt! In summary:-

- Please apply in advance of your project
- We effectively reimburse costs - cash on results (eg Beacon on air)
- We regret we are unable to support running costs

Application forms below should be submitted to the UKuG Secretary, after which they are reviewed/ agreed by the committee

www.microwavers.org/proj-support.htm

UKµG Technical support

One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, what is more important, test equipment. Our friends in America refer to such amateurs as “Elmers” but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let’s call them Tech Support volunteers.

While this is described as a “service to members” it is not a “right of membership!”

Please understand that you, as a user of this service, must expect to fit in with the timetable and lives of the volunteers. Without a doubt, the best way to make people withdraw the service is to hassle them and complain if they cannot fit in with YOUR timetable!

Please remember that a service like our support people can provide would cost lots of money per hour professionally and it’s costing you nothing and will probably include tea and biscuits!

If anyone would like to step forward and volunteer, especially in the regions where we have no representative, please email john@g4bao.comThe current list is available at

www.microwavers.org/tech-support.htm

80m UK Microwavers net – Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV

Chairman's thoughts

I trust every one of you have applied for your 2300MHz NoV by now? It is important that we not only show interest in this 13cm sub band, but use it and record that activity with reports in Neil's column in Scatterpoint. Note to self.....send in a report. (Added note .. 0.2dB more sun to cold sky noise on 2300MHz compared to 2320MHz, on my dish).

I have recently tested the Kuhne MKU23 G4 multi sub band 13cm transverter for a Radcom review. The review will appear in a forthcoming issue of Radcom. I am aware that there is a cheaper competitor in the form of the SG Labs 13cm transverter. From reports it would appear that it works very well and could be an easy and (relatively) cheap way to become active on this most interesting of bands.

With the launch of the Qatari Es'Hail-2 geostationary satellite later this year, carrying amateur transponder with an S band (2400MHz) uplink and X band (10GHz) downlink, the upcoming demand for suitable S band transmit equipment is likely to be very heavy. Both of these transverters provide 2400MHz in addition to 2300/2320Mhz capability, so should be suitable candidates for the uplink. A cheap PLL controlled satellite TV Ku band LNB, in conjunction with an RTL dongle, SDRPlay or other wide range, stable, SD receiver should provide a very effective downlink receive capability.

The UK Microwave Group submitted a response to OFCOM regarding their consultation on the 5GHz frequency range. The OFCOM proposal to open the band for WiFi seems to have been ill-thought-out and would seriously impact amateur (weak signal as well as possible Hamnet) use of the two sub bands we currently have available to us in the UK. The very robust response from the RSGB (thanks Murray) should leave OFCOM in no doubt about how we feel about this proposal. The UKuG response was a little less robust, but showed equal concern about the proposal. I understand that other users of this same frequency range were not too impressed either.

Now we are into August the EME2016 Conference looms large and much of the activity in my shack has been directed at following up my already-submitted Conference paper on LNA failures with more measurements for my talk, and to validate my earlier results. You will need to wait until after mid August to see what I discovered during my destructive testing of a large number of HEMT devices!

In tandem with the testing I have also been busy with my EME system. Although measured results on test equipment is all very interesting, nothing proves results better than 'real' testing in a system and the moon path is a very tough testing ground.

The Finningley Microwave Round Table was held in early July and was very successful. I was only able to attend on the Sunday, but the talks on that day were very interesting and resulted in me purchasing a couple of the ADF4351 synthesiser modules currently available on EBay.

Barry, G8AGN, and Gordon, G0EWN, have subsequently reported excellent results using these synthesisers to generate high stability, good quality, marker signals at 76 and 134GHz. Expect a Scatterpoint article soon.

Just a reminder that the Crawley Microwave Round Table is to be held on Sunday September 18. A comprehensive programme of talks has already been arranged. Don't forget to let Chris, G0FDZ, know that you will be going.

That's it for this issue.

73 de Sam, G4DDK

Acting Chairman, UKuG

Gunter VE7CLD Silent Key

From: Barry Malowanchuk VE4MA

I regret to inform you of the passing of Gunter VE7CLD on July 14th . Gunter was active on 24 GHz EME in 2002/3 and attended many of the Microwave Update conferences throughout the USA.

From Sam G4DDK

I did know Gunter from many meetings in the USA. As I recall he would take the train down from BC to various microwave events and, I think, the Dallas EME 2010 event. He would often take several days by train in preference to driving or flying. He was a lovely guy, very helpful and knowledgeable. Although I hadn't see him for some years, he remains one of those characters you will always remember. Vale Gunter.

Finningley Report

Sam Jewell G4DDK

That was a most enjoyable day at Finningley's MRT. I was only able to make one of the two days and chose to go yesterday. I was accompanied by JW and JQ from Committee as well as Alan, G3NYK, The tin box man!

Apart from the A1 being closed at Grantham on the way back, just to a spillage from a tanker, the 15 hour, 400mile round trip day was definitely worthwhile and the Finningley Radio club are to be thanked for putting on an excellent event. I counted about 25/30 in attendance on the Sunday. Maybe someone can correct that for me?

For those of Committee who have not yet made it to Finningley, you are missing out on an excellent venue with a good selection of talks each year. Yesterday was no exception with a really good talks on AD synthesisers, a novel suspended line technique, Elcom synthesiser repairs and others talks.

The range of surplus 'junk' in (what can I call it? warehouse, maybe?) is always productive of something of interest. This year, there had been a recent drop of Alvarion Airbreeze 5GHz link equipment. These units are a self contained box with heatsink fins attached to a 56 patch antenna which is 'sorta' diamond shaped. The antenna is speced 5.1 to 5.8GHz/21dBi and although it is normally for vertical polarisation, the E and H planes are equal, and the mounting allows it to be horizonally mounted.

Remove the single board innards, get a friend with a decent milling machine to remove the internal heatsink housing extrusions and you have a nice, flat, weatherproof, integrated unit that will house either a DB6NT transverter and relay (the antenna connection is on. Short MCX pigtail inside the waterproof housing) or a surplus SSPA and preamp and mount the transverter separately. I will be asking Dave, G4FAW, who has a decent industrial size milling machine, to do my second unit. He did one for me a few weeks back. Yes there are other sources. Lots of these units are now being made surplus.

Only £5 at Finningley. Kevin Avery knows about them and there are LOTs available. They had a pallet load dropped on them recently.

Enough.....

The attendees were asked about what band would be preferred for a beacon at the Dunstan Hill site? There was general apathy, but 5.7 or 24GHz just about won out.

With your approval we'll take that forward.

That's my brief report. I plan on going to Crawley in September.

73 de Sam Jewell, G4DDK
Acting Chairman, UKuG

Let me echo Sam's comments on an excellent day and thanks not only to Kevin and the other organisers but to Sam, John and Alan for putting up with my inane chatter and dodgy navigation on the way back!

I also came away with two of the 5 GHz units but I plan to have a delve in to the electronics before I take the "mill out the box and use it for an antenna" route. You never know what might be bodgeable until I get the lids off and have a "firkle" inside!

PS I mentioned the "Ionica Pizza box" code for programming the PMB2306 that might be hackable for the one in the Elcom synth. The link to it on my website is now fixed and at

http://www.g4bao.com/Files/PMB2306TNorteldual.asm

73

John G4BAO

Finningley: Antenna test range results 10 July 2016

David Wrigley G6GXK

Band: 1.296 GHz						
Antenna description		**Reading**	**Range**	**Total**	**Relative Level dB**	**Gain dBi**
Reference Antenna		-3.8	-30	-33.8	0.0	14.8
G8UDP (No3) long slot antenna	max	-6.0	-30	-36.0	-2.2	12.6
	min	-9.0	-30	-39.0	-5.2	9.6
G8UDP (No2)short slot antenna	max	-9.0	-30	-39.0	-5.2	9.6
G8UDP (No2)short slot antenna (15º Down tilt)	min	-3.0	-40	-43.0	-9.2	5.6
G8UDP (No1) short slot antenna	max	-3.0	-30	-33.0	0.8	15.6
G8UDP (No1) short slot antenna(15º Down tilt)	min	-6.0	-30	-36.0	-2.2	12.6
G4ASF Twin Yagi		-8.0	-20	-28.0	5.8	20.6
Band: 2.320 GHz						
Antenna description		**Reading**	**Range**	**Total**	**Relative Level dB**	**Gain dBi**
Reference Horn		-2.9	-40	-42.9	0.0	12.7
G3AAF 40 ele Yagi		-3.6	-40	-43.6	-0.7	12.0
" Driver Horn only		-7.5	-40	-47.5	-4.6	8.1
Band: 5.760 GHz						
Antenna description		**Reading**	**Range**	**Total**	**Relative Level dB**	**Gain dBi**
Reference Horn		-5.0	-50	-55.0	0.0	12.7
G3LYP Large square antenna		-3.5	-40	-43.5	11.5	24.2
G3LYP Small square antenna		-8.6	-40	-48.6	6.4	19.1
Band: 10.368 GHz						
Antenna description		**Reading**	**Range**	**Total**	**Relative Level dB**	**Gain dBi**
Reference Horn		-2.6	-40	-42.6	0.0	17.2
G8EOP Horn		-0.9	-40	-40.9	1.7	18.9
G8EOP Horn plus cable		-1.3	-40	-41.3	1.3	18.5
G8EOP Horn plus cable plus relay		-1.5	-40	-41.5	1.1	18.3

Crawley Microwave Round Table Program

Sunday 18th September 2016

Again this year following we will be holding a heat for the UK Microwave Group annual Project contest for the G3VVB trophy. Please do bring along your constructed equipment or project and enter. Entries do not necessarily need to have been finished during the last year.

Please note that the contest will also accept software entries as well as hardware. The winner of this round will go on to be considered, together with entries from all the other round tables over a year both before and after this event.

The morning will feature the usual 'bring and buy' sale, so if you have something to sell then please bring it along. The Crawley club also intend to sell the majority of the late Derek G3GRO's microwave equipment at this event, although no details of the contents are currently available.

Mike G3LYP will be happy to bring any chip components from the UKuW Group chipbank to you at the meeting. If you have a forthcoming project then why not contact Mike beforehand to place your orders, which are free for UKuW group members.

The program this year as ever offers the microwaver something different – come along and have a good chat, support the construction contest heat and hear the talks.

Below is the finalised timetable:

10:00 Venue opens
12:00 UKuW Group Project contest round judging commences
12:30 Lunch (hot dogs and burger rolls etc and tea/coffee available)
13:30 Opening remarks by Chris G0FDZ and the results of the Project contest heat
13:45 My new Microwave Manager's role – Barry G4SJH
14:15 A bodger's guide to building 24 GHz beacons - John G4BAO
15:00 A 'slab' type mixer for 122 GHz – Chris G0FDZ
15:30 Break (tea and coffee available)
15:45 10GHz portable beacons – Andy G4JNT
16:30 End of meeting

The venue is the Crawley Amateur Radio Club's hut and directions can be found at:

www.carc.org.uk/find_us/directions.shtml

Please contact Chris G0FDZ for more info on chris@g0fdz.com

BATC 2016 Convention for Amateur TV (CAT 16)

The BATC has run a number of highly successful rallies and conventions known as CAT (Convention for Amateur Television) at locations around the UK.

The 2016 Convention for Amateur TV will be held at the **RAF Museum Cosford** on **24 and 25 September** 2016.

The Events will start at around 1:00 pm on the Saturday, and conclude with the Biennial General Meeting early afternoon on the Sunday. Attendees will be free to wander around the Museum at no extra charge; we hope to arrange some guided tours. Arrangements are also being made for an informal dinner at a Hotel in Telford on the Saturday evening.

Latest news and discussion about the Convention can be found on the **BATC Forum**.

Previous events have been recorded and are available online:

- The recording from the 2015 and previous years conventions are now available on the BATC Online Youtube channel - **Click here for more details.**
- Some rare black and white footage from **CAT70** is available here.

This month I 'ave mostly been building…

A column (idea borrowed from the SBMS Newsletter and with a hat tip to Mark Williams' character Jesse of the Fast Show) designed for those of you who don't want to write a full technical article – but also those of you who do but only have a snippet to contribute such as a new project or a progress report.

From Chris Bartram GW4DGU

I've managed to snatch a few hours to do some things for myself this month!

I'm helping the Carmarthen ARC, and now the group around GB3KBQ get the hardware together for new 10GHz beacon transmitters. This has highlighted the need for a simple, high-performance beacon design which has good noise performance. The key to this is the design of a particularly good VCO, and I've been playing with a number of ideas. One thought which has found its way into a proof of principle prototype is a dual resonator transmission-mode oscillator.

Dual resonators allow much greater rates of phase change with frequency to be obtained around resonance than with a single resonator; this results in a faster roll-off of phase-noise around the frequency of oscillation. It's not black magic, and agrees with standard expressions used to design and analyse oscillators. The technique is used in the synthesisers of a number of very high performance analogue HF receivers.

My initial implementation at 10370MHz uses a two-pole dual-mode circular waveguide resonator (a prototype of the filter I used to sell), a maintaining amplifier using a BGA616 from my old 2005 10GHz transverter, a 6dB directional coupler to tap-off the output, and an SMA phase shift trimmer. The phase-noise performance is impressive: I can't see any using my HP70000-series spectrum analyser! That points to a PN performance rather more than 20dB better than typical integrated VCOs in current synthesiser chips.

The BGA616 (which is still a very cheap way of getting 9dB gain and a few mW Psat on 10GHz with minimal matching) wasn't a good choice for an oscillator, though. It seems – unsurprisingly, as it's a MMIC, and not designed for the job – to have rather poor 1/f noise. This causes random jumps in frequency of a few tens of kHz; not a necessarily awful performance at 10GHz! A maintaining amplifier made with a more appropriate device should reduce this. I'm currently designing that.

Also, I now have to introduce voltage tuning. Rather than attempt to tune the cavities, I'll use a voltage controlled phase shifter. This should produce more than enough tuning range to cope with temperature variations. That has been simulated, and, work pressures willing, I'll be producing a prototype PCB over the next few weeks.

I plan to publish the beacon design once it's completed.

My other project is the design and construction of a wide-spaced long yagi antenna for 1296MHz suitable for real locations! This is a major development of a design on a 4m boom I made back in the 'noughties. and has been prompted by the use of a very floppy, significantly longer, commercial antenna using the original DL6WU cookbook dimensions which somebody donated. It is a good antenna, but IMHO not suitable for real world conditions.

I have yet to start testing - which I'll do using natural sources - but the simulation indicates about 21.5dBi with -17dB first sidelobes. the first sidelobe level suggests optimum power distribution across the antenna aperture. The levels of other lobes are generally below about -26dB, which should give good G/T performance. I'll also write this up if it works as well as the sim. suggests!

From John Worsnop G4BAO

Rebuilding my 9cm system....

Spurred on by obtaining a Toshiba PA I decided it was time for a 9cm rebuild for an autumn return to 3400MHz. Sadly the Toshiba needs rather more work than anticipated so that will have to wait for stage 2, i.e. 9cm EME. In the meantime I've rebuilt my Ionica based transverter (see www.g4bao.com) with a new DF9IC locked OCXO and checked out the twin Ionica pa after 4yrs in the loft. All up and running now so just the outdoor part to do when I get the mast down. I've now completed 2 x g4ddk.com VLNA9s and restored my dual dipole 9cm dish feed with a new lemonade bottle radome. That will be offset from the 10 and 24GHz dual band feed on my 60cm dish and at the same time I plan to replace the 10GHz preamp with a 2 stage DB6NT built on a PCB from the G3PYB estate.

With all that and the tropical temperatures plus a singular lack of enthusiasm for working the "same old, same old," I've not been in the operating shack for most of the month so no QSOs to report.

A look at the Elcom synthesiser

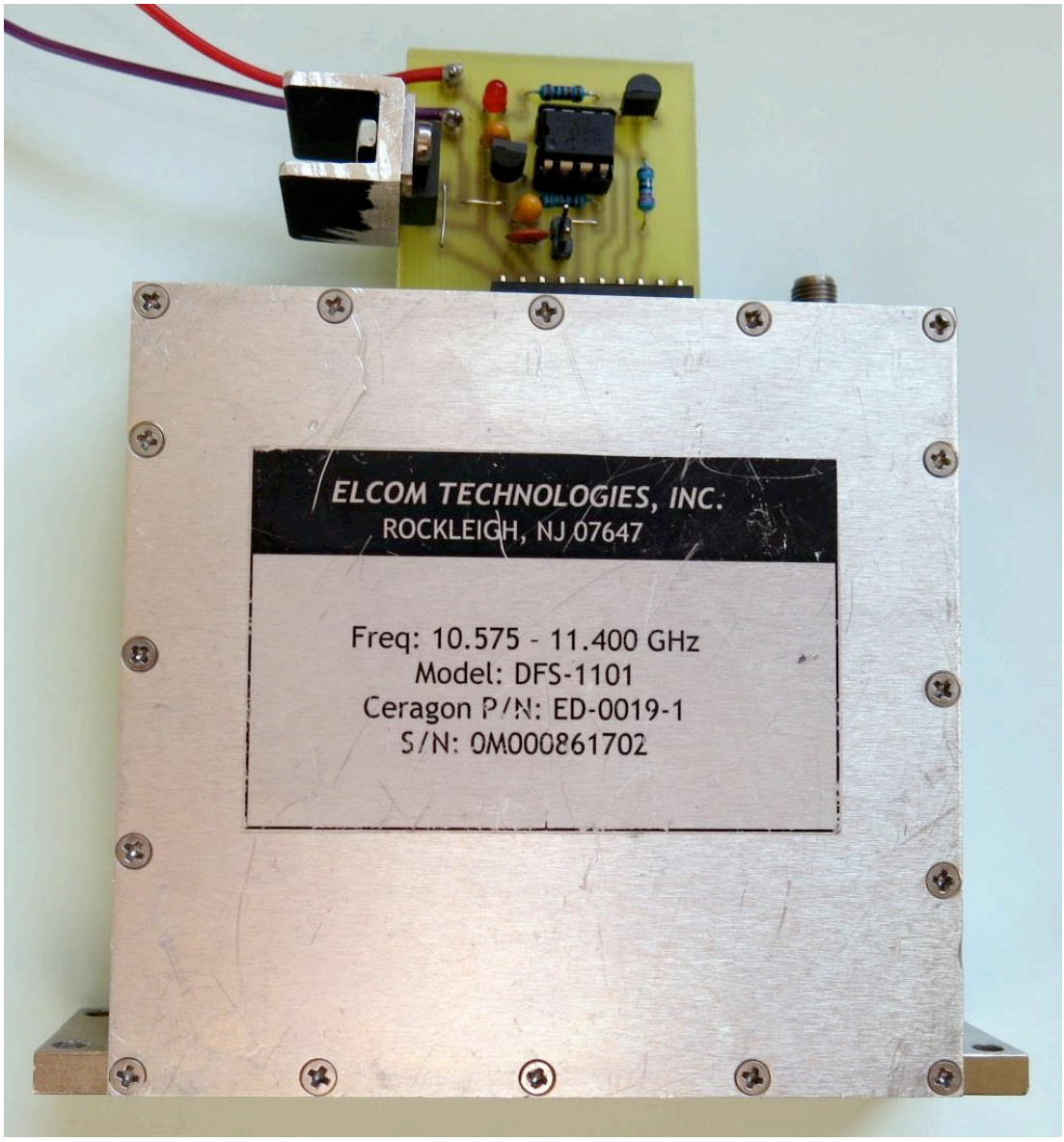
Barry Chambers, G8AGN (slides from his Finningley talk)

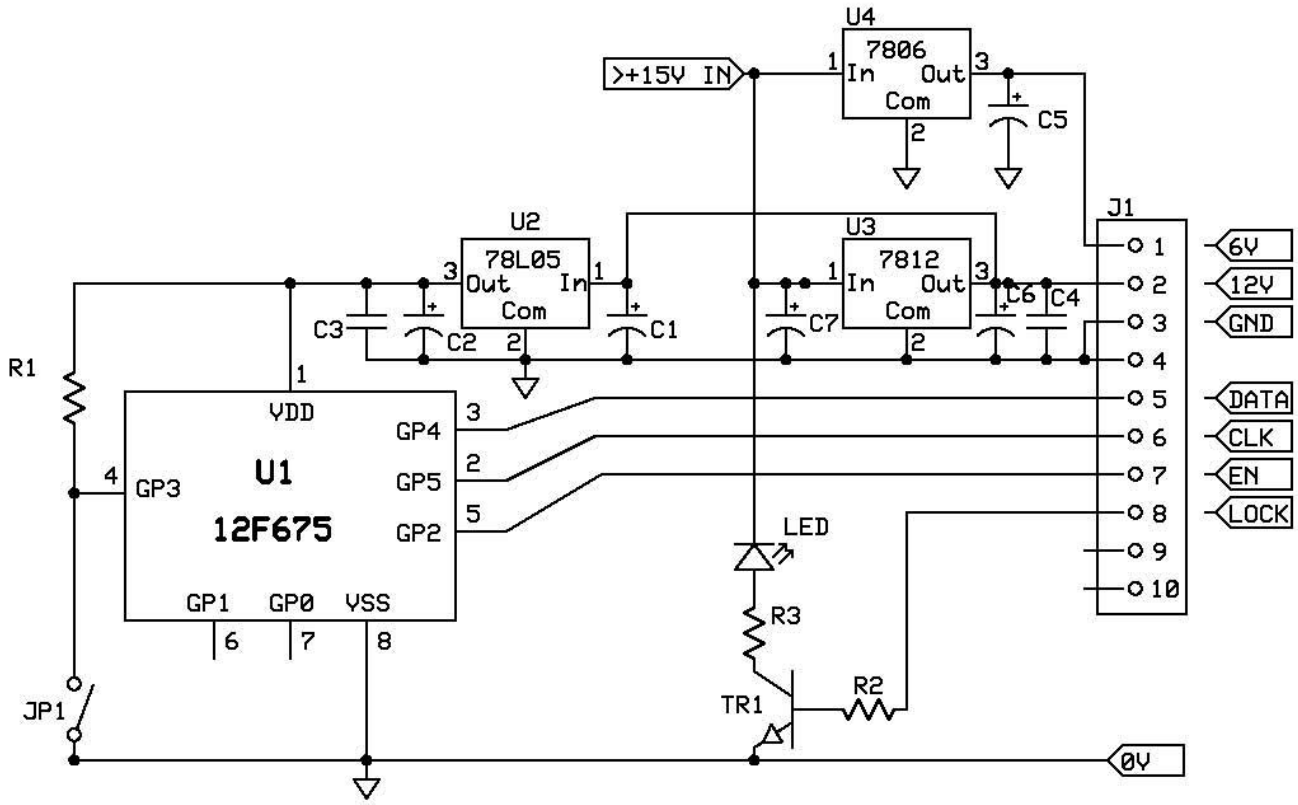
Elcom synthesiser models

Type	Tuning range GHz	Default freq GHz	Step size MHz	Ref freq MHz	Programming factor	Supply voltages
DFS- 1101	10.575 - 11.400	11.0	5	92.5	X2	6V and 12V
DFS- 1201	11.200 - 12.000	11.6	3.33	100	X3	6V and 12V
ILCDFSL- 1201	11.200 – 12.000	11.6	3.33	10	X3	8V and 12V
ILCDFSL- 1295	12.200 - 12.950	12.6	3.33	10	X3	8V and 12V
DFS- 1301	12.650 - 13.350	13.0	5	100	X2	6V and 12V

Other models and variants exist, depending on customer's specification

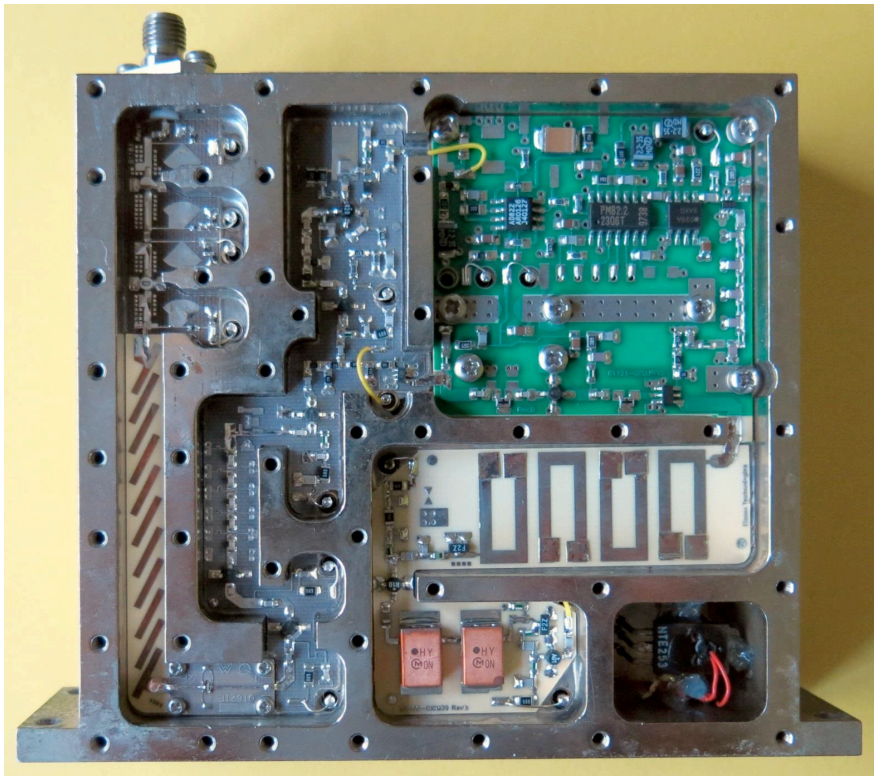
Elcom synthesiser with G4FRE programmer



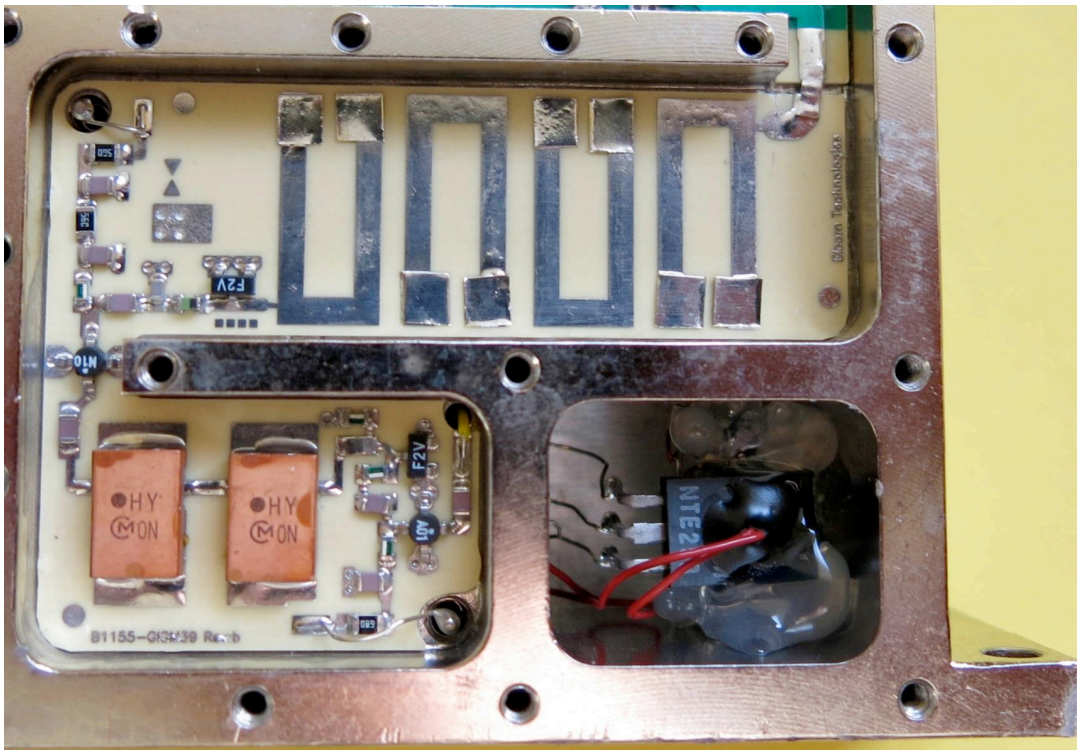


Can delete 7812 regulator and run directly from +12V

General view of DFS1101,1201,1301(RF side)

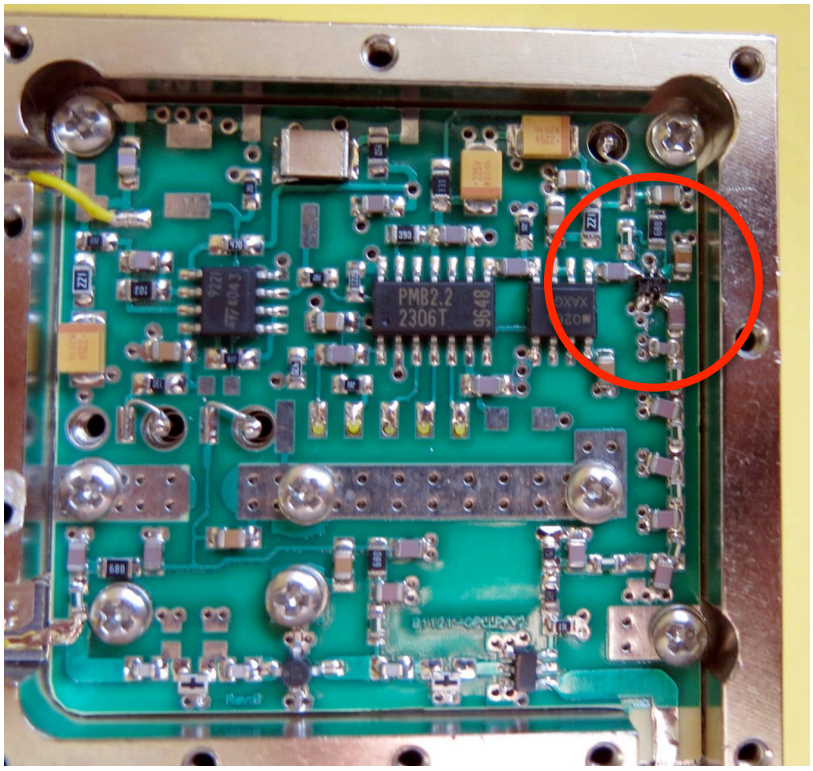


Reference oscillator chain



PLL Section

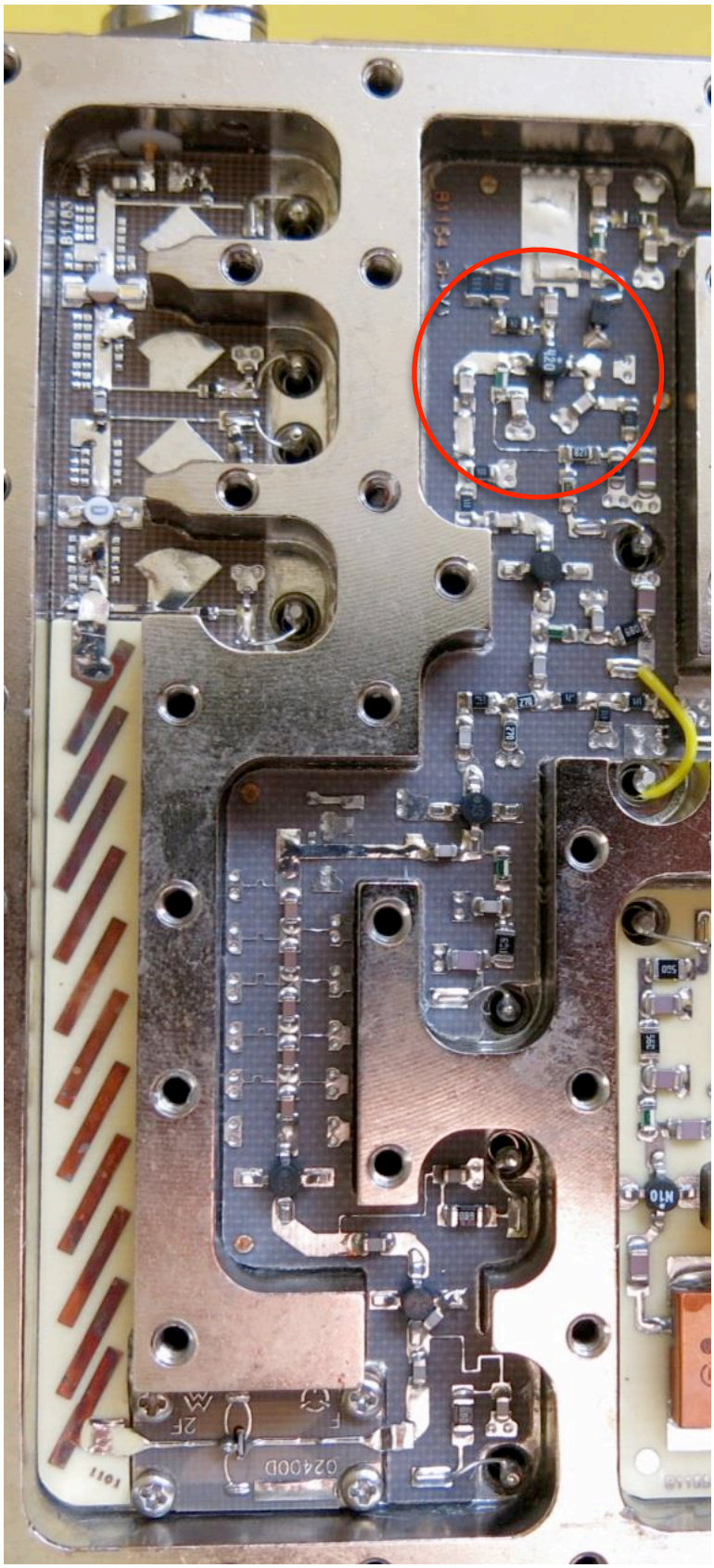
VCO Tuning voltage



VCO input

Reference input

RF output



VCO

PLL

Basic operating checks

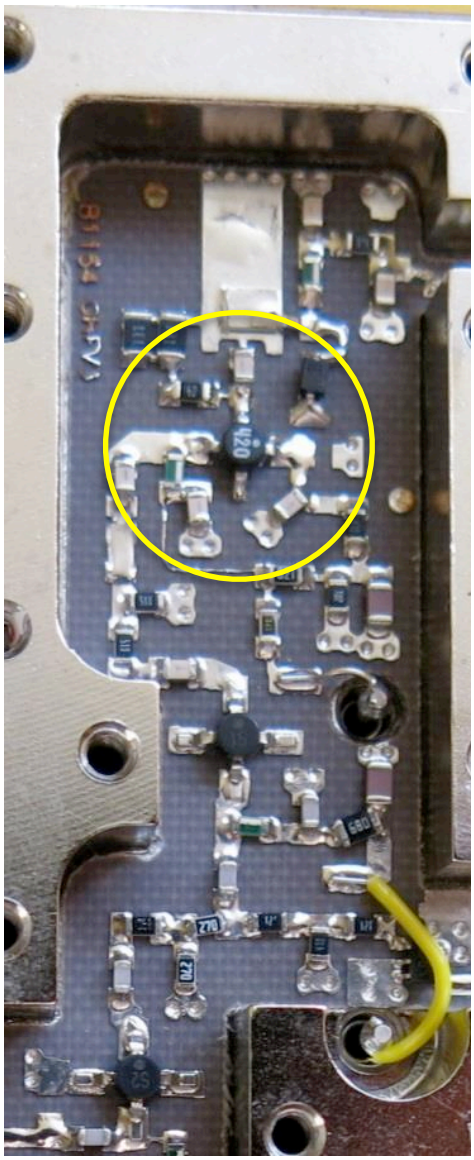
- Check voltages to the Elcom. 12V and 6V (8V should be OK)
- Check that the Elcom locks up on its default frequency when no PIC is present in the programmer
- Check that the Elcom locks up on the PIC frequencies

Fault-finding - 1

No VCO output

- Check around the VCO transistor, marked ● 420

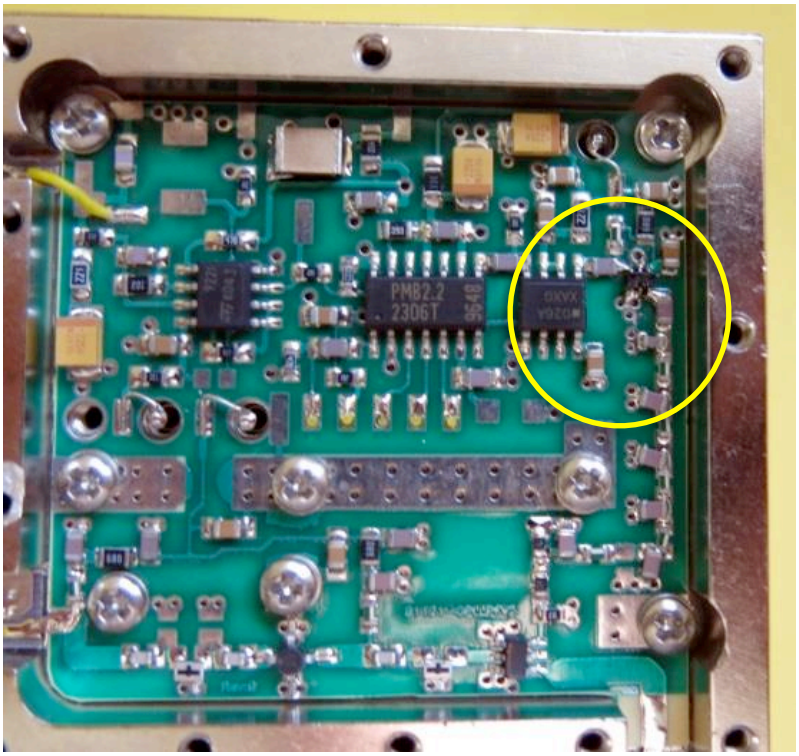
This can be replaced with a AT42086 (from Chip Bank)



VCO and Ref outputs to mixer both present

- Check for output after mixer IF LPF and after IF amplifier. The amplifier should have about 20dB gain.

This can be replaced by a ABA-52563 (from RS)



Fault-finding - 2

Elcom locks up on default frequency but not on PIC frequency

Some Elcoms take a long time to lock up, so the initial 5 second delay built into the G4FRE programmer software may not be long enough

Add several more statements in the G4FRE PIC code to increase the initial delay before sending frequency data to the Elcom's internal PIC

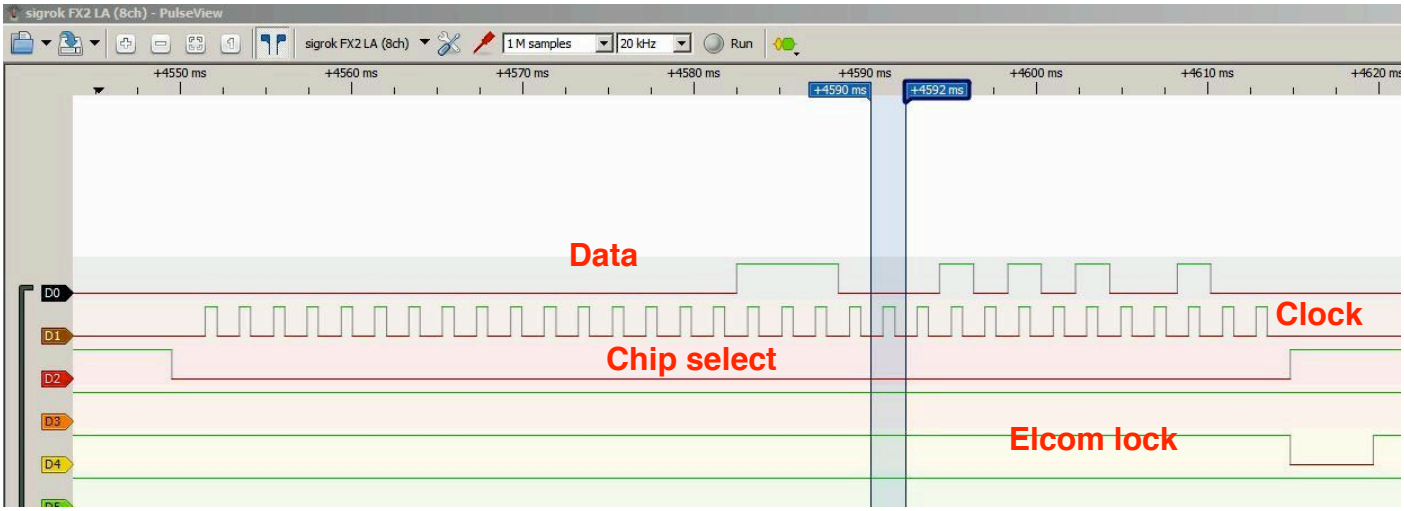
```
call delay1s
call delay1s
call delay1s
```

This gives an additional 3s of delay

Try varying the additional length of the delay

Debugging using a low-cost logic analyser

To program DFS1301 on 12.735 GHz, code this in G4FRE's software as hex 25 47 00 00 Then send this to the Elcom in reverse order as 8 bytes of data via SPI



Conclusions

- • Elcom synthesisers offer a simple way of producing high quality, highly stable signal sources for the mm-wave bands.
- • The frequency step size is quite large but OK for many applications.
- • I still have other Elcoms which are not yet debugged as there are many variants, even with the same model number.
- • Elcoms are now in short supply but DFS-1101 variants are still available on eBay from Art–in-Part. These items may not be in working order but may be amenable to fault-finding as outlined in this talk.

Next month:

Direct programming of the Elcom DFS synthesiser PLL

Barry Chambers, G8AGN and Rob Swinbank, M0DTS

Low-cost Microwave Operating - with a Learning Bonus

E.R. Jewell, G4ELM

What if I told you that you could get operational on an amateur microwave band very quickly, using a readily available transceiver, obtained for a pocket-money price?

How about you assembling a complete station with audio, text transmission and even video capability for about the cost of a Raspberry Pi? And all the software required is free and easy to download and some of the hardware can be had for free too.

Can you see yourself operating every day with direct links from home or, whenever convenient, from a typical portable location, limited only by the availability of other stations to work?

Would you like to have a simple connection to a network of other, like-minded microwave operators right around the world?

All this is perfectly possible and a mere handful of UK microwavers are already doing it. Why only a handful? Well, the answer is that it requires a distinct shift in attitude and the use of technology not usually embraced by amateur microwave operators - nor by many HF or VHF operators either.

The key is that the operation is all digital in nature and the modes used all rely on IP signalling (that is Internet Protocol but **not requiring any Internet connection**). All the frequencies used are unquestionably microwaves with familiar radio path, power level and antenna opportunities for the amateur to explore. All your existing microwave experience and skills will still be needed - or can be developed!

I don't want to lose my audience here so I ask that you do not take fright and bolt at the mention of digital modes and IP Networks in the context of microwave operations! There is a distinct learning bonus here for all who get involved. Knowledge will be gained that is up-to-the-minute and has already proven highly career enhancing for those seeking better employment prospects in the field of modern communications networks.

Should you wish to do so, you can use the experience gained and the systems you create to provide Emergency Communications for Public Safety Incidents or in support of large events by teaming up with Raynet or similar bodies.

Whatever exploration you undertake, you will certainly fulfil the “self-training of the licensee” intent of the Amateur Licence with your knowledge expanding over a range of current telecommunications methods and networking skills. The learning starts quickly!

Where is this going? The idea is to create microwave communications networks with the greatest possible flexibility, quickly and at a very reasonable cost. The larger the number of amateurs who can become involved in any given area rapidly helps to create the most useful network in terms of available interconnections and the most versatile, failure tolerant communications scheme with a developing number of alternate links between all participants.

BroadBand HamNet - BBHN

The current method of offering all the benefits of the network described above is by use of broadband modulation techniques in those amateur microwave bands which can support spectrum use of that nature - in practice this means 2.4 GHz and above.

Yes, I do mean 2.4 GHz and not 2.3 GHz where, sadly, UK amateurs have almost totally lost general access to our preferred narrowband operating areas at 2,300 and 2,320 MHz. It is well worth noting that we still have an allocation running from 2,390 to 2,450 MHz available - despite having to share much of it with unlicensed users. There is some slight feeling of satisfaction at being able to “reclaim” amateur spectrum allocations which we had previously considered “lost” to the massed ranks of the unlicensed users of the ISM bands!

The “pocket money” transceiver that is most often used will be shockingly familiar to almost all Scatterpoint readers - it is a Linksys Wi-Fi Router from the ubiquitous WRT54G-series of products produced over a number of years for the domestic market to allow Internet access around the home. Such Routers can be obtained at low cost and, possibly, even free from such organisations as Freegle! In the USA they are often available for a few dollars at Charity Shops (“Goodwill” in the States) and even on e-Bay in the UK they are readily obtained for a few pounds up to £20 or so for rarer models.

Linksys WRT54G-series Router

An initial note of caution - do not rush out to buy such a transceiver; only certain models are suitable and an advisory “shopping list” is readily available1 to guide you.

Other domestic and commercial Wi-Fi devices are also suitable and the Ubiquiti range of products is foremost in this respect - see the same “shopping list”. There is a wide range of 2 and 5 GHz units available - some with external antennas and some with directional antennas built-in.

Other manufacturer's Wi-Fi Routers may also be suitable for conversion into a BBHN Node - it all depends on the development route originally taken - Open Source or Closed Commercial design for hardware and/or software.

Ubiquiti NM2 & Buffalo Router

When you have acquired a suitable Wi-Fi Router, it is a matter of a few minutes work to completely convert it from its intended use and turn it into a BroadBand HamNet NODE - a terminating and relaying point within an overall network. A large amount of background information, various “How-to” videos, vast numbers of Forum questions and answers together with a worldwide Node map and other material can be found on the Web site of the BBHN organisation in the USA2. There is a simple technique, fully documented, that will let even a networking novice acquire and load the new firmware onto the device to re-purpose it into an Amateur Radio digital microwave transceiver using nothing more than a PC and an Ethernet cable3 - and the conversion cost is zero!

Just be aware that, after conversion, the BBHN Node is no longer directly compatible for communications with domestic Wi-Fi systems yet the Node can still “see” and identify them plus measure their received signal strengths. The new Node will now be operating under the much more generous Amateur Licence conditions related to power output and antenna gain so you use your call-sign to uniquely identify it, digitally.

Open Source Software & “Free” Hardware of Many Kinds

Key to amateur re-use or re-purposing of the Wi-Fi Routers as digital transceivers is the Open Source nature of the Linux software that the manufacturers originally programmed them with under a General Licence - although this was often changed later for commercial reasons.

These Wi-Fi Routers, many recent IP Telephones and some other hardware items are really nothing more than general purpose Linux computers with specialist interfaces added to suit the product need. Almost all such products were designed to accept software up-grades and changes throughout their life. You do not need to be an expert in the Open Source Linux Operating System to make changes to the software/firmware that is already loaded in the product; you can simply download a different file from an appropriate Internet source and use the “Administrator” access interface provided to re-program for your intended application - Amateur Microwave operation.

Exposure to Linux devices is yet another learning opportunity and can easily be extended to cover modern, single-board computing devices like the Raspberry Pi and BeagleBone Black. The Raspberry Pi is a versatile single board computer offering high processing power with low power consumption, making it an attractive device for hobby electronics in general. These computers are the ideal companions for BBHN Nodes and they can be used as Clients or Servers to provide many of the Services or Applications that generate the voice, text, video or data material which BBHN operators use or exchange with each other. It is even possible to create a BBHN Node from just a Raspberry Pi and a USB Wi-Fi “dongle”!

A modern smartphone is not, technically, an Open Source product but they are so commonly available that numerous software applications are provided for them either free of charge or for a minimal outlay. A smartphone is a device designed to offer a primary service as a mobile telephone. However, they typically contain many other useful functions - Wi-Fi, GPS, motion sensors and a video camera. Incredibly, it is now possible to acquire such items as a functioning Android smartphone, either free or for minimal cost, and integrate it into your station. How? Well, I was advised simply to ask a nearby teenager! Cast-off smartphones can now be obtained merely by asking and I was able to receive two within 48 hours of a request on Freegle! Both devices were actually better, more recent models than my own phone!

Simply installing a free “app” turned a redundant smartphone device into a Wi-Fi linked WebCam which was soon networked into my BBHN Central System. Accessory items such as the power supply/chargers for such products can easily come from an ordinary Car Boot Sale these days! The optional switching and linking devices were also obtained at remarkably low cost - it is surprising how many advanced Ethernet switches are available on a well-known auction site with starting prices of 99 pence!

We may not be in the “good old days” of ex-military, World War II surplus gear - so fondly remembered by our amateur forebears - but we are now in an age where surplus electronic products of great complexity are readily available as give-away or throw-away items.

The BBHN Mesh

Each BBHN Node meshes automatically with all other Nodes that are in range - your own and neighbouring amateurs devices – and most Nodes can typically run the BBHN software plus another small software application simultaneously (e.g. a text chat room or a web page to provide what is known as an “Advertised Service”). Should a more complex Service be required, it can be run on a separate computing device like a PC or Raspberry Pi which has greater memory space available and simply connects to a BBHN Node via an Ethernet port - like the Asterisk Server illustrated below. Asterisk is an Open Source “telephone exchange” program which is available free for private use. Whether built into your Node or running on your PC, Raspberry Pi, etc. these add-on services can easily be advertised to all other node users who are connected.

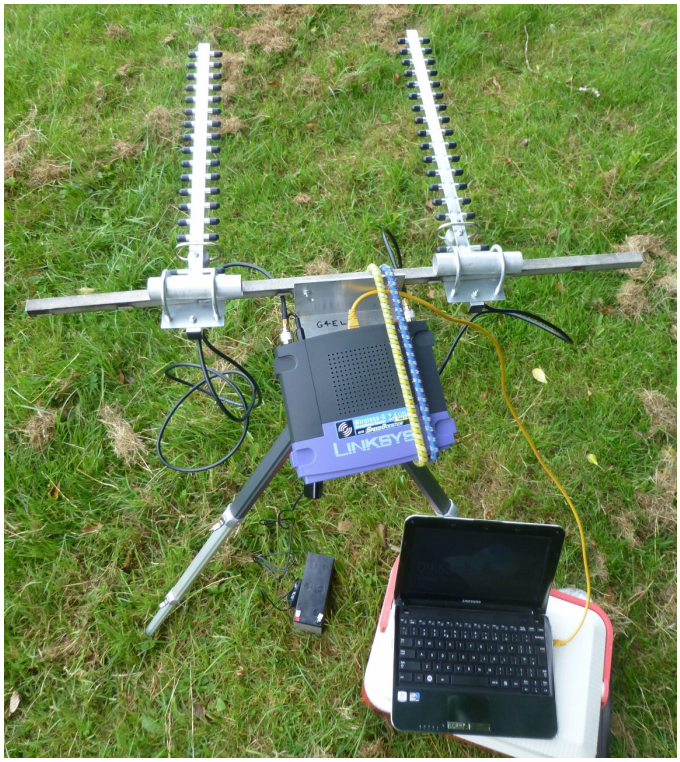
A “typical” BBHN station's “Cluster” of Nodes and ancillary equipment can soon grow - not least as you add more low-cost or free re-purposed hardware! Some form of central switching, routing and port forwarding sub-system may become necessary as the station's complexity develops and different forms of Internet linking are explored - and greater network learning is achieved. Ethernet switches and Wi-Fi Routers of the conventional type can readily be added to expand capabilities and the Services offered to other Mesh operators. See postings on https://www.facebook.com/groups/BBHNUK/ to view a diagram of one such central system.

Those fellow Mesh operators are already located all around the world. Of course, you will not be able to access the more distant stations directly by 2.4 GHz RF propagation but you CAN arrange a back-up system to get your International BBHN career underway - you can place your Nodes onto the wider Mesh via an Internet

Tunnel! Several BBHN UK operators now offer the facility to link a Client Tunnel device within your local "Cluster" to their QTH where a Tunnel Server is available which is permanently linked to a distant amateur's site allowing onward interconnection to numerous other Mesh operators and their Nodes and Services. Typically, these Tunnels reach across to Austin or elsewhere in Texas to gain access to the larger US Amateur BBHN microwave population who are already operational. Still further "tunnelling" then leads to all the developed countries in the world - certainly as far as New Zealand and Australia - so contact with these distant BBHN operators becomes simple and access to the Services they advertise is free and easy. Yes, you can have the best of both worlds!

What's in it for me?

Why would I want to experiment with BBHN? The attraction of so many modes available through just one Node when using compatible accessories is a draw. Speech, data, text chat, BBS, video, Web pages, GPS and NTP time standard data, streaming, etc. should be enough to get anyone started! There are equivalents to Echolink and DX spotting or ON4KST-like Chat systems to assist with all forms of microwave operating and all provided via such a low-cost introduction scheme. Come and join us in the BBHN UK group and either see what is happening via the Facebook page5 or make contact with the group by e-mail if you prefer6.



The latest Amateur Licence Conditions offer considerable new freedoms to experiment with portable stations, remote station control - even unattended operation. Read the Licence conditions and the OfCom Guidance Notes very carefully and you will be pleasantly surprised. Once your Node is fully meshed with those of other amateurs, licence conditions allow the forwarding of their material because you are all now within an established net.

A BBHN Node is much more than a microwave "Plaything"! Yes, you can still go out portable with a tripod-mounted station! One advantage over conventional amateur operation is that you know you will almost always be able to see, identify and measure the strength of other signals on the band - mostly ISM of course. It is still perfectly possible to make or acquire directional antennas with significant gain to add, externally, to your Node - see photo below. As a microwaver, I am keen to try alternatives to Wi-Fi vertical polarisation and intend to build a pair of circularly-polarised, helical antennas to use from elevated sites. BBHN networking is definitely an educational and worthwhile way to move your amateur microwave activities into the future.

Links:

1. "Node Shopping List":- http://www.broadband-hamnet.org/which-hardware-to-use.html
2. BBHN USA Web site - join now for free:- http://www.broadband-hamnet.org/
3. Node conversion method:- http://www.broadband-hamnet.org/documentation/68-firmware-installation-instructions.html
4. Facebook page for BBHN UK, new members welcomed:- https://www.facebook.com/groups/BBHNUK/
5. Web page for BBHN UK:- http://bbhnuk.onthewifi.com/
6. BBHN UK Contact e-mail address:- BBHNUK@gmail.com

"Typical" Broadband-Hamnet Cluster & Applications

Smartphone
WebCam
{Wi-Fi linked}

Node-30
Buffalo

Node-100
HSMM-Pi Node
Raspberry Pi B+
incl. WiFi dongle

5 Volt Supply

Node-20
WRT54

VoIP Phone

Non-BBHN
Wi-Fi Router

Central switching &
routing sub-system

5 Volt Supply

Raspberry Pi B
Running Asterisk

Node-10
WRT54

?

VoIP Phone

Ethernet cable to any Node
port for Admin or Comms

Node-200
Ubiquiti NM2

~24 Volt Supply
Via POE

Any PC

WAN port to domestic
Internet Router

Node-01
WRT54GSv1
Running BBHN Node
+ Tunnel Software

Tunnel Client provides an
Internet Link to BBHN World

RJ11 Audio cable

RJ45 Ethernet cable

All BBHN Nodes mesh together & operate in the 2.4 GHz Amateur Band
using 1 of the lower 6 channels common to the ISM allocation

Contest Results

John G3XDY, UKuG Contest Manager

5.7GHz Contest – June 2016

Slow but steady on 5.7GHz, conditions were aided by some rain scatter at times. Congratulations to Telford & District for continuing their winning ways, this time from Guernsey as GP3ZME/P. M0HNA/P was the runner up, just beating G4BRK by a very small margin.

June 5.7GHz Contest						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	GP3ZME/P	IN89QK	6	1464	G3XDY	398
2	M0HNA/P	IO91GI	6	598	GP3ZME/P	229
3	G4BRK	IO91HP	4	594	GP3ZME/P	261
4	G4LDR	IO91EC	4	488	GP3ZME/P	199

10GHz Contest – June 2016

Comments were few and far between in the logs. Some rain scatter was in evidence, with a noteworthy contact between G4KUX and F6DKW at 712km. In the Open section the Telford & District club again take the leading position, this time operating from Guernsey. Runner up was Nick G4KUX in Co Durham. In the Restricted section Stewart G0LGS/P took the honours, with M0HNA/P as runner up.

June 10GHz Contest						
Open Section						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	GP3ZME/P	IN89QK	12	3096	G3XDY	398
2	G4KUX	IO94BP	7	2633	F6DKW	712
3	G4LDR	IO91EC	11	1950	G4KUX	395
4	G4BAO	JO02CG	3	625	G4KUX	298
Restricted Section						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G0LGS/P	IO81XW	8	1065	G4KUX	302
2	M0HNA/P	IO91GI	10	754	GP3ZME/P	229
3	2E0MDJ/P	IO81XW	5	563	GP3ZME/P	282
4	G1DFL/P	IO91KM	1	24	G8GTZ/P	24
5	G3YJR	IO93FJ	0	0		0

24GHz Contest – June 2016

In contrast to last year where the majority of the entrants were roving during the contest, all of this year's entrants operated from just one location. This did mean that some stations felt left on the fringes of the activity, however.

Congratulations go to Keith GW3TKH/P as winner, with G8CUB/P as runner up.

June 24GHz Contest						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	GW3TKH/P	IO81LS	3	266	G8CUB/P	93
2	G8CUB/P	IO91CL	5	209	GW3TKH/P	93
3	G3ZME/P	IO82QL	1	84	GW3TKH/P	84
4	G4LDR/P	IO81XG	2	65	G4NNS	36

47GHz Contest June 2016

Four stations entered this event, and Roger G8CUB/P worked all the others to give him the leading score by some way. Keith GW3TKH/P and Pete GW4HQX/P were joint runners up. As on 24GHz, no roving was used this time.

June 47GHz Contest						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G8CUB/P	IO91CL	3	215	GW3TKH/P	93
2	GW3TKH/P	IO81LS	1	93	G8CUB/P	93
3	GW4HQX/P	IO81LS	1	93	G8CUB/P	93
4	G4LDR/P	IO81XG	1	29	G8CUB/P	29

76GHz Contest June 2016

76GHz has now been included in this event, and this brought entries from Neil G4LDR/P and Roger G8CUB/P. They worked each other over a 29km path. More entries would be welcome!

June 76GHz Contest						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G4LDR/P	IO81XG	1	29	G8CUB/P	29
1	G8CUB/P	IO91CL	1	29	G4LDR/P	29

5.7/10GHz Championship Tables

Positions after two events, the best three count to the overall total.

5.7GHz				
Pos	**Callsign**	**5/29/15**	**6/26/15**	**TOTAL**
1	G(P)3ZME/P	1000	1000	2000
2	GW3TKH/P	827	0	827
2	GW4HQX/P	827	0	827
4	G4BRK	406	406	812
5	M0GHZ	471	0	471
6	M0HNA/P	0	408	408
7	G4LDR	0	333	333
8	G3VKV	156	0	156
10GHz Open				
Pos	**Callsign**	**5/29/15**	**6/26/15**	**TOTAL**
1	G(P)3ZME/P	1000	1000	2000
2	G4KUX	466	850	1316
3	G4LDR	0	630	630
4	GW3TKH/P	530	0	530
5	G4BAO	271	202	473
6	M0DTS/P	424	0	424
7	G8GTZ/P	250	0	250
8	G4GSB/P	163	0	163
9	G3VKV	99	0	99

continued...

10GHz Restricted				
Pos	**Callsign**	**5/29/15**	**6/26/15**	**TOTAL**
1	G0LGS/P	1000	1000	2000
2	2E0MDJ/P	1000	529	1529
3	M0HNA/P	0	708	708
4	GW4HQX/P	549	0	549
5	M0GHZ	498	0	498
6	G0PEB/P	487	0	487
7	G1DFL/P	54	23	77
8	G3YJR	0	0	0

UK Microwave Group Awards News

Congratulations to Tony G4NBS, who has just received Squares Awards stickers for having 70 squares confirmed on 1.3GHz, and 15 squares on 2.3GHz. The claims included some nice DX such as SP4MPB (KO03) on 1.3GHz and OZ9PP in JO47 on 2.3GHz.

A reminder that UKuG awards are free to our members. There are awards for squares on all microwave bands in increments of 5 squares, plus Firsts awards, and most recently joint UKuG-SOTA distance awards for portable operation.

Look for details and claim forms here: http://www.microwavers.org/awards.htm

73 de John G3XDY, UKuG Awards Manager

Nanowaves – a new Finnish record

Janne Pulkkinen OH1SDR (from the Nanowaves Yahoo group)

Claiming a new Finnish record of 27.7km line of sight optical contact using digital modes on incoherent infrared (850nm) between Hevonlinna (OH1SDR) and Tornivuori (OH1MN) observation towers 1.8.2016.

After having a long period of nightless nights here in Finland, it's getting a bit darker again, which makes me happy in many ways! One of them is THz experiments.

So, we did our first run couple nights ago and wanted to share the results. I wrote a story about the trip.

My idea was that it would give something also for the non-radio-amateurs.

Here's few pics taken from the trip:

The optical path

https://groups.yahoo.com/neo/groups/UKNanowaves/photos/albums/1271508668/lightbox/537135456?orderBy=ordinal&sortOrder=asc&photoFilter=ALL#zax/1988152201

Tornivuori (Tower mountain) observation tower end

https://groups.yahoo.com/neo/groups/UKNanowaves/photos/albums/1271508668/lightbox/537135456?orderBy=ordinal&sortOrder=asc&photoFilter=ALL#zax/1163606231

The author at the Hevonlinna observation tower end

https://groups.yahoo.com/neo/groups/UKNanowaves/photos/albums/1271508668/lightbox/537135456?orderBy=ordinal&sortOrder=asc&photoFilter=ALL#zax/537135456

First decodes using nothing else than PSK, hi

https://groups.yahoo.com/neo/groups/UKNanowaves/photos/albums/1271508668/lightbox/537135456?orderBy=ordinal&sortOrder=asc&photoFilter=ALL#zax/721276454

Activity News : July 2016

By Neil Underwood G4LDR

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

Thank you to those who sent in activity reports. July has seen quite a bit of activity on the mm wave bands including activity in the north of England. Although there has been activity on the cm bands especially non-contest activity I have not received any reports. I have received a report on the G(P)3ZME trip to Guernsey that took place at the end of June which I include here. I also include a report on some 10GHz EME tests.

Activity on the cm bands

From G3UKV AKA G(P)3ZME/P, IN89.

A few random notes following the Telford & DARS trip to Guernsey, under the call GP3ZME/P (in case some readers were wondering, the prefix 'GP' is an optional alternative for a club call sign to be used in Guernsey). The Telford group visited the island at the end of June, but arrived home with insufficient time to make even a brief report before the 1st July deadline for Scatterpoint reports. At HF and VHF, the group had almost a 1000 QSOs, but things were a little quieter above 1000MHz….

23cm was rather a poor relation. Using a Tonna yagi, we only had 10 watts available, due to the failure of a newly constructed PA just a few days before we left on our trip. QSOs included G4YTL, F5FJZ and GK4LOH. Activity over the period (June 25-29th) was minimal.

On 13cm, we worked Ralph G4ALY in IO70VL, G8OHM (IO92), G4NNS (IO91), G8CUL, 2E0MDJ/P and G4BRK. The South Coast and Shropshire beacons were both audible much of the time.

9cm was a blank, although the equipment was available, and the above two beacons were both audible.

6cm (5.7GHz) was also a very quiet band. GB3ZME occasionally became audible, along with GB3SCX of course. Stations worked included Brian G4NNS, G4ALY, M0HNA/P, G4BRK, G4LDR and G3XDY during the 5.7/10GHz during the June 26 contest period.

3cm was the most rewarding band, with 14 different stations worked. No spectacular ODX, but included G4NNS, G7JTT (IO90), G4ALY, M0HNA/P (IO91), G0LGS/P (IO81XW), 2E0MDJ/P, G4EML/P, G6ZAC/P (IO90SV), G8GTZ/P (IO91), G4LDR, G8OHM (IO92AJ), F6DKW (JN18, 360Km), F1PYR/P (JN19), and best DX G3XDY (JO02OB) at 397Km.

We also carried 24GHz with us, but there were no requests or tests at all on that band, which was a little disappointing.

All the equipment worked fine on this our fourth trip to Guernsey – no blue smoke to be seen, not even from the ubiquitous FT817 IF transceivers, (we blew up two on our last visit in 2012!). Our paper logging left a bit to be desired, but hopefully our UKAC and 5.7/10G entries were more-or-less accurate. And no rough English Channel ferry trips either.

Thanks to all who gave us a call, whether successful or not, on any of the microwave bands. Also to the various residents of Guernsey, and members of the Guernsey ARS who showed us their 'bunker' club HQ and especially Paul GU4YBW who gave us a mini tour of the island.

73 Martyn G3UKV
(The uWavers group included Martyn G3UKV, Jim G8UGL, Mike G4NKC & family (Kim, Lucy), Dave G8VZT, Kevin G8UPF. The DC-banders included Paul M0PNN, David MW0UAA, Peter M1FGN.).

The GP3ZME/P station ready for action.

From G4LDR, IO91

On the 21st July I attempted a contact with Alan, F/GM0USI/P in IN88AQ. Unfortunately I have a line of trees that I was beaming along in the direction of IN88 and consequently no contact on 10GHz was possible. A number of other stations were active that day and did manage QSO's with Alan. I did however work Adrian, G4UVZ/P (IO80LW) who was running his new higher power amplifier.

mm- wave Activity

From Roger (and Sue) G8CUB, IO91CL

For the millimetre contest in July, I again travelled to Hackpen IO91CL12. With so many bands to set up, I had gladly accepted the assistance of my xyl Sue. Chris G0FDZ had also made the journey, to set up on the track south of the car park at Hackpen.

The wx forecast, had looked very promising earlier in the week. But, on the day, the humidity was high, with mist out to the west.

A 47GHz qso with Keith GW3TKH/P (IO81LS) showed signal levels to be down on that expected, being 55 each way on ssb, at 93km. Unfortunately Keith's 24GHz LO had failed, but 24GHz signals from Neil G4LDR/P (IO91WG) were huge. I had brought the van, to accommodate all the gear, so was using a 60cm dish at 7m on 24GHz.

A pity then that the high dew point, meant that any long range contacts were not going to happen. On 76GHz I was really struggling to find a signal from Keith. Eventually I found it, but only S1, way down on what was worked on the same path last September. A one way qso resulted, as Keith could not hear my 50mW signal. Conversely a 2 way 76GHz contact with Neil was very easy, with signals 59+ in each direction. We then worked on 47GHz with big signals each way

I then moved location to Clyppe Pypard IO91BL36, to try and work back to Chris at Hackpen. On 134GHz signals were again down on expected, and we just managed a 1 way contact at 5.3km. Then trying a new band at 122GHz, I could just get a whisker of a signal from Chris. It was too weak to identify, or peak. So back at Hackpen we completed a 120m contact on 122GHz, at 599 each way of course. Neil had arrived at Hackpen, to witness our 122GHz contact, while he worked Keith on 47GHz.

Chris G0FDZ had already completed contacts with G4LDR on 24/47/76GHz, and one way with GW3TKH/P on 47GHz.

The multi-dish, multi-band set up of Chris G0FDZ/P and G8CUB/P on Hackpen Hill
(Roger's 24GHz system is on the mast attached to the van).

Roger also sent in a report of further 122GHz activity

On Sunday 31st July Chris G0FDZ and I did some tests on 122GHz at Higham in Kent. Assisting Chris were Kevin G8XIR & Chris G4FJW.

Unfortunately some gremlins got into my Rx LO, which failed. So we just made some 1 way contacts. At 2.3km signals from me received by Chris G0FDZ/P, were 559. At 1.3km the level had improved to S6-7. Long range contacts on 122GHz at low altitude are always going to be a problem due to oxygen attenuation, but tests suggested 5km should be possible.

From Neil G4LDR/P IO80 and IO91

For the 24GHz and up contest on the 17th July I operated from Stoke Hill (IO81WG) on the North West edge of Salisbury plain before moving to Hackpen Hill (IO91CL).

I had easy contacts with G8CUB/P and G0FDZ/P on Hackpen from Stoke Hill on 24, 47 and 76GHz over the 29km line of sight path. Keith GW3TKH/P on the Blorenge (IO81LS) had problems with his 24GHz system so an attempt was made on 47GHz, which was unsuccessful as the path is not quite line of sight and high humidity was attenuating signals.

The only other station active on 24GHZ that I was aware of was G3ZME/P (IO82QL). This path proved to be unworkable on this occasion due to poor conditions.

I decided to move to Hackpen where I worked GW3TKH/P on 47GHz over the 93km line of sight path. Keith's 100mW amplifier on TX and the same amplifier on RX enabled me to hear Keith and him to hear me. Simple diode mixers both ends would not have worked due to the high humidity. For the same reason it was decided not to attempt a QSO on 76GHz as we both have diode mixers with only a few hundred micro watts on transmit at best (and high noise figures on receive).

I might be questioned if July is the best month for an all band mm-wave contest with the potential of high temperatures resulting in high concentrations of water vapour in the atmosphere adding many 10's of extra loss at these high frequencies even over middle distant paths. However I get the impression that some mm wave operators would not want a contest in the middle of winter, although they would be willing to operate on a cold, low humidity day to break a distance record.

From Rob M0DTS, IO94.

A short report on some 24GHz activity in IO94.

Terry G1LPS and I recently completed some 24GHz transverters, these were built using Broadern 28GHz transceivers and Elcom LO modules. We have been doing some tests on ATV and SSB, the ATV tests so far have been a Gunn Tx into a 25dB horn at Terry's QTH and I have been portable at various locations up to 50km using the transverter and sky mini dish to receive his signal.

In the International ATV contest in June we had a 1-way contact at 50km with P5 signal on Analogue FM, the weather was thick fog with heavy rain at one end, It shows that qso's are possible whatever the weather even with low power!

We have also has some fun ssb qso's from our home locations, my setup was the transverter on my mast with the sky mini dish and Terry was using a tiny horn pointing upwards at his mast through the shack window using reflections for the qso, the path is 28km.

We plan on doing some more dx paths on ATV/DATV/SSB soon using the transverters at both ends to utilise the greater Tx power. Clive G4FVP now has the parts to build a transverter and will hopefully be active soon.

From Barry G8AGN, IO93.

Gordon, G0EWN, and Barry, G8AGN, carried out our first two way tests on 76GHz today, 29 July 2016. We started at our local reservoir and tried across a 600m path. Signals were S7/8 both ways. We then both moved locations to try our local 10km path on the west side of Sheffield. The weather was less than ideal with frequent rain showers, low cloud and mist. Both ends of the path were above 1000ft asl. Gordon's signals were received by Barry S7 and Barry's signal was S2/3 with Gordon. This was not really an accurate report, however, as by this stage Gordon's location was completely obscured by low cloud and rain!

Gordon was using separate Tx and Rx which were obtained from G3PYB before he became SK. The Rx has been modified by replacing most of the original LO chain by an Elcom DFS1301 synth.

Barry was using an Elcom ILCDFSL-1295 synth for Tx and Rx, followed by a tripler which drove a DL2AM doubler/mixer block. The antenna was a 25cm ProCom dish with a home-brew 2p splashplate and circular waveguide feed.

EME

From John, G7JTT, IO90.

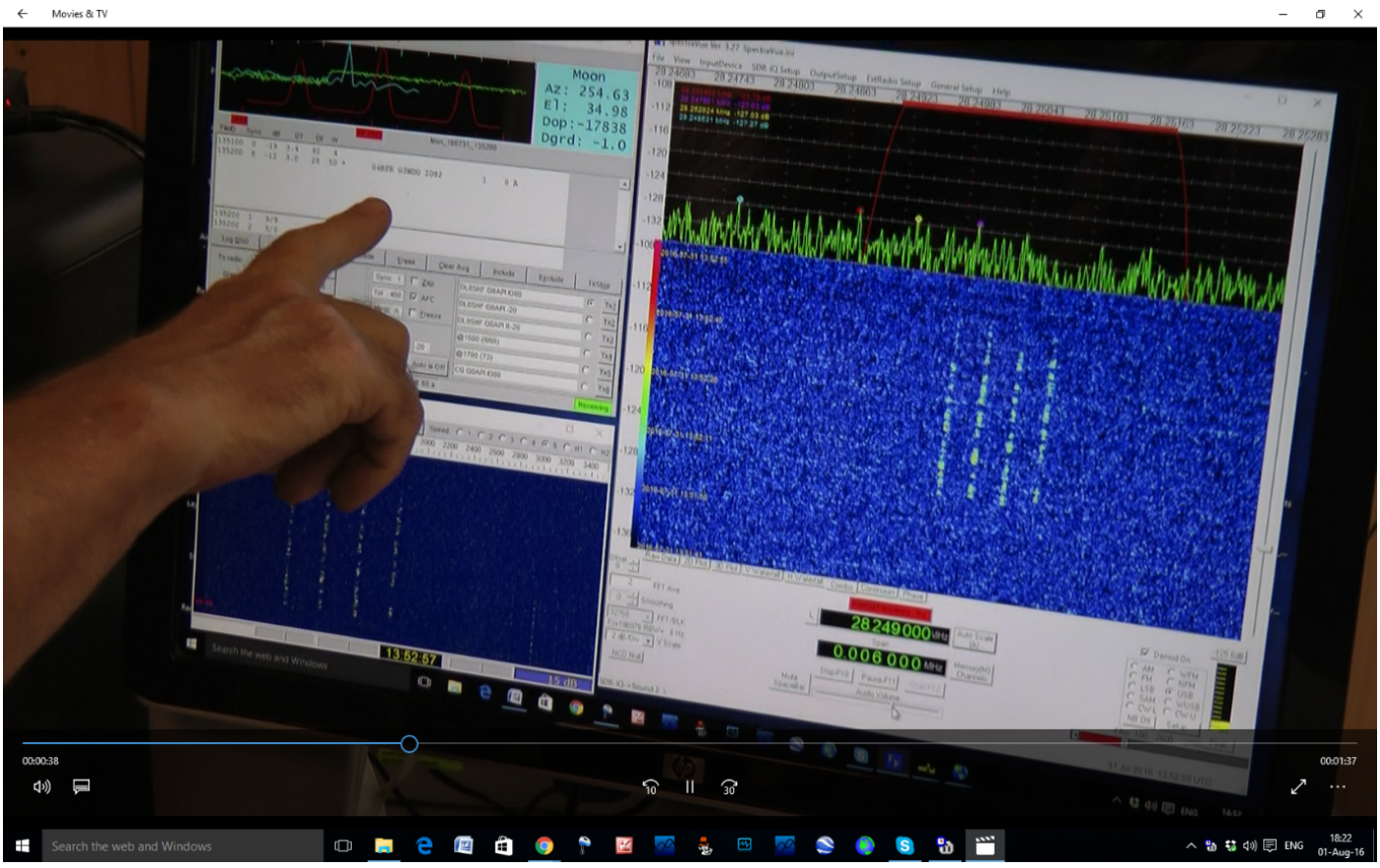
Sunday 31st August was an opportunity to test the refurbished 12ft diameter dish at Flight Refuelling ARS (G4RFR). This dish was originally used by FRARS members to work Charlie G3WDG on 10GHz back in 1993.

Over recent years the AZ/EL drives have been replaced with steeper motor systems and an NEC Earth station positional indicator system added to give 2 dec. place resolution. Manual tracking was used for EME tests, resulting in decoding of JT4G signals from the Moon beacon DL0SHF and JT4g, CW and ssb from G3WDG. Charlie's signals were at a peak approaching 20dB above the noise floor in a 6Hz bandwidth.

The RX used for the tests was an Octagon LNB with a short brass guide tube to a Super VE4MA choke feed, designed to match the 0.43f/d dish. The tube was fitted with a taper end to mate with the original LNB horn - held in place with quick set Araldite.....

Sun noise was measured at over 15dB, with 1.5dB of Moon surface noise making for easy tracking by meter and SDR. The system was locked using G4JNT software controlled synth LO mixer/down converter from 618 to 144MHz and a local 10368.000000MHz source generated from a 10MHz GPS referenced synth outputting at 1296.000000MHz via waveguide filter and a 20dB horn .

Once again Julian G3YGF and John G0API, who operated the system, wish to thank G3WDG and Petra G4KGC for the excellent signals - we promise to build some TX kit next ...!



G3WDG's JT4g signal as received at G4RFR

... and finally

The deadline for activity news for the next edition of Scatterpoint is Thursday 1st September.

122 GHz - The First UK Amateur Radio contact

https://www.youtube.com/watch?v=4-UDVoOM6PQ&feature=em-subs_digest

Published on Aug 4, 2016

This video is of the first UK contact in the 122 GHz band which took place on Sunday, July 17 at 1345 UTC between Roger Ray G8CUB/P and Chris Whitmarsh G0FDZ/P, both stations located at Hackpen, Wiltshire (IO91CL)

The distance was 120m and the CW reports were 599 both ways.

The 122 GHz band suffers from high atmospheric losses due to an Oxygen resonance (similar to 60GHz), so signals on 122 were weaker than on 134 GHz.

The weather had high humidity, and absorption of all millimetre wave frequencies was considered by many to be high. Power levels were 70uW for Chris G0FDZ and 300uW for Roger G8CUB. One feature of G0FDZ's system was the use of a slab type mixer which has been recently developed to make millimetre wave mixers easier to construct.

Recent beacon approvals

Murray Niman G6JYB

GB3SCQ	47088.905	Bell Hill	New Beacon	Approved Jul-2016
GB3CMS	10368.960	Chelmsford	Site Change	Approved Jun-2016
GB3NGI	1296.905	Ballymena	Replacement	Approved Jun-2016 (may succeed GB3CFG)
GB3USK	1296.870	Mere, Wilts	Site Change	Approved Jun-2016 (was 1296.875)

Other News

The UKuG website and our YouTube channel has been updated with videos and photos of 47 and 122 GHz millimetric kit and operating at:

www.microwavers.org/?47ghz.htm

www.microwavers.org/?122ghz.htm

An opportunity to hear even more about this will be on Tuesday September 3rd when Chris G0FDZ gives a talk on "Millimetric Microwaves" at the Chelmsford Club - as per:-

www.g0mwt.org.uk/#September

Meanwhile in the lower bands, UKuG supported the detailed and robust RSGB response to Ofcom's 5.7GHz Wi-Fi consultation at

http://rsgb.org/main/blog/spectrum-forum-posts-overview/spectrum-forum-papers-consultations/2016/08/01/5ghz-wi-fi/

73

Murray G6JYB

UKµG Microwave Contest Calendar 2016

Dates	Time UTC	Contest name	Certificates
6-Mar	1000 - 1600	1st Low band 1.3/2.3/3.4GHz	F, P,L
10-Apr	1000 - 1600	2nd Low band 1.3/2.3/3.4GHz	F, P,L
8-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz	F, P,L
29-May	0600 - 1800	1st 5.7GHz Contest	F, P,L
29-May	0600 - 1800	1st 10GHz Contest	F, P,L
5-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
19-Jun	0900 - 1700	1st 24GHz Contest	
19-Jun	0900 – 1700	1st 47GHz Contest	
19-Jun	0900 – 1700	1st 76GHz Contest	
26-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
26-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
17 -Jul	0900 - 1700	24GHz Trophy / 47 / 76/122-248 GHz	
31 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
31 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
14- Aug	0900 - 1700	3rd 24GHz Contest	
14- Aug	0900 - 1700	3rd 47GHz Contest	
14- Aug	0900 – 1700	3rd 76GHz Contest	
28 -Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
28 -Aug	0600 - 1800	4th 10GHz Contest	F, P,L
11 -Sep	0900 - 1700	4th 24GHz Contest	
11 -Sep	0900 - 1700	4th 47GHz Contest	
11 -Sep	0900 – 1700	4th 76GHz Contest	
25 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
25 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
13 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz	F, P,L

Key:		
	F	Fixed / home station
	P	Portable
	L	Low-power (<10W on 1.3-3.4GHz, <1W on 5.7/10GHz)

Contest results are also published online – please follow the link from the UKuG Contests page at:

www.microwavers.org/?contesting.htm

73
John Quarmby G3XDY

Microwave activity days in France. Journeés d'Activité

August WE 27 & 28* September WE 24 & 25 October WE 29 & 30

* Please note date change in August.

73 Jean Paul F5AYE

Events calendar

2016

Jan 23	Heelweg	www.pamicrowaves.nl/
Feb 13	Tagung Dorsten	www.ghz-tagung.de/
Apr 9	CJ-2016, Seigy	cj.ref-union.org/
Apr 16–17	Martlesham Microwave Round Table & UKμG AGM	http://mmrt.homedns.org
Apr 16–17	IARU-R1, Vienna	
Apr 16–17	EUCARA (European Conference on Amateur Radio Astronomy)	https://www.eucara.nl
Apr 23	RSGB AGM, Scotland	rsgb.org/agm
May 20 – 22	Hamvention, Dayton	www.hamvention.org/
May 22	BroadBand HamNet (BBHN) Meeting, Crawley ARC	BBHN.Event.2016@gmail.com
Jun 24 – 26	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
July 9–10	Finningley Round Table	www.g0ghk.com/events/round-table/
Jul 29 – 31	Amsat-UK Colloquium, Holiday Inn, Guildford	www.amsat-uk.org/colloquium/
Aug 19–21	EME2016, Venice	www.eme2016.org/
Sept 9–11	61.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 18	Crawley Round Table	www.microwavers.org/cra-prog.htm
Sept 24 –25	BATC Convention, RAF Museum Cosford	www.batc.org.uk/convention.html
Sept 30–Oct 1	National Hamfest	www.nationalhamfest.org.uk/
Oct 3 – 7	European Microwave Week, London	www.eumweek.com/
Oct 7 – 9	RSGB Convention	rsgb.org/convention/
Oct 13–15	Microwave Update, Saint Louis, Missouri	www.microwaveupdate.org/
Nov 12 (tbc)	Scottish Round Table	www.gmroundtable.org.uk/

2017

Apr 22–23	Martlesham Microwave Round Table & UKμG AGM	http://mmrt.homedns.org
July 14 – 16	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Oct 6 – 8	RSGB Convention	rsgb.org/convention/
Oct 8 – 13	European Microwave Week, Nurembourg	www.eumweek.com/

2018

June 22–24	Ham Radio, Friedrichshafen	http://www.hamradio-friedrichshafen.de/
Sept 23–28	European Microwave Week, Madrid	http://www.eumweek.com/

NB Some of the 2017/18 event links may not be working yet.

Yahoo log-in for Scatterpoint

We have received a number of reports from members advising they are no longer able to log into Yahoo groups. Some months ago Yahoo Groups made changes to its formatting including a change to the sign-in page where the original single page requested entry of Yahoo ID or email and a password.

The revised sign-in now has two pages where the first page requests an email address only. If you enter a non-Yahoo email address and click "Next" you will see a message: "sorry, we don't recognise this email".

The solution is to enter your normal Yahoo ID into the "email box" and click "Next", this will bring in the second page requesting your Yahoo password.

Enter your password and click "Sign in" and you should now be in your Yahoo groups Home page.

If you are aware of any UKuG members having difficulty with their login to Yahoo groups please pass this information on to them.