An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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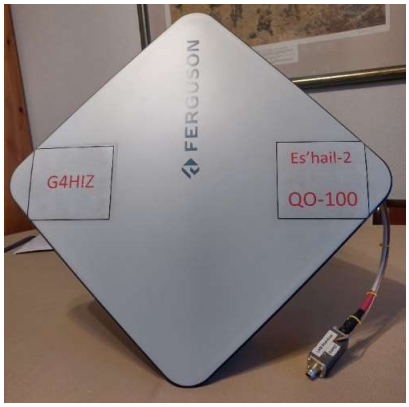

Jen G4HIZ 'Squarial' for 10GHz QO-100


Pete G1DFL on 24GHz from Dover

UK Microwave Group

Subscription Information

The following subscription rates apply

UK £6.00 US $9.00 Europe €9.00

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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)

Please send pictures and tables separately, as they can be a bit of a problem.

Thank you for you co-operation

Roger G8CUB

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.

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 (e.g. 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 contact the committee.

The current list is available at

www.microwavers.org/tech-support.htm

UKµG Chip Bank – A free service for members

By Mike Scott, G3LYP

Non-members can join the UKµG 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 components on the site will not be a guarantee of availability of that component.

The service is run as a free benefit to all members of the UK Microwave Group. The service may be withdrawn at the discretion of the committee if abused. Such as reselling of components.

There is an order form on the website with an address label which will make processing the orders slightly easier.

Minimum quantity of small components is 10.

These will be sent out in a small jiffy back using a second class large letter stamp. The group is currently covering this cost.

As many components are from unknown sources. It is suggested values are checked before they are used in construction. The UKµG can have no responsibility in this respect.

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

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Loan Equipment

Don't forget, UKuG has loan kit in the form of portable transceivers available to members for use on the following bands: **Contact Neil G4DBN for more information**

5.7GHz 10GHz 24GHz 76GHz 122GHz

Direct Programming the newer Elcom Synthesizers

Lehane Kellett, G8KMH g8kmh@mm-wave.com

Introduction

The Elcom synthesizers are still in use for many of the microwave bands and the usual approach to setting them on frequency is to use an external PIC (G4FRE, et al) or drive the ADF4252 directly with an Arduino(M0DTS/Scatterpoint 9/2016). However, the newer units contain a flash programmable PIC16F73 instead of the 16C73B. Not surprisingly there's a socket on the board for programming the device in production and this is the approach detailed here. Doing so makes the unit self-contained, only needing power, at the expense of more complexity in setting it up than an external PIC, but read on.

As the PLL is programmed directly the range of frequency intervals, within the capabilities of the module, are wider.

Prerequisites:

- A JST 1.25 mm 5 pin connector with leads. These are often known as servo cables and available (£1-2) from the usual sources.
- PicKit 3 or similar in circuit PIC programmer
- MPLAB programming environment, with C compiler (optional, see below)
- The ADIsim windows program to calculate PLL register values (optional..)
- A copy of the code, contact me for a copy of the C source code (optional..)

Firmware

The C code simply sets the ADF4252 registers, as calculated by ADIsim. If you haven't used ADIsim before then it does require some knowledge of the device. Rob, M0DTS, also set the DAC with his Arduino and this code also does this. I'm guessing this value could do with optimising but so far had no issues.

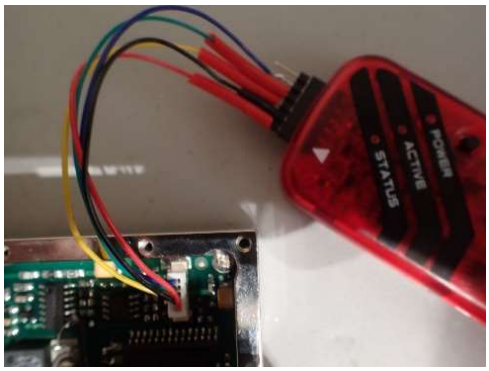
Alternatively, I'll calculate the ADF4252 values for a specific frequency, change the code, and send a small .hex file to be flashed, just as long as I'm not overwhelmed! I will need the model number too.

It would be easily possible to extend the code to read the input pins, currently used for serial input from the external PIC, and have multiple frequencies available.

Connecting to the Elcom

The PICKIT or similar needs to be connected to the JST connector leads. The colour codes seem to be all the same on the servo cables, so are:

PICKIT	Function	Lead(skt pin)
1	MCLR/Vpp	Red (1)
2	Vdd	Black(2)
3	Vss GND	Yellow(3)
4	PGD/ICSPDAT	Green(4)
5	PGC/ICSPCLK	Blue(5)



If you're using a different programmer then connect the leads as indicated in the table. Ensure the Elcom is powered before programming and the MPLAB IDE is configured to not supply power from the PICKIT.

References

Scatterpoint September 2016 - https://www.microwavers.org/scatterpoint/2016/Scatterpoint_1609.pdf
http://g4fre.com/dfs1201.htm http://www.m0dts.co.uk/index.php?item=161

An innovative approach to a 10GHz antenna with the re-use of a 'Squarial'

Jen Easdown G4HIZ

Many of us shall remember the 'Squarial', one of the antenna options from the ill-fated British Sky Broadcasting (BSB) satellite broadcast system of the late 1980's. These occasionally pop-up at rallies and I bought a couple recently for experimentation. The squarial is a type of phased array, consisting of 225 antenna elements, connected such that all the individual signals are added together to give an overall gain relative to a single element. One can only guestimate the gain to being around 26dBi.

Originally, the antenna was designed to receive Right-Hand-Circular polarised signals in accordance with the WARC-77 frequency plan for the UK satellite broadcast channel allocations, in the range 11.7 to 12.2GHz.

Taking a Squarial apart reveals the phased array structure, as shown in Photo 1.

Photo 1. The 225 element array present in a Squarial

The question was, is a squarial any good for 10GHz band operation?

After removing the LNB, it was seen that it used a WR-75 waveguide interface with two mounting screws matching a standard 4-hole flange. Hence waveguide components were put together to enable an Octagon LNB to be mated to the antenna (see Photo 2). The original LNB was discarded due to its poor performance relative to modern standards.

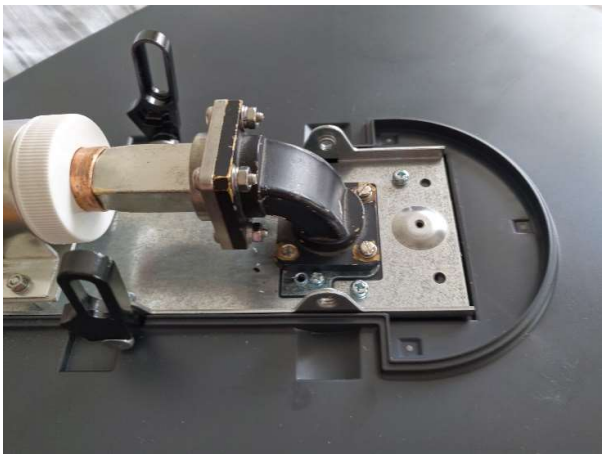


Photo 2. Waveguide interface and LNB mounting

After sorting out the LNB, a mounting bracket was fabricated to allow the antenna to be mounted and rotated to check for receive capability. See Photo 3.

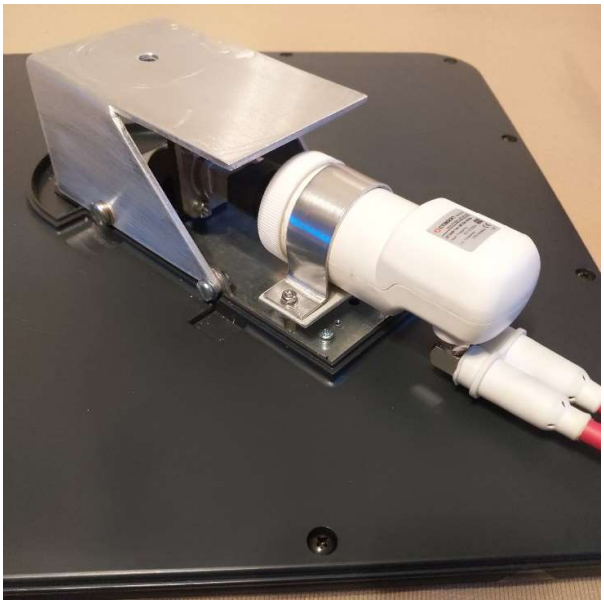


Photo 3. Mounting bracket

At this stage, it wasn't known what the polarisation was. Was it circular or something else? If it was circular, then a 3dB loss was anticipated when receiving a linearly polarised signal (as for QO-100). However, on testing with reception from the QO-100 narrow-band transponder, vertical downlink, it was found that the antenna definitely had linear polarisation characteristics, i.e. good gain with optimum orientation and about -16dB at 90 degrees off optimum. One can only assume that the original circular polarisation was only valid in the originally designed narrow frequency range, with linear polarisation being predominant at the QO-100 receive frequency of approximately 10.5GHz.

QO-100 satellite reception tests were performed using a FunCubeDongle Pro+ SDR together with SDR# software, with a 2.4kHz bandwidth. Signal reception quality of about 28dB S/N was achieved for the narrow band beacon at 10.4895 GHz. See Photo 4.

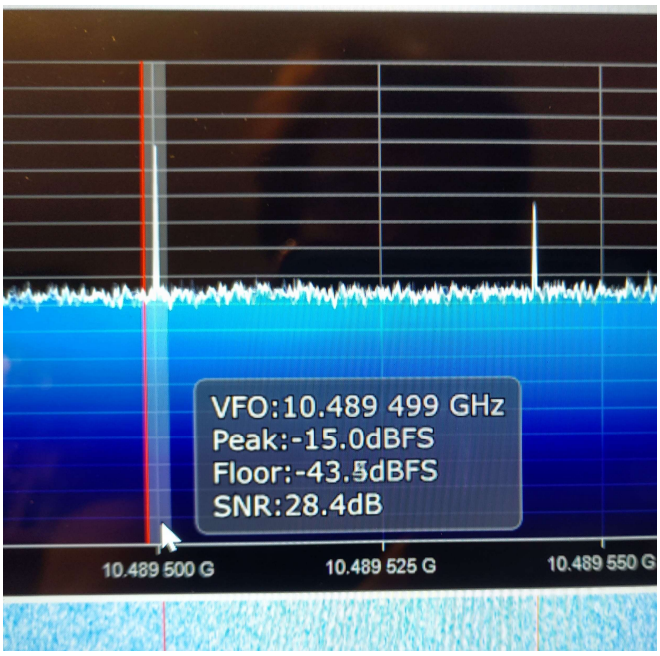


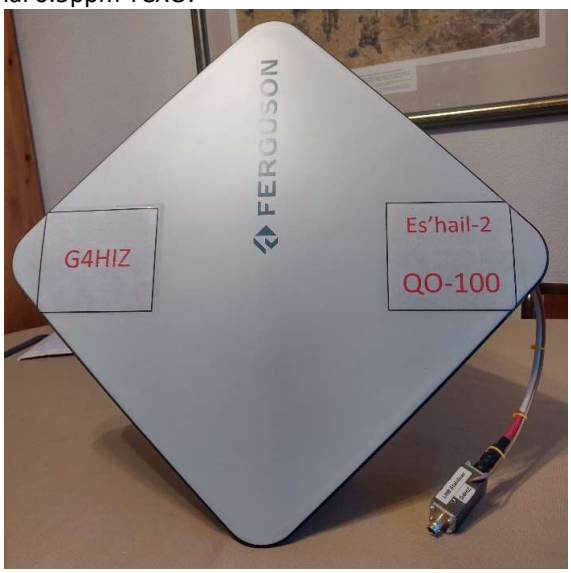
Photo 4. Reception of QO-100 narrow band beacon

The antenna gain appeared to be quite good, being roughly equivalent to a 56cm dish, with the Squarial only measuring 0.4m x 0.4m (internally about 0.35m x 0.35m).

After this, terrestrial beacon reception was tried using the GB3PKT 10GHz beacon on 10.368945GHz located at St Osyth in Essex and received at Warden Bay car park on the Isle of Sheppey, Kent. The distance involved was about 50km across the Thames Estuary. Reception was good once again. In this case, the antenna was rotated such that the 'Ferguson' was horizontal to give horizontal polarisation. A screen shot of the reception (same reception conditions as for QO-100) gave a S/N of about 37dB. See Photo 5.

Photo 5. Reception of GB3PKT at Warden Bay, Sheppey (JO01KJ)

The complete G4HIZ modified Squarial can be seen in Photo 6. The LNB was of the Octagon PLL type with local stabilisation provided by an external 0.5ppm TCXO.



G4HIZ Squarial with vertical polarisation in-line with the 'Ferguson' name

The Squarial is comprised only of a number of interconnected passive antenna elements, hence it should be good for transmit also. To check this, it is intended to conduct tests using both narrow band and DATV signals.

I hope that I have whetted the appetite of 10GHz experimenters. If you've got a Squarial somewhere, why not get it out and have a play!

A 10-12.5 GHz in, 40-50 GHz out Quadrupler

– Final Report Tom Williams, WA1MBA,

Presented at - Microwave Update/ Eastern VHF Conference, 2023

Background

Purpose – to increase amateur activity on the EHF bands by at least two means. Firstly, this device can be used directly as a beacon, albeit low power, when coupled with a signal source of +3 to +5 dBm at 11.77+ GHz it will output a signal at 47.088+ GHz at just under 20 milliwatts (about +12 dBm). This signal can be frequency modulated, keyed on and off, or continuous, and the device provides for external keying. There are other papers and talks in this Microwave Update meeting describing 47 GHz beacons and sectoral antennas for that purpose. Secondly, the device can be used on the bench as a ready source of EHF signals in the 40 to 50 GHz region at power levels +5 to +12 dBm for signal source needs. Although this level of signal is not quite high enough for use as an LO in some mixers, it can suffice in others.

Basic Requirements that were met with the final device are:

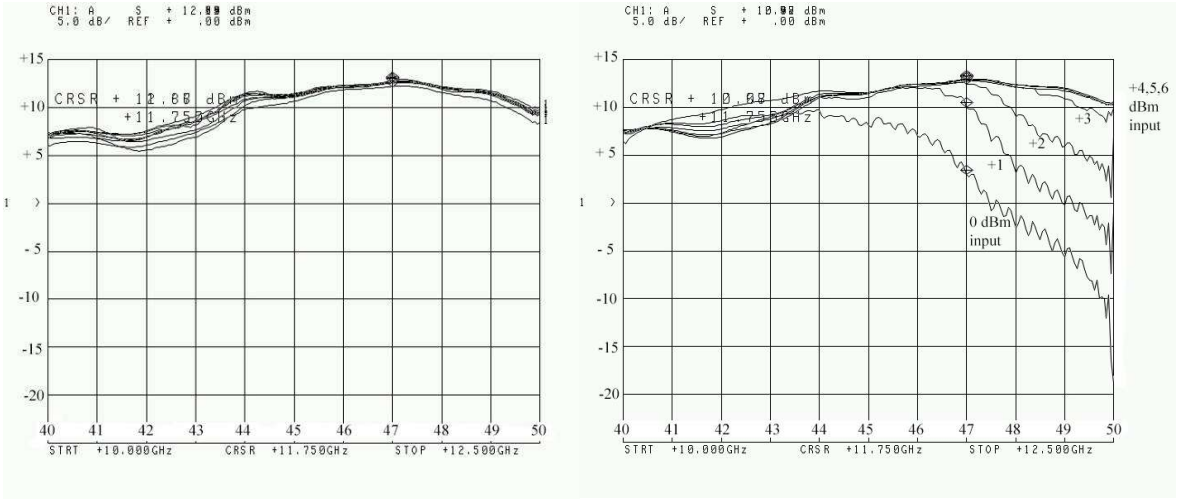
- operates with single power supply (6 to 13 VDC)
- provides for external keying of output with no leakage during “key up” periods
- uses standard SMA input and WR22 output
- requires +3dBm to +5dBm input to deliver +5 to +12.5 dBm output
- maximum output is at the 47 GHz amateur band

History

The original design started in 2016 after hearing that the Cellular 5G band was going to include EHF bands with one adjacent to the Amateur 47 GHz allocation. A few of us hearing this decided that some kind of beacon for 47 GHz would be helpful to put signals on the air and could also be used for other purposes. Parts were selected in 2017 and a design for a block and a bias board was completed in 2018. That basic design proved to function as expected in a prototype unit. However, soon afterward the power supply IC selected was in short supply and essentially vanished. This required a re-design of the bias board in order to have the KEY signal pin grounded for the “on” condition.
The aluminium split-block design was submitted to two machine shops. One did an excellent job but at a price far too high for the project. Another was very busy with other business and did not respond for a while. Then the pandemic hit and progress on all fronts slowed or halted. In 2020 we added a few features to the block, and the fabrication of that was stalled. In 2021 the re-design of the bias board was completed, and tested on a breadboard. Also that year I decided to ask Mark Lewis, N0IO for block machining. His results in past millimeter-wave projects was excellent, and he took on the job for this project at a very reasonable cost. During the year 2022 we had fabricated over 50 sets of blocks, had them plated, fabricated bias boards, RF circuit boards, and began assembly. MUD conference proceedings of the last few years describe circuits, RF ICs, etc. for this project.

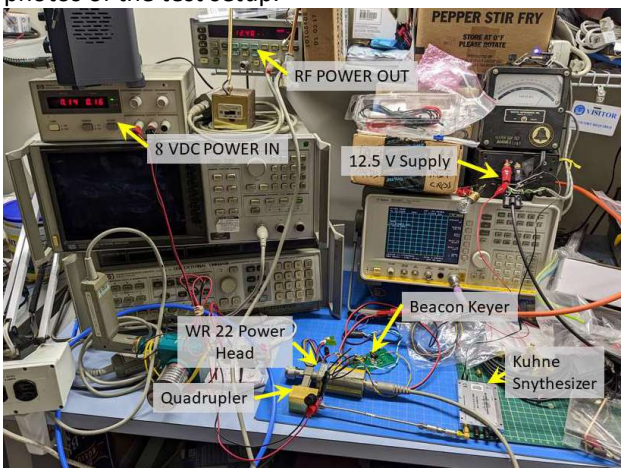
Assembly and Test

Our initial 16 units yield was 50% pass both DC and RF test. Troubleshooting and fixing those units taught our assembler what to do differently, and the yields improved. Our limited materials, plus the purchase of some additional RF ICs to replace some which were damaged, yielded 43 working units. All working units were then swept and the results scrutinized. With only one exception, all units were within 1 dB of the same 47 GHz output power when 4 dBm was applied to the input. More than 85% reached their maximum power at 47-48 GHz with just 3 dBm input, and the others did so at 4 dBm in.



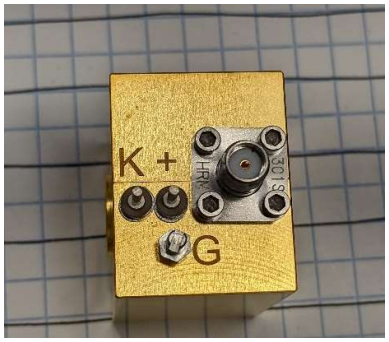
Sweep plots. The vertical scale is output power at 5 dB/, the horizontal is output frequency at 1 GHz/. On the left are overlays of 7 different units all at +4 dBm input giving an overall idea of how similar they are. On the right is an overlay of the same unit run a different input power levels.

Concerned about fragility and long-term use as beacons, I followed the advice of NEWS club President Dick Frey W2AAU and with some advice from Brian Justin WA1ZMS performed some life tests. Both tests were run with +4 dBm applied at 11.77 GHz (Kuhne 8-13 Synthesizer with power splitter), and a keyer was attached sending a 30 second beacon sequence, some 20 seconds of which was a continuous key down. Each had a WR22 power head connected to a dual input HP-438A power meter for quick checking a few times a day. One was operated in a benign environment, where DC bias was sourced at 8V, and the unit was in a room where the temperature varied from 63 to 66 degrees F. The second unit was operated at +12.5 VDC, and put into a box with plastic foam insulation and a 5 watt power resistor dissipating over 2 W, resulting in a continuous air and block temperature at or above 106 degrees F (41 C). See photos of the test setup.



Photos of Life Test Setup. On the left, prior to adding the high temperature stress test, the equipment and values are labelled. On the right, the box containing the stressed unit with a temp measurement.

The first unit (8V, room temp) functioned consistently well for 100 days continuously. At that point it was shut down. The second unit (being run at a higher voltage and temperature) failed after 9 days and 2 hours of continuous operation. The power regulator IC had failed, and replacing it fixed the unit. The consequence of this test requires that I inform users to be careful when operating them as continuous beacons. In such circumstances they should be run on reduced voltage (anywhere from 6 to 8V) and preferably by keying the ~11GHz source signal rather than keying the quadrupler. Also, if possible the ambient temperature should be kept below 100F if practical. As a bench signal source, at room temperature, running it at a reduced voltage (8V) is still recommended. If used as a source (such as an LO) in a portable station, a reduced voltage (8V) is also recommended.




Photos On left is the Input side of the unit, including Key, Power, and Ground pins and the RF input SMA. The middle photo is a unit in the ribbon bonder being assembled, and on the right is all the units after final assembly and testing.

Post Script

The final cost to build (design time was not charged) came out to just over $400. All functioning units have been swept and a copy of that performance curve will be included with the unit. Please contact the author - tomw at wa1mba dawt org

Editors Comment

Very many thanks to Tom for allowing his article to be presented here. My 47GHz transverter uses a quadrupler to drive a WR-28 mixer. That uses an old Pasolink x4 multiplier that needs 100mW or so of drive at 11…GHz.
Tom's multiplier only requires modest drive. The multiplier output can be used on transmit FM on 47GHz. Details of a suitable 10MHz phase modulator, will be in the next edition of Scatterpoint. My original 'Simple 47GHz transverter' can be found in the Scatterpoint archives, or at rfdesign.co.uk
I am going to buy one of Tom's quadruplers for instrumentation use. If anyone else wants one, please get in touch, then we can save on carriage. (editor@microwavers.org)

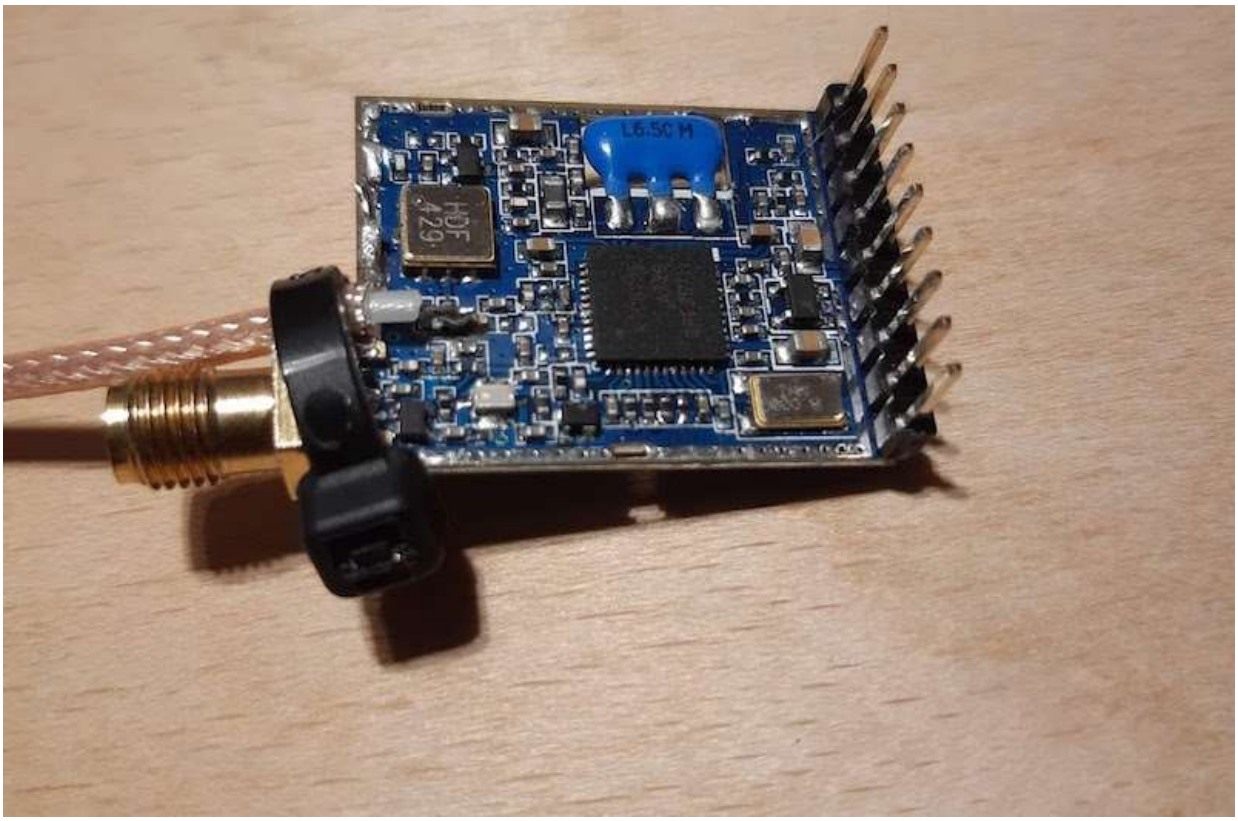
5.7 GHz Receiver

Andrew M0CWX

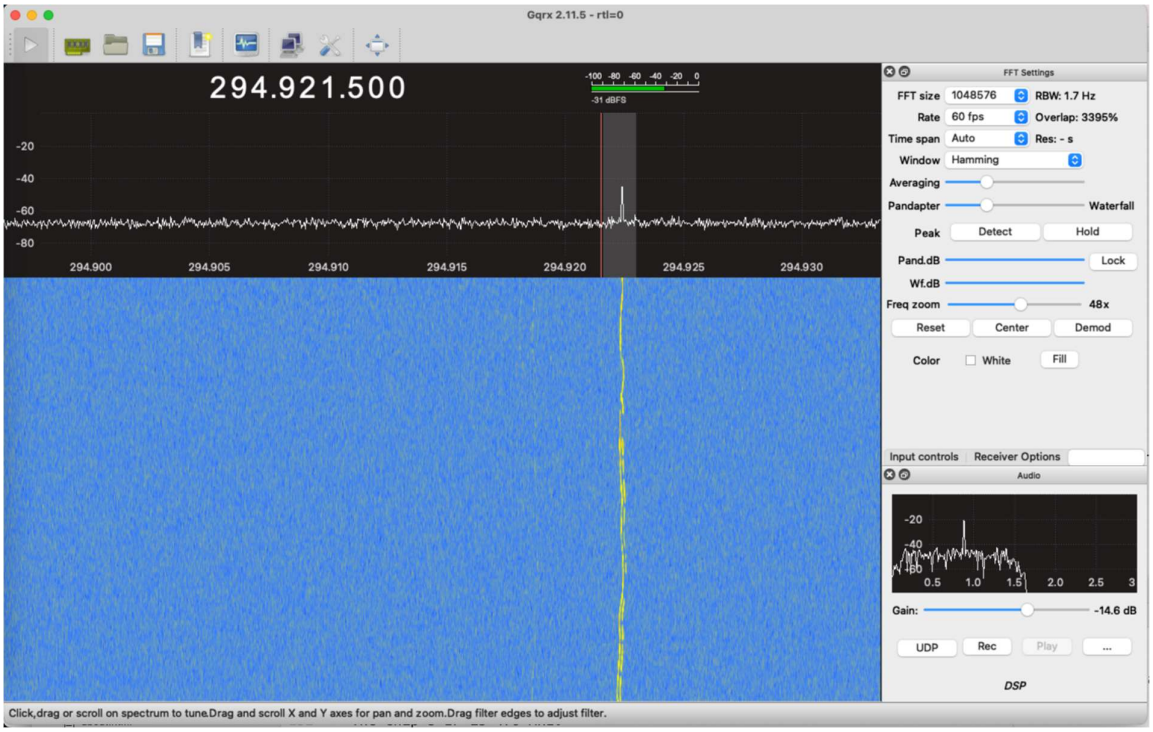
Inspired by OH2FTG's Youtube Video I bought a RX5805 from eBay for £5.99. It would have undoubtedly been possible to buy cheaper from AliExpress, but I knew this would have no hidden costs.

The RX5808 is a 5.8GHz video receiver for a drones from 5705 to 5945 MHz [Datasheet]. This fits beautifully (or some might say not!) over the higher two segments of the 6cm Amateur Band, 5650-5680 MHz, **5755-5764 MHz**, **5820-5840 MHz**

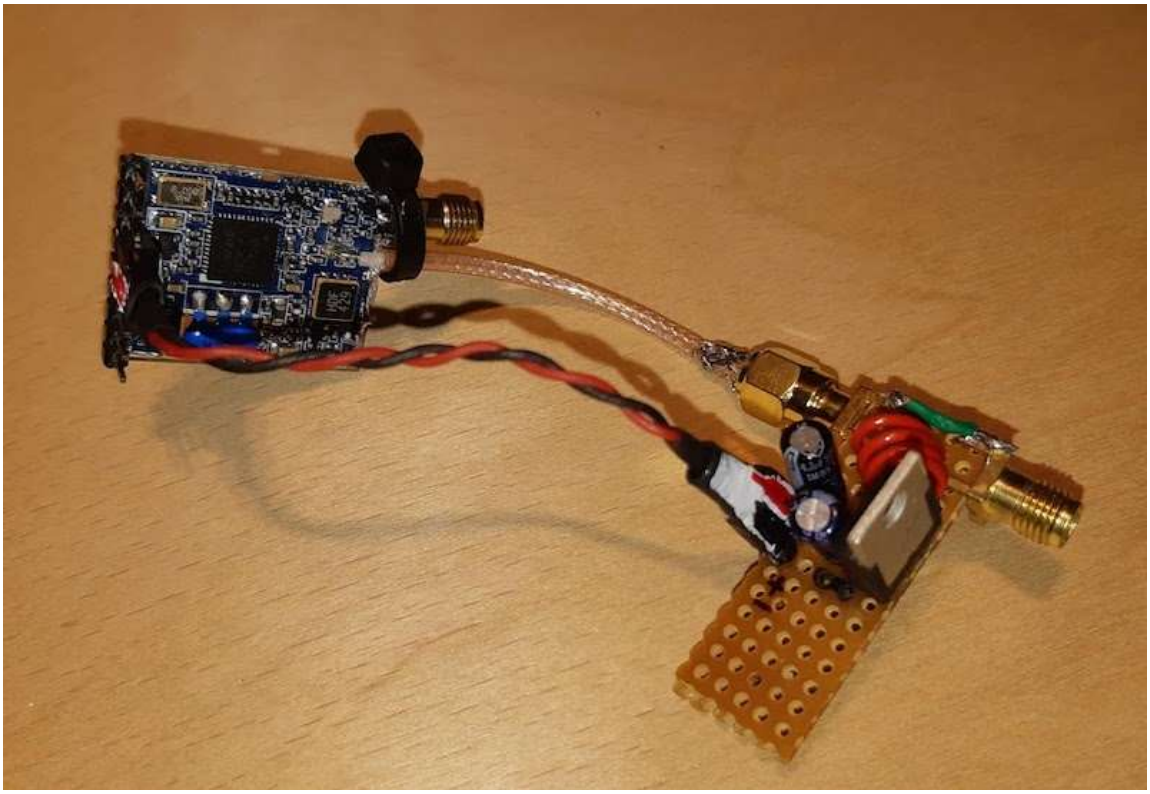
After a quite easy de-soldering of the case, I found that the receiver comprised an RTC6715 chip [Datasheet]. Pin 43 was IF out. Soldering some coax onto the pad near the pin was a little tricky, but not too bad. I used a cable tie as a low-tech solution to stop it moving about.



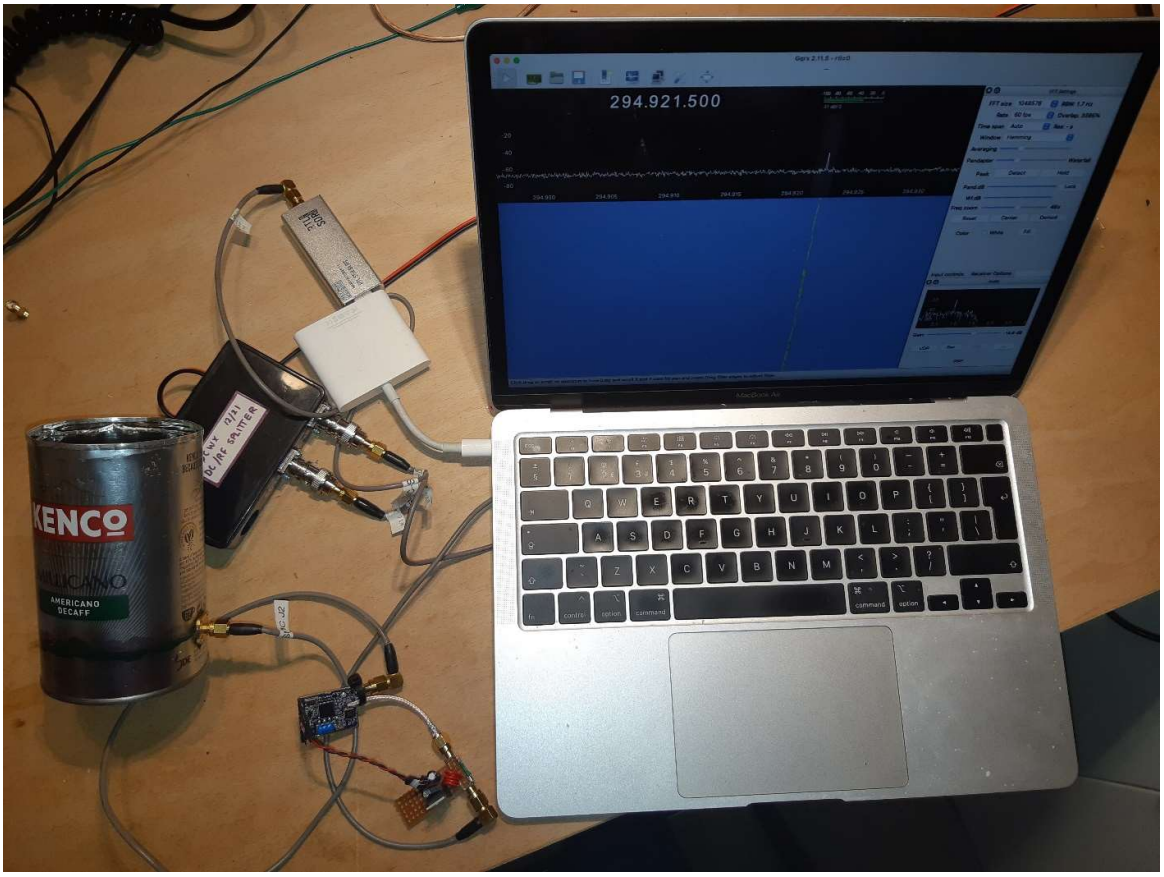
The RX5805's frequency switches correspond directly to the RTC6715's, as the chip is in the "easy channel selection mode". All three switches open (not earthed) put the receiver onto 5945 MHz. The chip's IF is 479 MHz. Since I wanted to listen on 5760 MHz; 5760-5945 MHz puts the beacon section of 6cms -185 MHz below the IF at 294 MHz. By changing the three switches on the RX5805, I could change the frequency it thinks it is on, hence changing my IF. 294 MHz is a quiet part of the radio spectrum here, so I don't need to worry whilst I'm testing about screening from local nuisances.



Sure enough, listening on 294.91 MHz on my SDR with the antenna on the bench, I found the GB3ZME beacon in Telford some 25 miles away. The RX is obviously a bit drifty at the start, and I can think of a few ways to help it out.



The next part of the project was to add a bias-T so that the whole receiver can be mast-mounted, and the 249 MHz signal should not get attenuated too much down my UHF feeder. As usual I put a LM7805 in the bias-T for the inevitable day I put 12V+ up the antenna!

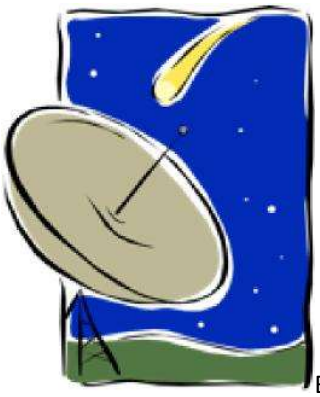


The complete prototype system works on the bench. The antenna is just a coffee can "horn", which would benefit from optimization!

I'm not going to win any DX awards with it. It is a pleasant couple of evening's work. The only tricky bit is getting a wire from the IF pad of the chip.

I again highlight the importance of the UK's amateur beacon network in providing a confident reference point for testing receivers.

Activity News September 2023



By John G4BAO

Please send your activity news to: **scatterpoint@microwavers.org**

From the DR9A Team

DR9A was QRV during the European UHF and up contest from Hohloh in the Black Forest (JN48EQ). The operating team was Suad DK6XZ and Martin DL5NAH on 432MHz and Alex DL2GZW and DL8AAU on 1296MHz with Henning DF9IC and Helmut DB1TP supporting.
Systems in use were on 432MHz: 3x 6x9 Ele 750W
1296MHz 2xQuados and 2x 6x23Ele 750W.

DR9A station

QSO maps at
70cm: http://qsomap.adventureradio.de/mapsanalysis.php?log=806569
23cm: http://qsomap.adventureradio.de/mapsanalysis.php?log=171649

Extremely good conditions for almost the whole weekend. Saturday morning many beacons from the UK that we only know from beaconspot.uk like GB3USK IO81 - S9 on 23cm. Once the contest started, the conditions seemed to decay a bit, but fortunately they came back. Sunday was even better, M1CRO/p was constantly complaining that we were solid S90+20 all the time. Finally 15min before the end of the contest EI8KN (IO62) called - we heard him with the back of the "East" Yagi. Not a bad signal for close to 1200km on 23cm.

From Rainer EA8DMF

On the 3rd of October I temporarily put my 23cm beacon into operation. It uses a slotted waveguide antenna with 7 slots on both sides. Beacon details are EA8DMF IL18QJ 1296.945MHz (+/-) CW/A1 16el Yagi towards CT/UK. Hopefully we will get more details once this beacon is fully operational.

From Jaques F1BHL

I took part in the 2.3GHz activity during the August SHF UKAC. On the 22nd an exceptional duct occurred above the Channel allowing some good contacts on 2.3GHz between the Normandy coast and UK stations. I was located on a cliff near Bayeux at 60m asl with a 1.5m grid dish, running 10W from a home-made 432MHz to 2320MHz transverter in a masthead box. The beacon GB3SCS (200Km) was received 20dB over 9 during the whole of the contest. The signals from some stations including G1YBB/P (337Km) were received several tens of dBs over S9. My ODX was G8KPD/P at 660Km, plus GW8ASD at 442Km who was running just 500mW in the shack via 13m of coax. In the end he worked 27 UK stations which represents 70% of the UK stations active that evening with an average distance per QSO of 364Km.

From Phil G0JBA

I had not been active on the radio for the last year but had a burst of enthusiasm for the October 24GHz contest. I set up my 24GHz system at home; a 40cm off set dish with 2W from a Kuhne system. Dish at 15m above ground and my QTH 4km from English Channel at 32m ASL. I worked M1CRO/P who were at Walton on the Naze (JO01PU), 67km path and signals 59+20. Then G1DFL/P Pete, who was at JO01QD just above Dover. A 15km obstructed path and not an easy QSO. I gave 41 and my report 55. Pete was running lower power. Finally, later on the Sunday evening, I worked ON/PA0MHE, Maarten, on SSB, with 51 report each way at 139km path. We were both operating from our home locations. I have found the ON0HVL beacon on 24048.985MHz an invaluable resource to ascertain propagation across the Channel. The Belgium beacon keepers kindly moved the beacon to face the UK in the Spring of 2023. It is mounted on a Church Tower and was facing Northeast and now facing Westwards. It is 123km from my location and it is fascinating how the propagation changes over a 24hr period. I can hear the beacon most of the time; sometimes barely audible in the noise and then over a few hours it will build up to 599. Looking forward to some decent autumnal propagation and seeing what can be worked/heard on 24GHz.

From Nick G4OGI

From JO01MG in Kent, I continue my study of 10Ghz beacon reception and observed signals along a heavily skewed path with signals peaking at 40 degrees azimuth. All the “usual” beacons, namely DB0GHZ, PE9GHZ, PI7RTD, ON0EME, PI7ALK and PA3GCO with GB3PKT strongest of all at 59. I then noticed OZ5SHF and OZ7SHF followed by SK6WW at really good strength, all whilst beaming at 40 degrees. SK6WW is my ODX on 3cm with the current set up of a 54cm dish. The 40-degree path from Kent was effectively along or very close to the defined boundary noticeable in the airmass and temperature charts at the time. A more detailed report is in the GHz Bands column in November RadCom.

From Pete G1DFL

For a change during the October 24GHz contest, I visited a new square JO01 and a new site at Swingate Dover, to work a few 24GHz folks who are normally out of range from IO91. I had the usual disorientation with the hand sighting compass that a new site brings, but pleased to get 13 QSO's across 6cm, 3cm and 1.2cm.
I worked John G4BAO over a difficult path on 10GHz initially to set up for a 24GHz test, but it was always a stretch and signals were poor even on 10GHz so nothing doing on 24GHz. On 24GHz I worked M1CRO/P, G3XDY and G0JBA with the tripod atop a small chalk mound!

From Graham, G3TCT

The propagation over the weekend 7/8 October was impressive, and unusually coincided with contests! Contacts 23cm over 500km were,
6th of Oct F6DRO JN03 910km, F4IAA JN05 716km.
7th Oct F6DRO JN03 910km EA1IT IN73 909km EB1B IN73 875km DR9A 832km. 8th Oct LX/ON4MU/P JN29 617km (new DXCC) F8KHP/P JN38 719km 0823 HB9XC JN37 829km (New DXCC)
Graham notes that dx signals can be good even when those closer are not enhanced.

(This is classic “ducting” where the propagation duct has a beginning and an end and “goes over the heads” of stations in between without returning to earth…Ed)

From John G4BAO

The only GHz QSO activity of note from me this month due to holidays was a foray into the October 24GHz contest where I doubled last year's score by working not only M1CRO/P but G8DKK/P from my home station (see below) Bryan was out on a local hill testing his new transverter system.
Some progress is being made on the proposed Essex coast 24GHz WebSDR project with another step taken towards getting site permission. The hardware has been ready to go for a while, but these things take time, patience and careful negotiation! Kudos to Tony G0MBA for his persistence and help in negotiating permission to use an existing repeater site.

From David G4RQI

David confirms that he "had a nice chat" with OZ1FF on SSB with signals a steady 59 at 640km. Dave runs an IC-705 driving a DB6NT transverter and a 2Watt PA to a 48cm PW dish with a penny feed @ 8m agl. Shortly afterwards he worked PA0O on CW 559 both ways at 526km before, in desperation, resorting to spotting beacons. His 10GHz beacon haul between the 5th and 7th September included DB0VC, PI7ALK, DB0GHZ, GB3PKT, GB3CAM, DB0MU, PI7ASN, ON0EME, and PA3GCO.

From Bryan G8DKK

During the October 24GHz contest I took my new 24GHz transverter and operated from Stump Cross IO92XA03, west of Therfield primarily to listen for GB3CAM. A bonus for the day was a SSB QSO with G4BAO who was active in the contest.
My initial set-up was the transverter with 20dB horn antenna on a tripod 1.6m agl.
I found GB3CAM immediately at switch-on visible on the waterfall display of the
IC-705 running a 432MHz IF. Signal level +15dBn in a 2.4kHz BW (S-meter S5) 37km LoS. I then fitted 42cm dish in place of horn. Signal level increased to +25dBn
(S-meter S8). I probably could have detected GB3CAM with the open waveguide
on the front of the transverter given the signal level with the 20dB horn but
I was tight for time and making the QSO with G4BAO was the "icing on the cake"!

From Dave G8GKQ

Nothing remarkable, but I went out to Thruxton Hill, my nearest Microwave site for the October 24GHz contest and worked G8ACE/P, G1EHF/P and G4LDR. Best DX from this mediocre site was 22 km, but there were a lot of stations who I attempted contact with. Primary talkback on 144.39 SSB (my preferred option) worked well, with a Zello backup. Started the day in coat and gloves, but was wearing sunhat and T-shirt by lunch time, a great day out.

From Rudi OE5VRL

I received the F9ZG beacon on September 7th at 1000 UTC on 10368.914MHz. The signal was up and down, but at times some 20 dB above the noise in a 2.5 kHz bandwidth. Two hours earlier, I had a QSO with G4GLT in IO80CN over 1324 km. Conditions overall were really exceptional but sadly not much activity in terms of QSOs for such a good period of propagation.

From Kjeld OZ1FF

I only had a few QSOs including one on 10GHz with G4RQI. I also heard the OY6BEC 10GHz beacon for the first time at a distance of 1,124 km, as well as DC0VC on 24 GHz at 225km.

From Kev ZB2GI

I recently operated on QO-100 with John King ZB2JK, from the GARS club station at Coaling Island. On SSB I worked 11DXCCs with a Yaesu FT817, DX Patrol up-converter and power amplifier connected to POTY mounted on a 60cm dish. RX was LNB with TXCO fed via a basis tee, connected to an RTL_SDR dongle running on SDR Console with the Beacon lock Feature activated.

Conditions on 10GHZ during the October 2023 Heatwave

Dave G4GLT

The home barometer was around 1030 for most of this heatwave from 5th-11th October.
The limits of the beacons heard on 10 GHz were GB3CAM, GB3MHZ, GB3PKT, PE9GHZ, PA3GC0, PI7RTD, PI7ALK (625km),
PI7ASN (755km), DB0MU (787km), DB0JK (751km), DB0MOT (864km) HB9BBD (982km), HB9G (861km), F5ZLF (728km), F5ZWM (729km), F1ZAF (822km), ED1ZBE (806km), F1ZUQ (597km), F5ZVV, and F1ZAP. F1ZAF in JN03KV was a new beacon heard as was F1DBE in JN17MU.
It is of note that ED1ZBE was at times 599, and was this strength and greater most of the day on 10th October.
Contacts were had with F6DRO on four days over 897km with strong signals on SSB on two of these days. Dom is in JN03TJ and runs 45watts to a 120cm prime focus dish on 10GHz. In the photo below 144mhz/10GHz is on the front tower and 432/1296MHz on the rear tower. At the moment 2320/5760/24048 and 47GHz are portable in the garden. I have contacted Dom previously, but I was always weak with him, so these recent contacts have to be described as due to exceptional ducting conditions. Conditions were so exceptional that on one day the central French beacons continued strongly through the night.

On the last day of the good conditions it became very windy at my portable site and F1ZUQ beacon was very strong indeed.
After a couple of failed tests, around 0900Z, I managed an easy QSO on CW with Jean Louis F5DYD in JN03KG, at 886km. F5DYD runs 2W to an 80cm dish as shown above. He is at 370M ASL and the dish is 11m AGL. The yagi is a combined 2m/70cm beam on a pneumatic mast.
On two of the days I contacted Pierre F4CKV in JN16NL (681km) on SSB with 59 both ways. He was running 160mW to a 73cm prime focus dish at a high portable site. That is amazing.
After a failed QSO I tried again later with Guy F2CT, and we did complete a CW QSO. He is at IN93GJ (just beyond Biarritz) making the path 818km.
Guy says that he hopes to be at Martlesham next year. I am not sure of his exact working conditions but when I worked him in 2022 he was running 50W to a 1M+ dish.
Finally, I contacted Jean Claude F5BUU from the remote 10GHz set-up at Prat d'Albis (1200m ASL) near the border with Andorra in JN02TW. He runs 10watts to a 1 metre dish. On SSB signals were very strong both ways at 943km.
Pierre (F4CKV) sent me a recording of my beacon signal on this WEBSDR just pre-sunrise.

So, all in all an amazing experience. Thanks to all those who participated and made it so enjoyable. That includes my partner who is very tolerant!
Would I do anything different next time? Perhaps I would use that distant WEBSDR myself and get a better feel of the conditions by testing into it. Also I will start using the IC705 when monitoring instead of the FT817 as it was only by chance that I heard DB0MOT briefly. I need to decide if it actually makes monitoring easier using an SDR screen.

Dave G4GLT (October 2023).

From the Committee

UK Microwave Group Regional Support
The committee would welcome additional volunteers who can provide support for beginners in their area, in the areas of test equipment, workshop facilities, and technical support.
If you are able to help, please contact the Secretary in the first instance: secretary@microwavers.org

Proposed Simple method for frequency changeover of the VK dual band board

Chris G0FDZ

UK only – alter to suit other countries

The operator will just need to operate the band switch (122/134) to select the correct frequencies rather than making a mistake involving two switches

4	1011	122,256.000	122,400.100	144.100
5	1010	122,400.100	122,256.000	144.100

Greatest compatibility

A	0101	134,256.000	134,400.100	144.100
B	0100	134,400.100	134,256.000	144.100

Compatibility with exsting equipment (TOGGLE SWITCH CLOSED)
134 NORMAL BAND

8	0111	134,144.200	134,000.100	144.100
9	0110	134,000.100	134,144.200	144.100

Lowest frequency use if TRA-120-045 is troublesome (TOGGLE SWITCH OPEN)
134 LOW BAND

Hardware

Small 12v relay wih two c/o contacts , spst switch, thin connecting wire
Band changeover switch is a minature toggle switch with the common connected to GND
0n the 134 side is connected to **Bit 4** on the board
The 122 side is connected to a 12v relay (with reverse biased diode across the coil)

The common of each of the two c/o contacts are connected to GND
The **2 BIT c/o contact** has the 134 connected side (N/C) connected to a minature toggle switch and the other side of the switch goes to **BIT 2** on the board
The 122 side (N/O) is not connected
The minature toggle switch allows instant QSY to the 134 LOW band
from the 134 NORMAL band if needed
For the **BIT 1 c/o contact** the 134 side (N/C) has nothing connected to it and the 122 side (N/O) goes to the **BIT 1** on the board

The **A/B switch** is used to select one of the two frequencies in each channel group and is connected to GND (common) and the B side goes to **BIT 0** on the board

Contest News 2023

August 5.7GHz Contest 2023

Entry levels were average for this band. No reports of any propagation enhancements.

Well done to winner Telford and DARS G6ZME/P. Runner up Paul M0EYT/P whom also had the best DX with G4ODA at 274Kms.

73 Chris G0WUS

5.7GHz Contest August 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G6ZME/P	IO82QL	7	984	G3XDY	265
2	M0EYT/P	IO80WP	9	952	G4ODA	274
3	M0GHZ	IO81VK	8	935	G3XDY	246
4	G4LDR	IO91EC	8	816	G4ODA	212
5	GW4HQX/P	IO81KR	6	667	M0EYT/P	140
6	G4BRK	IO91HP	6	649	G4ODA	152
7	G8GKQ/P	IO91JA	2	93	M0EYT/P	77
8	GW3TKH/P	IO81KR	1	91	G6ZME/P	91

10GHz Contest August 2023

This event had a fair turn out however no entrants to the Restricted section.

Well done to Open winner John G4ZTR and Neil G4LDR as runner up who also had the best DX working ON4CJQ/P. Thanks to Keith G4ODA for the checklog

73 Chris G0WUS

10GHz Contest August 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4ZTR	JO01KW	25	5872	F6DKW	365
2	G4LDR	IO91EC	18	3305	ON4CJQ/P	455
3	G4MBS/P	IO92IH	16	2514	GW4JQP	271
4	M0GHZ	IO81VK	17	2416	G4KUX	358
5	G4UVZ	IO80KX	15	2317	G4DBN	342
6	M0EYT/P	IO80WP	14	2200	G0HIK/P	396
7	GW3TKH/P	IO81KR	13	1865	G4ZTR	276
8	G0HIK/P	IO84KD	5	1579	M0EYT/P	396
9	G4DBN	IO93NR	7	1342	G4UVZ	342
10	GW4JQP	IO71KR	6	1308	G4MBS/P	271
11	G0MDQ/P	IO82QJ	8	1013	G4ZTR	245
12	G4BAO	JO02CG	6	746	M0EYT/P	243
13	G4RQI	IO93IR	4	611	G4ZTR	247
14	G3YJR	IO93FJ	5	588	G4ZTR	230
15	G7MHF/P	IO82QJ	3	258	M0GHZ	111
16	G8GKQ/P	IO91JA	4	235	M0EYT/P	77
17	GW4HQX/P	IO81KR	1	84	G4UVZ	84

5.7/10GHz Championship Tables

Positions after four events, best three count to the total

5.7GHz

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	27/08/2023	TOTAL
1	G6ZME/P	1000	1000	871	1000	3000
2	M0GHZ	563	980	552	950	2493
3	G4LDR	474	0	1000	829	2303
4	G4CLA	791	952	0	0	1743
5	M0EYT/P	466	0	0	967	1433
6	G4BRK	295	415	300	660	1375
7	G1EHF/P	583	0	351	0	934
8	GW4HQX/P	0	0	0	678	678
9	G1DFL/P	0	0	332	0	332
10	G7WHI/P	0	0	224	0	224
11	G8GKQ/P	0	0	0	95	95
12	GW3TKH/P	0	0	0	92	92
13	GW0MDQ/P	44	0	0	0	44

10GHz Open

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	27/08/2023	TOTAL
1	G4ZTR	1000	1000	1000	1000	3000
2	G4LDR	722	0	874	563	2159
3	M0GHZ	553	595	406	411	1559
4	G(W)4MBS/P	139	573	555	428	1556
5	G4CLA	786	657	0	0	1443
6	G4ASR	0	675	727	0	1402
7	G3ZME/P	0	0	903	0	903
8	G4DBN	0	569	0	229	798
9	M0EYT/P	401	0	0	375	776
10	G0HIK/P	471	0	0	269	740
11	G4KUX	0	0	628	0	628
12	GW0MDQ/P	376	0	0	173	549
13	G8GTZ/P	457	0	0	0	457
14	GW4JQP	0	0	226	223	449
15	G3YJR	0	0	311	100	411
16	G4UVZ	0	0	0	395	395
17	GW3TKH/P	0	0	0	318	318
18	G7MHF/P	0	0	107	44	151
19	G4BAO	0	0	0	127	127
20	G4RQI	0	0	0	104	104
21	G8GKQ/P	0	0	0	40	40
22	GW4HQX/P	0	0	0	14	14

10GHz Restricted

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	27/08/2023	TOTAL
1	M0PAI/P	0	917	1000	0	1917
2	G7AQA/P	0	1000	0	0	1000
3	GW0JSB/P	633	0	0	0	633
4	G1DFL/P	0	0	570	0	570
5	G4SJH/P	0	0	304	0	304
6	G4TNX/P	0	170	0	0	170

24GHz/47GHz/76GHz Contest September 2023

A wet day was not very inviting for portable operation, and once again there were no entries on 76GHz. Several stations lost points through logging errors this time.
Congratulations go to the following:
24GHz Winner Noel G8GTZ /P Runner up Dave G4FRE/P
47GHz Winner Neil G4LDR/P Joint Runners up Dave G4FRE/P and Roger G8CUB /P

John G3XDY
UKuG Contest Manager

24GHz Contest September 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G8GTZ/P	IO91GI44	6	472	G0MDQ/P	140
2	G4FRE/P	IO81XW91	7	414	G3UKV/P	74
3	G0MDQ/P	IO82QJ85	4	393	G8GTZ/P	140
4	G8CUB/P	IO91DL56	5	263	G0MDQ/P	119
5	G4SJH/P	IO91GI44	4	170	G4FRE/P	74
6	G3UKV/P	IO82QL83	2	111	G4FRE/P	74
7	G7MHF/P	IO82QJ85	3	110	G4FRE/P	67
8	G4XAT/P	IO91XG89	1	102	G8GTZ/P	102
9	G4LDR/P	IO91GC68	2	71	G8CUB/P	45
10	G1DFL/P	IO91NM78	1	47	G4SJH/P	47

47GHz Contest September 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4LDR/P	IO91GC68	2	71	G8CUB/P	45
2=	G4FRE/P	IO81XW91	1	53	G8CUB/P	53
2=	G8CUB/P	IO91DL56	1	53	G4FRE/P	53
4	G8GTZ/P	IO91GI44	2	49	G4LDR/P	26

24/47/76GHz Championship Tables 2023

Positions after three events, best three of four count to the final total

24GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	TOTAL
1	G8CUB/P	427	1000	557	1984
2	GW3TKH/P	1000	670	0	1670
3	G3UKV/P	629	732	235	1596
4	G4FRE(/P)	52	660	877	1589
5	G1EHF/P	819	676	0	1495
6	G8GTZ/P	443	0	1000	1443
7	G(W)0MDQ/P	0	133	833	966
8	M0GHZ/P	666	282	0	948
9	G4LDR/P	371	280	150	801
10	GW4HQX/P	0	672	0	672
11	G1DFL/P	328	181	100	609
12	G8ACE/P	385	155	0	540
13	GW4MBS/P	363	139	0	502
14	G(W)7MHF/P	0	133	233	366
15	G4SJH/P	0	0	360	360
16	G4XAT/P	0	0	216	216

47GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	TOTAL
1	G8CUB/P	1000	919	746	2665
2	G4LDR/P	601	244	1000	1845
3	G4FRE/P	0	796	746	1542
4	G8GTZ/P	818	0	690	1508
5	G1EHF/P	189	1000	0	1189
6	G8ACE/P	358	118	0	476
7	GW4HQX/P	0	425	0	425

76GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	TOTAL
1	G8CUB/P	1000	0	0	1000
2	G4LDR/P	465	0	0	465
3	G8ACE/P	314	0	0	314
4	G8GTZ/P	221	0	0	221

Scottish Microwave Round Table

The 11th Scottish Microwave Round Table is being held between 1030 and 1700 Saturday 11th November at the Museum of Communication Burntisland,
Fife, Scotland.

An interesting programme of speakers has been arranged, microwave test facilities will be provided and an opportunity to purchase components
and microwave related items. The cost is £12 including a buffet lunch .

A Dinner will be held in the evening at a local hotel. Full information
and online registration is available at https://gmroundtable.org.uk/about/ for more details.

2023 Programme:

Mark Hughes GM4ISM "Test equipment for Amateur Radio"

Paul Dobie GM0PJD "Getting started on 23cm EME - the first 200 contacts"

Neil Smith G4DBN "Reconstructing Cold War Spy Bugs"

Gavin Taylor GM0GAV "Microwave in Mobile Networks"

Andy
MM0FMF

Midlands Microwave Round Table

Saturday 2nd December Lectures, Antenna Test Range, Test Equipment, Junk Sale and Hot Lunch.
Sunday 3rd December Continuation of some activities and other stuff depending on demand.
Accommodation available 1st, 2nd and 3rd subject to confirmation.

Contact Paul Nickalls G8AQA to book or discuss
paulnickalls@btinternet.com
01694 772 441

Beacon News

From 14/10/2023 GB3USK is only on from 0700 to 1800UTC every day, subject to enough solar power.

73
Graham G3TCT

The 3cm GB3MHZ beacon is currently on test from my home QTH (JO02pa90)
It is operating as an attended beacon for now, but will be off overnight.
It is being reported in IO80 so far.
The beacon antenna is barely 3m AGL? The beacon is running 1W to a 12 slot antenna
10368.830MHz. GPS locked. No PI4 at present.
73 de Sam, G4DDK

Crawley Microwave Round Table 2023 Report

The Crawley venue was well attended. It was an early start John!

UKuW Group project competition round/G3GRO trophy was won by Jen G4HIZ

In the afternoon there was a series of talks…

Chris G0FDZ ‘The new VK 122 & 134GHz system’

Denis G0OLX ‘IC-905 transceiver’

Marek M0JUR ‘Makespace and their tools in Amateur Radio’

Gareth G4XAT was then in full flow with the presentations below:

1. My ‘Blue-box’ approach to 10GHz and 24GHz…(slight re-write of the Harwell uWRT presentation)

2. Then "Tilt-O-Matic", the reasons and design decisions (as published a while back in SP)

3. “Signal Box” GPS locked source 144MHz-24GHz (The warbling wonder....)

4. “Track-Master” –The Dish-Director with manual control or RPI3/NodeRed dashboard

5. A 2m Talkback solution - in search of maximum talkback

6. And POWER for it all….. my findings with a Fogstar 105A/Hr LiFePO4 battery

7. And finally... "OK, so this is a uW event…" where I detailed a HF transverter for the Pluto or similar.....
https://dxpatrol.pt/produto/adalm-pluto-hf-transverter-charon/

Thanks to everyone involved in organising, what was a very well attended and interesting event.

UKuG MICROWAVE CONTEST CALENDAR 2023

Dates, 2023	Time UTC	Contest name
12 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz

UKuG MICROWAVE CONTEST CALENDAR 2023

Month	Contest name	Certificates	Date 2023	Time GMT	Notes
Jan	1.3GHz Activity Contest	*Arranged by RSGB*	17-Jan	2000 - 2230	RSGB Contest
Jan	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Jan	1930 - 2230	RSGB Contest
Feb	1.3GHz Activity Contest	*Arranged by RSGB*	21-Feb	2000 - 2230	RSGB Contest
Feb	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Feb	1930 - 2230	RSGB Contest
Mar	REF/DUBUS EME 3.4GHz	*Arranged by REF/DUBUS*	4-Mar to 5-Mar	0000 - 2400	REF/DUBUS EME 3.4GHz
Mar	Low Band 1296/2300/2320/3400MHz	F, P,L	5-Mar	1000 - 1600	First 4 hours coincide with IARU
Mar	1.3GHz Activity Contest	*Arranged by RSGB*	21-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Mar	1930 - 2230	RSGB Contest
Jun	REF/DUBUS EME 2.3GHz	*Arranged by REF/DUBUS*	25-Mar to 26-Mar	0000 - 2400	REF/DUBUS EME 2.3GHz
Apr	Low Band 1296/2300/2320/3400MHz	F, P,L	2-Apr	1000 - 1600	
Apr	1.3GHz Activity Contest	*Arranged by RSGB*	18-Apr	1900 - 2130	RSGB Contest
Apr	REF/DUBUS EME 1.2GHz	*Arranged by REF/DUBUS*	22-Apr to 23-Apr	0000 - 2400	REF/DUBUS EME 1.2GHz
Apr	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Apr	1830 - 2130	RSGB Contest
May	*432MHz & up*	*Arranged by RSGB*	6-May to 7-May	1400 -1400	RSGB Contest
May	*10GHz Trophy*	*Arranged by RSGB*	7-May	0800 - 1400	Sunday, to coincide with IARU
May	Low Band 1296/2300/2320/3400MHz	F, P,L	7-May	0800 - 1400	Aligned with IARU event
May	24GHz/47/76GHz		14-May	0900-1700	
May	1.3GHz Activity Contest	*Arranged by RSGB*	16-May	1900 - 2130	RSGB Contest
May	REF/DUBUS EME 10GHz & Up	*Arranged by REF/DUBUS*	20-May to 21-May	0000 - 2400	REF/DUBUS EME 10GHz & up
May	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-May	1830 - 2130	RSGB Contest
May	5.7GHz/10GHz	F, P,L	28-May	0600-1800	
Jun	Low Band 1296/2300/2320/3400MHz	F, P,L	4-Jun	1000 - 1600	Aligned with some Eu events
Jun	1.3GHz Activity Contest	*Arranged by RSGB*	20-Jun	1900 - 2130	RSGB Contest
Jun	5.7GHz/10GHz	F, P,L	25-Jun	0600-1800	
Jun	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Jun	1830 - 2130	RSGB Contest
Jul	VHF NFD (1.3GHz)	*Arranged by RSGB*	1-Jul to 2-Jul	1400 - 1400	RSGB Contest
Jul	24GHz/47/76GHz		9-Jul	0900-1700	
Jul	REF/DUBUS EME 5.7GHz	*Arranged by REF/DUBUS*	15-Jul to 16-Jul	0000 - 2400	REF/DUBUS EME 5.7GHz
Jul	1.3GHz Activity Contest	*Arranged by RSGB*	18-Jul	1900 - 2130	RSGB Contest
Jul	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Jul	1830 - 2130	RSGB Contest
Jul	5.7GHz/10GHz	F, P,L	30-Jul	0600-1800	
Aug	ARRL Microwave EME	*Arranged by ARRL*	12-Aug to 13-Aug	0000 - 2359	ARRL EME 2.3GHz & Up
Aug	1.3GHz Activity Contest	*Arranged by RSGB*	15-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	22-Aug	1830 - 2130	RSGB Contest
Aug	5.7GHz/10GHz	F, P,L	27-Aug	0600-1800	
Sep	ARRL Microwave EME	*Arranged by ARRL*	9-Sep to 10-Sep	0000 - 2359	ARRL EME 2.3GHz & Up
Sep	24GHz/47/76GHz		10-Sep	0900-1700	
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	19-Sep	1900 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	F, P,L	24-Sep	0600-1800	
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Sep	1830 - 2130	RSGB Contest
Oct	*432MHz & up*	*Arranged by RSGB*	7-Oct to 8-Oct	1400 - 1400	IARU/RSGB Contest
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	7-Oct	1400 - 2200	RSGB Contest
Oct	24GHz/47/76GHz		15-Oct	0900-1700	
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	17-Oct	1900 - 2130	RSGB Contest
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Oct	1830 - 2130	RSGB Contest
Oct	ARRL EME 50-1296MHz	*Arranged by ARRL*	28-Oct to 29-Oct	0000 - 2359	ARRL EME Contest
Nov	Low Band 1296/2300/2320/3400MHz	F, P,L	12-Nov	1000 - 1400	
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	21-Nov	2000 - 2230	RSGB Contest
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	25-Nov to 26-Nov	0000 - 2359	ARRL EME Contest
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Nov	1930 - 2230	RSGB Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	19-Dec	2000 - 2230	RSGB Contest

EVENTS 2023

October 13-15	RSGB Convention	rsgb.org/convention
October 21	BAT Online Convention (CAT 23 Part 2)	http://batc.org.uk/live
November 2	IET Millimetre Colloquium Glasgow	https://events.theiet.org/events/iet-colloquium-on-mm-wave-and-thz-engineering/
November11	Scottish Round Table	www.gmroundtable.org.uk
November 20 -Dec 15	ITU WRC 23, Dubai	rsgb.org/wrc-23
December 2	Midlands Roundtable, Eaton Manor, SY6 7DH	eatonmanor.co.uk/midlands-round-table-event/

EVENTS 2024

January 13	Heelweg	www.pamicrowaves.nl
August 9-11	20th EME Conference, Ewing NJ, USA	EME2024Trenton.org
September 22-27	European Microwave Week, Paris	https://www.eumweek.com

80m UK Microwavers net

Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV

and Finally

Noel G8GTZ/P braves the rain to win the September 24GHz Cumulative Contest