



An Amateur Radio publication for the Microwave Enthusiast

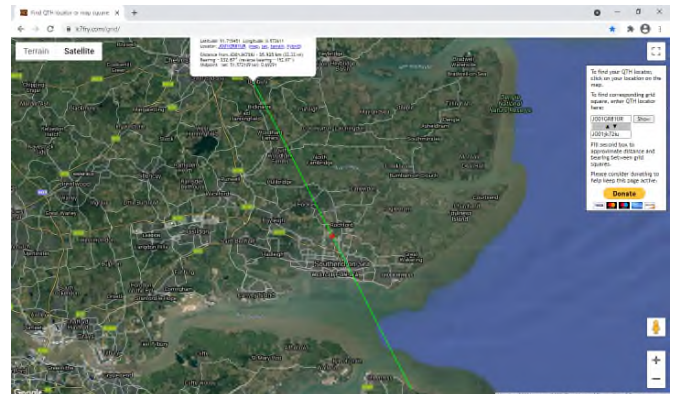
scatterpoint

March 2021

Published by the UK Microwave Group

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UK 122GHz record G0FDZ/P & G8CUB/P 36km



10GHz Lunchbox transverter Martyn G3UKV

Subscription Information

The following subscription rates apply

UK £600 US \$1200 Europe €10 00

This basic sum is for **UKuG membership** For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via

<https://groups.io/g/Scatterpoint> 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, rftd, 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

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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

UK Microwave Group Contact Information

Chairman: Neil Underwood G4LDR
email: chairman@microwavers.org
located: Wiltshire IO91EC
Tel: 01980 862886

General Secretary: John Quarmby G3XDY
email: secretary@microwavers.org
located: Suffolk JO02OB
Tel: 01473 717830

Membership Secretary: Bryan Harber G8DKK
email: membership@microwavers.org
located: Hertfordshire IO91VX

Treasurer: David Millard M0GHZ
email: treasurer@microwavers.org

Scatterpoint Editor: Roger Ray G8CUB
email: editor@microwavers.org
located: Essex JO01DP
Tel: 01277 214406

Beacon Coordinator: Denis Stanton G0OLX
email: beacons@microwavers.org
located: Surrey

Scatterpoint Activity news: John G4BAO scatterpoint@microwavers.org
Contests & Awards Manager: G3XDY as above g3xdy@btinternet.com

Assistants

Murray Niman	Webmaster	G6JYB	g6jyb@microwavers.org
Kent Britain	USA	WA5VJB/G8EMY	wa5vjb@flash.net
Mike & Ann Stevens	Trophies	G8CUL/G8NVI	trophies@microwavers.org
Noel Matthews	ATV	G8GTZ	noel@noelandsally.net
Robin Lucas	Beaconspot	G8APZ	admin@beaconspot.uk
Chris Whitmarsh	mmWaves	G0FDZ	chris@g0fdz.com
Mike Scott	Chip Bank	G3LYP	g3lyp@btinternet.com
Paul Nickalls	Digital	G8AQA	g8aqa@microwavers.org
Heather Lomond	SDR	M0HNO	m0hno@microwavers.org
Neil Smith	Tech Support	G4DBN	neil@g4dbn.uk
Barry Lewis	RSGB uWave Manager	G4SJH	barryplewis@btinternet.com

UK Regional Reps

Martin Hall	Scotland	GM8IEM	martinhall@gorrell.co.uk
Gordon Curry	Northern Ireland	G16ATZ	gi6atz@qsl.net
Peter Harston	Wales	GW4JQP	pharston@gmail.com

International

Kent Britain	USA	WA5VJB/G8EMY	wa5vjb@flash.net
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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

47GHz

76GHz

UK Microwave Group AGM

Information on the AGM was in the February Scatterpoint, but is in part repeated here, for information:

Notice is hereby given that the 2021 Annual General Meeting of the UK Microwave Group will be held at 10:00am on Sunday, 18th April 2021, by Zoom. Meeting details are given below.

This will include the election of the officers of the committee and the presentation of the Chairman's, Secretary's and Treasurer's Annual Reports.

A vacancy for Trophy Manager exists, a volunteer to look after engraving and maintenance of the trophies would be very welcome.

UK Microwave-Group is inviting you to a scheduled Zoom meeting.

Topic: UK Microwave Group AGM

Time: Apr 18, 2021 10:00 AM London

Join Zoom Meeting

<https://zoom.us/j/98353195917?pwd=VFpWbWRNY1ZwWXZZbWZ3bVlvcW84Zz09>

Meeting ID: 983 5319 5917

Passcode: 631403

Microwaves in a lunch box

Martyn Vincent G3UKV

With time on my side I noticed my previous DB6NT 10GHz G2 transverter lying helpless and abandoned on a shelf in the shack. What a waste! Local outdoor market 'Aladdin's Cave' still trading, so purchase small and medium sized plastic lunchboxes at total cost of £2.78 with an idea in mind.

Rummage around shack boxes to find a fairly rare 12 volt coax relay suitable for 3cm. Gotta. Also 10dB standard horn with WG16 feed + SMA adaptor to match.

All items so far fit in the smaller lunchbox. But usual 7AH lead-acid battery far **too large** . . . so take local advice and purchase two LiPo 3 cell batteries (2.2AH claimed). Perfect! Fully charged they each deliver ~12 volts, and fit singly in the box, with the second as back-up. My faithful Yaesu FT817 IF sits comfortably on top, powered by its internal battery. I only have to add a single wire from its Acc. socket to switch the transverter over to TX when required (the IF coax provides the earth return), plus mike or key. Fuse and LED to add, plus a small spirit level on the waveguide completes the job.

So, I now have a fully hand-held portable 10GHz Transceiver, approx. 8" X 6" 6" overall, complete with antenna, and about 230mW TX output.

All that remains is to travel to a suitable local high spot and look for beacons, or even arrange a sked on 3cm.

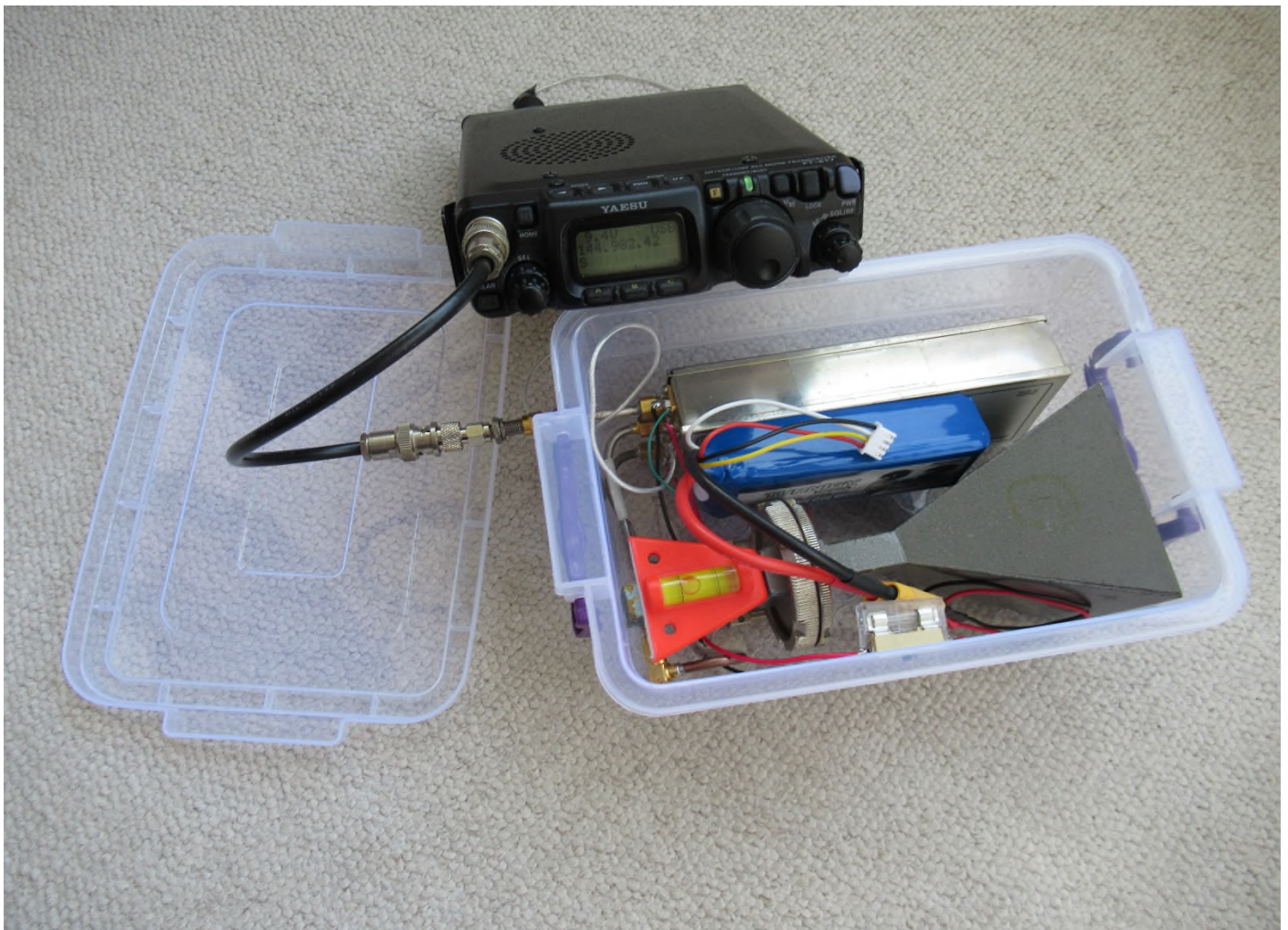


Photo1: Inside the lunchbox - DB6NT Xverter, LiPo battery, horn + feed, coax relay (under W/G), spirit level, 10dB horn.



Photo 2: Front view, ready to go.



Photo 3: Rear view, PTT link and antenna horn



I only have a small VHF and microwave antenna array, and I was using one of the Dual 31 ele yagis on 13 cms,

Two problems, it's built well but the radome collects snow and ice in the winter, and is completely detuned.

The other problem is lack of gain , about 19dBi

The top antenna is a 23cms Dual 70ele , with no real way of mounting above it as the feeder would have to pass through the elements.

The original position of the Dual 31 ele was end mounted between the 2mtrs yagi and the 23cms yagi, about 2.5 wavelengths above the 2mtr yagi, so very little if any interaction between them

The new 13cms antenna is a Wimo 67ele, 3mtrs long.

The 2mtr antenna is a 13ele on a 8mtr boom, 40mm square section, so the 13cms Wimo could be mounted on the 2mtr yagi boom, definitely strong enough, the whole antenna would be in front of the stub mast, albeit it is thick wall GRP scaffold.

Neil, G4DBN, had some 10mm carbon fibre rod spare and made up for me 3 X 30cms spacers with mounting brackets.

So the trombone support for the 13cms yagi is not used, and there will not be any boom flexing as I found with a 67 ele 23cms Wimo, the carbon fibre supports are very strong and there is no lateral movement .

This year there has been some major work, a small vertical 70cms yagi was removed, and the grid dish for 6cms was moved up to between the 2mtr and 70cms yagis

A 65 cms grid dish I purchased about 10 years ago ,which was designed for 6cms , but I think the grid spacing was too great , but ideal for 9cms , so this dish has been put between the 70cms yagi and the 6 & 4mtr yagi, This dish is feed with a horn beautifully made by Neil, G4DBN

I had been nagged by George G8AIM, to get going on 9cms, I was left a Ionica PA module by a SK friend, and I did have parts of a Ionica motherboard, I was also left a TS-790E transceiver, just 2&70.

But that transceiver has a separate Rx to cover about 850MHz to 915MHz, just one diode to cut and put a connector on the rear panel, there is a rubber bung in the E version.

I cheated on the 9cms transverter, changed the IF filters in an Ionica Rx module to 870MHz and modified a couple of cut out sections of the motherboard, for the Local Oscillator buffer and the TX mixer.

The IF frequency is 870 MHz, Tx mixed up from 2mtrs and the Rx directly in to the TS-790a at 870MHz, There is a 10MHz OCXO feeding an ADF4351 SV1AFN synth board in the transverter, which keeps it slightly warm in the winter to avoid condensation.



Above is the assembled 13cms Wimo on the front section of the 2mtr yagi.

Next task is the reconnecting the sections of the 2mtr yagi, I also had to remove the end section of the 30ele 70cms yagi to get the tower to tilt over far enough, its normally luffs over with the antennas pointing skywards.

The array now consists of

Dual 70ele 1296 MHz

Wimo 67 ele 2320MHz

Dual 13 ele 144 MHz

29dBi grid dish 5760MHz

Dual 30 ele 432 MHz

65cm grid dish 3400MHz

Dual band 50MHz/70 MHz 5ele + 6 ele

Below that are the transverters for 2320MHz 100W 3400MHz 15W & 5760 MHz 10W

The 3cms Transverter and dish are mounted on the chimney to get good mechanical stability

Richard G8JVM IO82SP

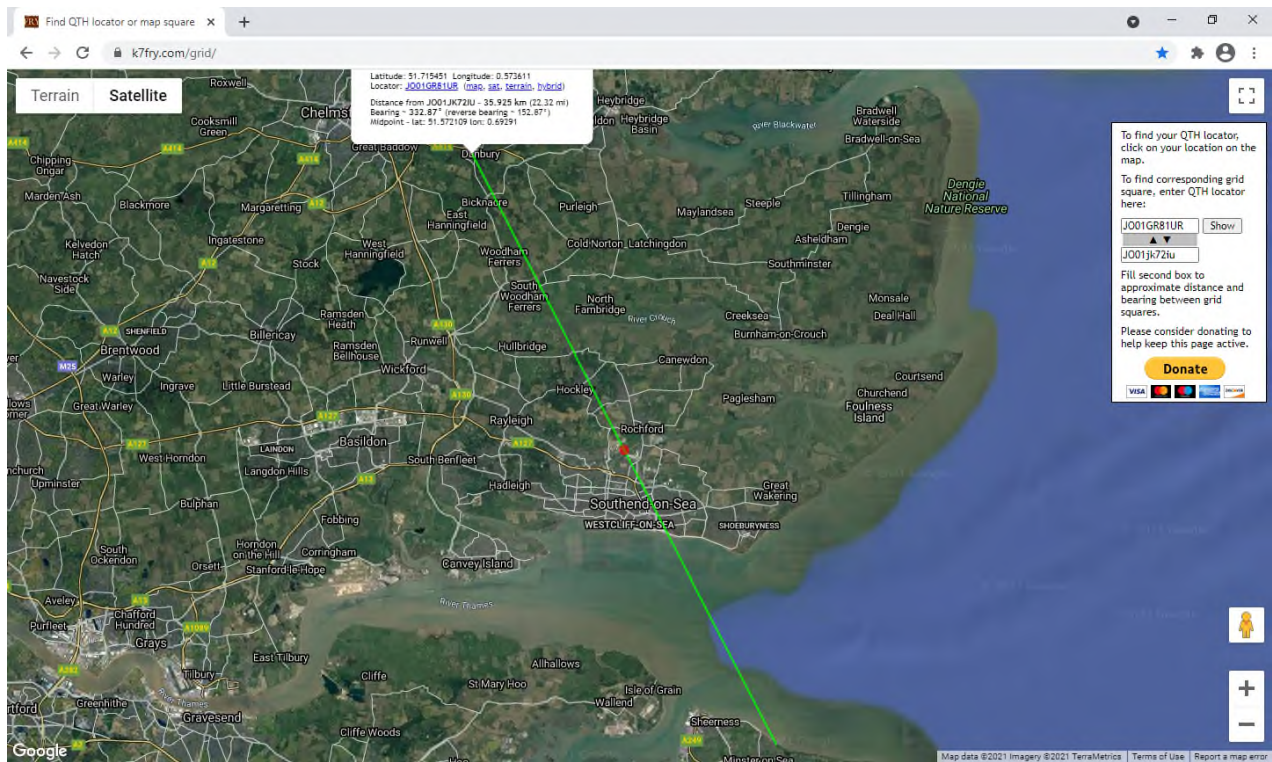
UK 122GHz Record April 2021



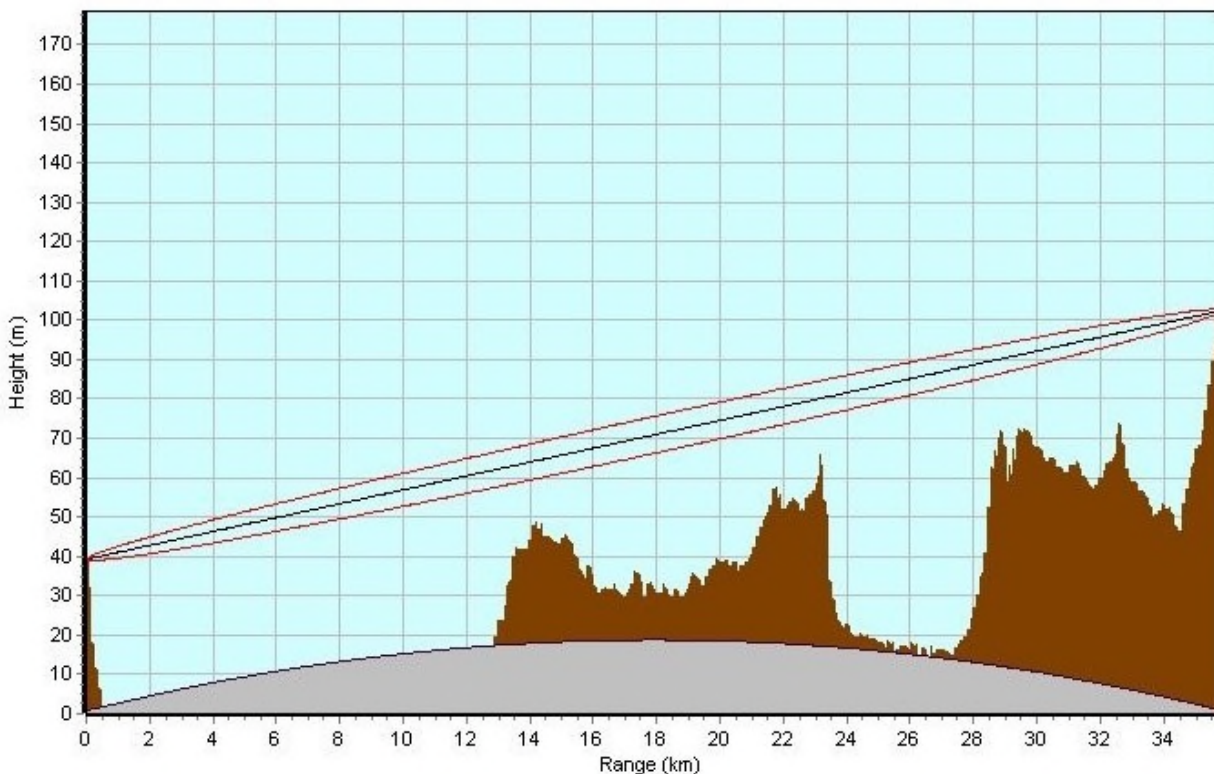
Chris G0FDZ/P Minster, Isle of Sheppey. Kent. View across the Thames estuary to Southend.



Roger G8CUB/P Danbury Essex



JO01GR81UR Danbury to JO01JK72IU Minster 35.925 km



The profile from G0MJW's program shows good clearance, but a significant sea path. Distance was 35.925km. Previous record was held by Michael as MJ/DB6NT IO89VG22 to Gert F/DG8ED IN99CK32 @ 35.8km. There is potential to increase the distance to around 40km, but access to other holiday areas of the Isle of Sheppey are currently restricted.

The QSO took place on 7th April 2021 at 10.30z. Signal reports were 539/519. JO01GR81UR Danbury to JO01JK72IU Minster 35.925 km. Path loss predicted 188.3dBm. Pressure 1023mb. Temperature 6°C, humidity 42%, dew point -6°C.

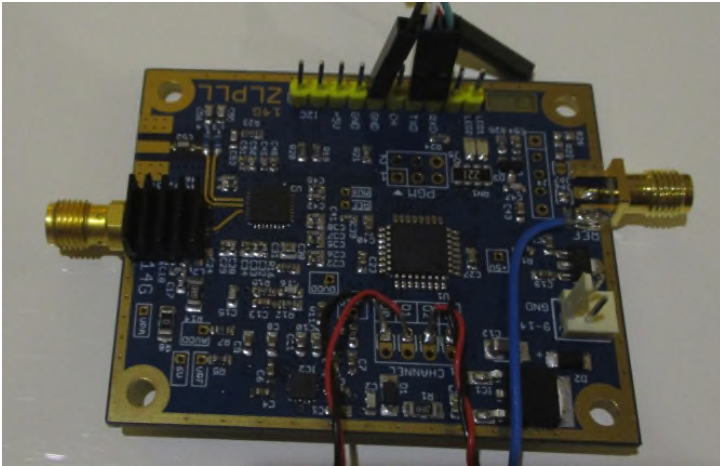


View through the TX scope toward Minster from Danbury. The mast is on the former Marconi/BAE radar site. The tower blocks further on at Southend. In practice azimuth had to be adjusted further to the left (East).



Chris GOFDZ operating the key on the 122GHz transmitter.

Other than the VK3CV system, all other units use the ZL PLL 14G ADF5355 synthesiser board from Wayne ZL2BKC which can store 16 frequencies. Either 10MHz or 100MHz references are used, with the emphasis on low phase noise ones, for the receive LO.



From Ebay US in December, I found what looked like a WR-08 multiplier. It turned out to be a WR-06 one. The new multiplier using micrometer tuning, worked on both 122 and 134GHz.

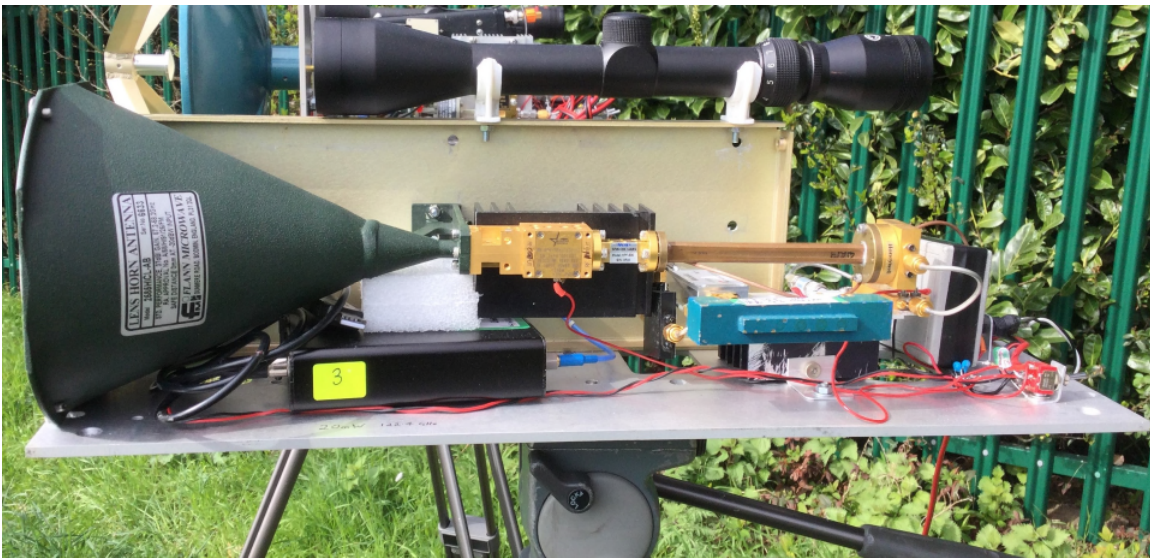
On the multiplier I found that I can leave one micrometer adjustment alone. Tune the input one for max. diode volts, and the output one for the biggest dip. Optimum is slightly one side of that. A bit like tuning an HF PA.

So I can now receive and transmit both frequencies on one dish. TX o/p is just over 5mW on each band. Received signal within 1dB at each frequency. However I found the LO level to be right on the knee of enough to drive the fundamental mixer that I had.

In January this year again on Ebay, but from Germany, were some biased mixers. These were Millitech WR-10 units optimised for 94GHz. The big advantage, was that they only needed 1mW drive. With the 5mW drive, they worked better than my existing mixer, both at 122 and 134.

Adding a new low noise 432MHz pre-amplifier from Kevin G3AAF completed the update.





Separate 10mW TX. Consisting of ZL 14G synth on 7.65GHz, and doubler to 15.3GHz. This is amplified to 22dBm to drive a x4 multiplier to 61.2GHz. A Quinstar amplifier via a high pass filter, drives a Terratech doubler producing 10 – 20mW @ 122.4GHz.



TX & RX used by Chris. Receiver on the right is an unmodified VK3CV board, with 144 MHz IF. Transmitter on the left consists of a ZL synth, on 10.2GHz doubled into a power amplifier on the left which produces 22dBm at 20.4GHz. This drives a tripler (modified 57G gold block) to produce +14.5dBm at 61.2GHz. In turn driving a Terratech doubler to 10mW. The horns used on both TX & RX are 100mm (4") Quasi-Optical horns. These basically consist of a small launch horn, and a 100mm lens, in a plastic body.

Chris would like to thank Chris G4FJW for his assistance, and I would like to thank XYL Sue M6SUA for her help, in making this QSO happen.

Although in both directions we used 10mW transmitters, the antennas were relatively small. The figures suggest that a pair of VK systems with IQ mods, and 30cm dishes, would have produced similar results.

The current VK / VK system record is:

On October 18th 2020 Dave G1EHF and Noel G8GTZ worked 17.03km between IO91GI25WT (Coombe Gibbet) and IOIO91HL86NW (Mud Lane Peasmore). Barefoot VK3CV units were used at both ends into 60cms 47GHz dishes.

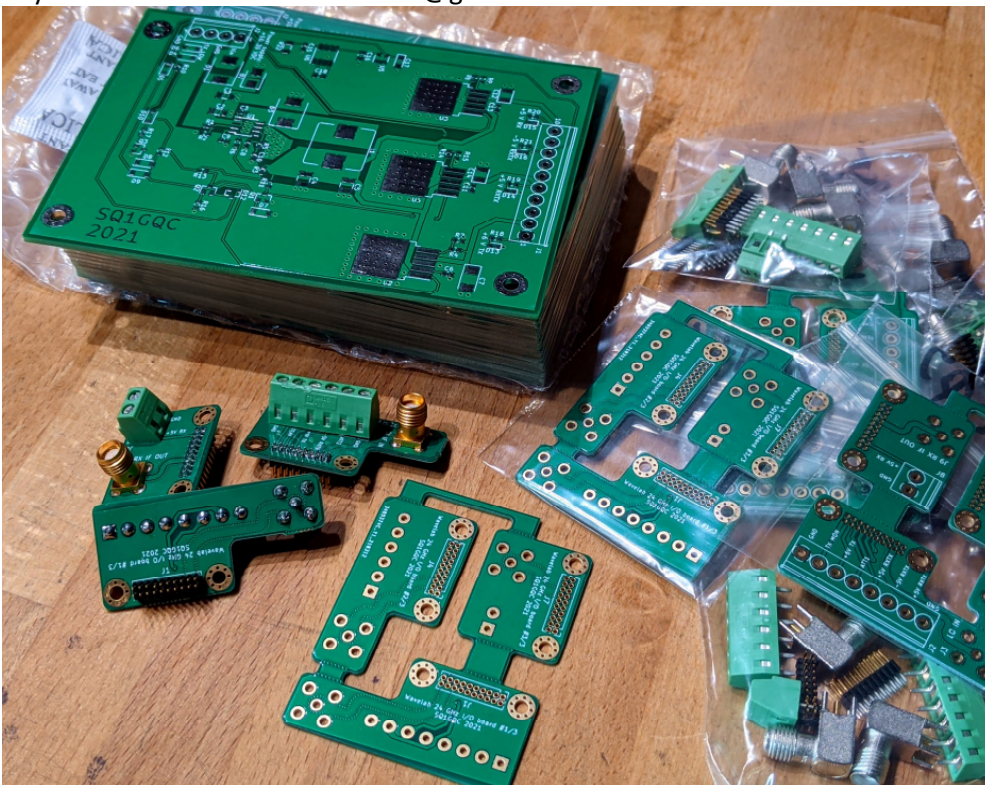
This month I have been.....

From Neil G4DBN

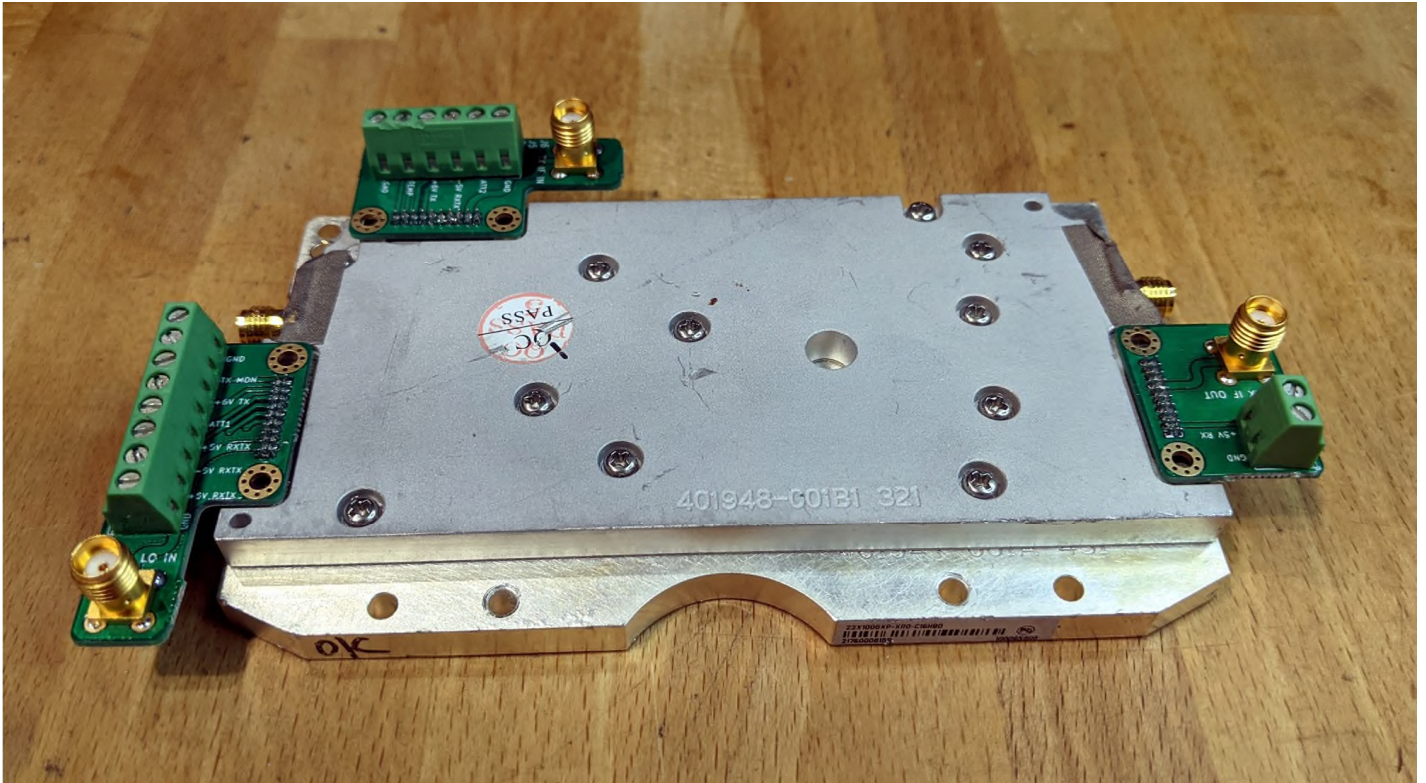
A work in progress. 10 GHz lens horn for one of my shallow offset dishes, Rexolite 1422 biconical lens, one-piece aluminium body, Radial SMA. The idea is to mount it alongside a similar 5.7 GHz lens horn so I can do a 2 degree nod of the dish elevation to change bands. The other benefit is that it is sealed against moisture and spider ingress.



I've just received a batch of connector and power PCBs for the Wavelab 23 GHz transverter units being sold on Ebay by Bison Electronics. Pawel SQ1GQC kindly made the Gerbers available. I've sold a dozen sets and have a few left if anyone else needs them. Email neil@g4dbn for details.



The three completed connected PCBs in place on one of the transverters. The 24 GHz connectors are on the main body, the other SMA's are for LO and IF in/out.



Editors Comments

Thanks to all that sent in reports and articles this month. Portable contesting is now allowed, with the second Low Band contest happening this weekend.

With large numbers of F6BVA 10GHz transverters being constructed, and many Wavelab 24GHz units from Poland being modified. There should be a big increase in operation on those two bands, this year.

I had promised the start of some technical articles this month. Time has flown, so I have incorporated some of my thoughts into the description of equipment used for the 122GHz record contact.

Next Microwave Group Talk

Backyard Hydrogen Line Astronomy – by Brian Colemann G4NNS

Wednesday 14th April at 20.00 UTC

Hear how Brian G4NNS has used his 3.7m EME dish to map the galaxy – by listening to emissions from Hydrogen at 21cm (1.4GHz).

A discussion of the hardware & software needed as well as some results will be included.

UKuG talks are streamed at: batc.org.uk/live/ukmicrowave

Receiver

Since my 30THz receiver was described in the January 2021 issue of Scatterpoint, the weather has become warmer and I hit a snag recently when testing outdoors. The Melexis 90614 sensor is used in the receiver to measure the sensor temperature T_{sensor} and the heat source (distant transmitter) temperature T_{source} . Then a valid received signal requires that $T_{source} - T_{sensor} > 0$. In practice, the receiver field of view is large enough that the source is seen against a background which also emits an infrared signal since it is at a temperature $T_{background}$. In my early testing, the outside temperature and background were typically around or below 0°C, but my sensor temperature was above this and so the detection criterion given above was valid. A problem occurs, however, when $T_{background} > T_{sensor}$ since this results in a valid signal being received even when the source is not switched on. This can be avoided by using the detection criterion $T_{source} - T_{sensor} > X$ where X can be thought of a variable threshold which can be adjusted at will in the same way as the squelch control on an FM receiver. In practice, a value for X can be set using a potentiometer and read using an ADC input on the receiver Arduino, as shown in Figure 1. Hence, when the source is not switched on, the value of X is increased until the receiver LCD display shows “NO SIGNAL”. Since $X = T_{background} - T_{sensor}$, it would be possible to set the value of X automatically by reading these values during the spaces between dots and dashes when the transmitter is sending QRSS, but the manual “squelch” control is easier to implement.

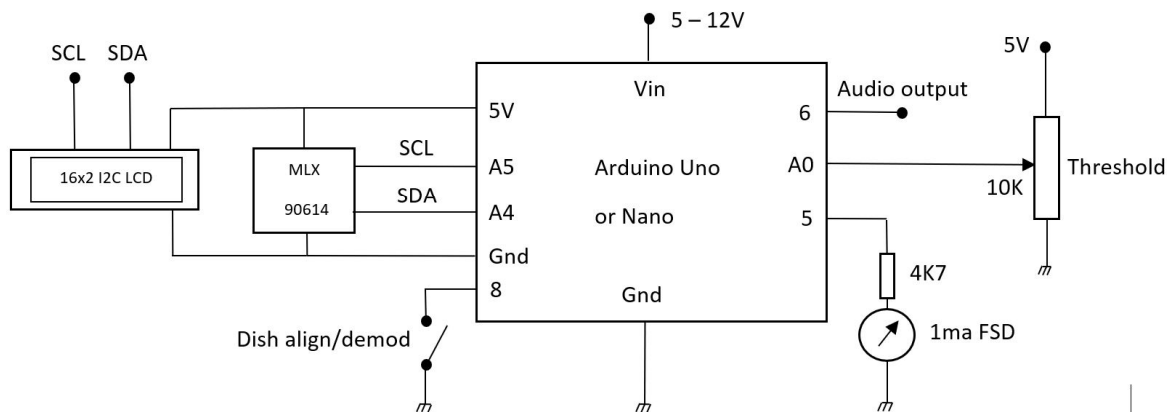


Figure 1 30 THz receiver with variable detection threshold

It should be remembered that the Melexis 90614 sensor is calibrated at the factory for sensor temperatures in the range -40°C to 125°C and source temperatures in the range -70°C to 380°C. Looking again at the detection criterion $T_{source} - T_{sensor} > X$, it can be seen that an alternative but still valid criterion would be $T_{sensor} - T_{source} > X$. In this case the receiver would be able to detect a source which is at a lower temperature than that of the background. This has been verified in practice, after making the appropriate changes in the receiver’s Arduino sketch, by detecting the presence of a bag of frozen peas at a distance of 11m from the receiver – no, this is not an April Fool joke!

Transmitter

Extensive testing by Chris, G0FDZ, and myself has shown that the L298N driver board in the transmitter, as described in the February 2021 issue of Scatterpoint, gets extremely hot when used with a 12V NEMA17 stepper motor. The original transmitter design used a stepper motor of external appearance which is identical to a NEMA17 but which operates at 6V rather than the more usual 12V and so no thermal problems were identified. Accordingly, the transmitter design has been changed to use a TB6600 driver instead of the L298N since it can supply more current and also supports motor micro stepping which results in smoother operation. At present x4 micro stepping is being used (800 rather than 200 steps per 360° rotation) and this also allows more control over the shape of the transmitted infrared pulses. The revised transmitter circuit is shown in Figure 2.

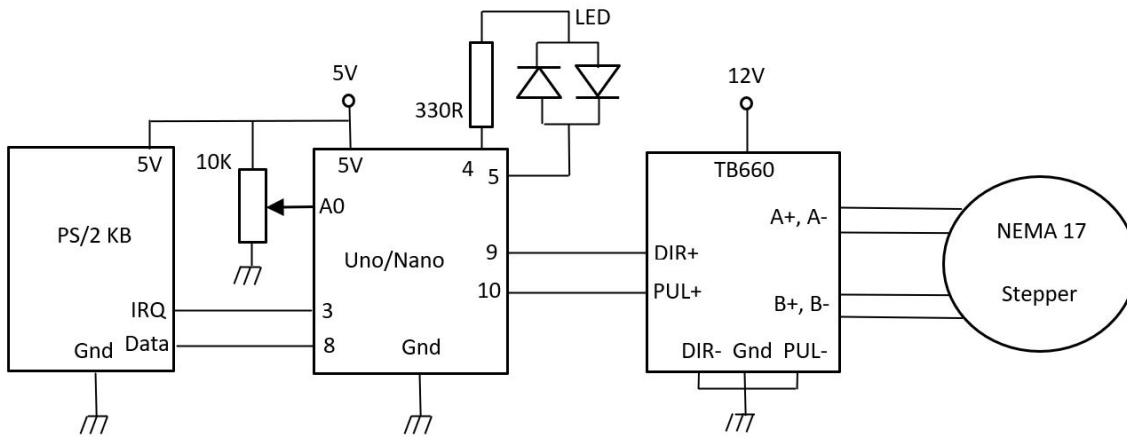


Figure 2 30 THz QRSS modulator using TB6600 driver for NEMA 17 stepper

Copies of the Arduino sketches to drive the revised receiver and transmitter designs are available on request by e-mailing me at b.chambers@sheffield.ac.uk.

Alternative sensor

Following a suggestion from Andrew, VK3CV, I have been looking at using an alternative receiver sensor based on a PIR detector as commonly used in intruder alarms and night lights. These PIR detectors contain two sensing elements arranged electrically in opposition so as to detect object movement rather than the temperature of a stationary object. The response time of these sensors appears to be faster than that of the Melexis 90614, hence the interest in their possible use in a 30THz receiver. VK3CV made the suggestion that one of the PIR sensing elements could be rendered inactive by masking off one half of the sensor window using black plastic tape, as shown in Figure 3(a).



Figure 3(a) Front side of HC-SR501 PIR board with "insect eye" lens removed from sensor

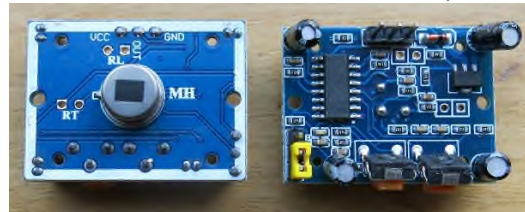


Figure 3(b) Top and bottom views of HC_SR501 PIR sensor board

In normal use, the signal from the PIR detector is processed using a special ic, the BISS0001 which provides signal amplification, filtering and a voltage comparator. To save time and effort, I simply used the PIR sensor board "as is" but tapped off the amplified signal from the PIR detector at pin 16 of the BISS0001 and then fed this into an Arduino Nano ADC input. The PIR detector signal approximates to a square wave and so the "signal present" and "signal absent" states are readily identified and were used to switch an audio tone on and off. Depending on which half of the PIR detector is rendered inactive by masking, the "signal present" state may be represented either by a high voltage or a low voltage at pin 16 of the BISS0001. The system was tested on the bench using a heated resistor as the infrared signal source and this was periodically masked off using a rotating chopper blade made from LEGO parts. The test setup is shown in Figure 4 and may be seen in action at [1]. Initial results were encouraging.

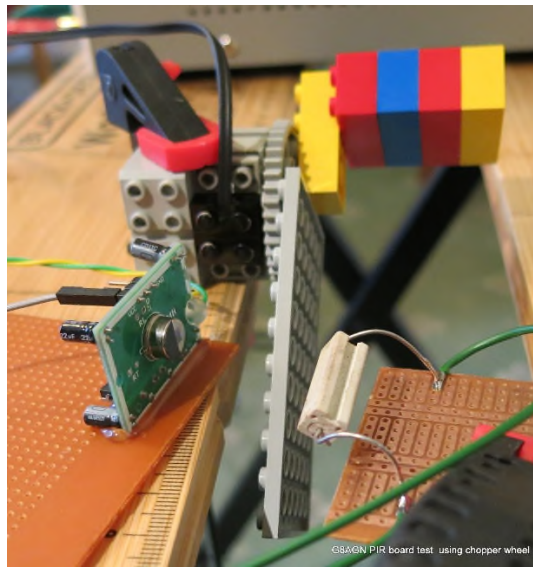


Figure 4 Chopper blade test of PIR detector

Reference

- [1] https://www.youtube.com/watch?v=jZ_IQgRyC5c

Scatterpoint activity report

Activity News: March 2021



By John G4BAO

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

From Neil G4LDR



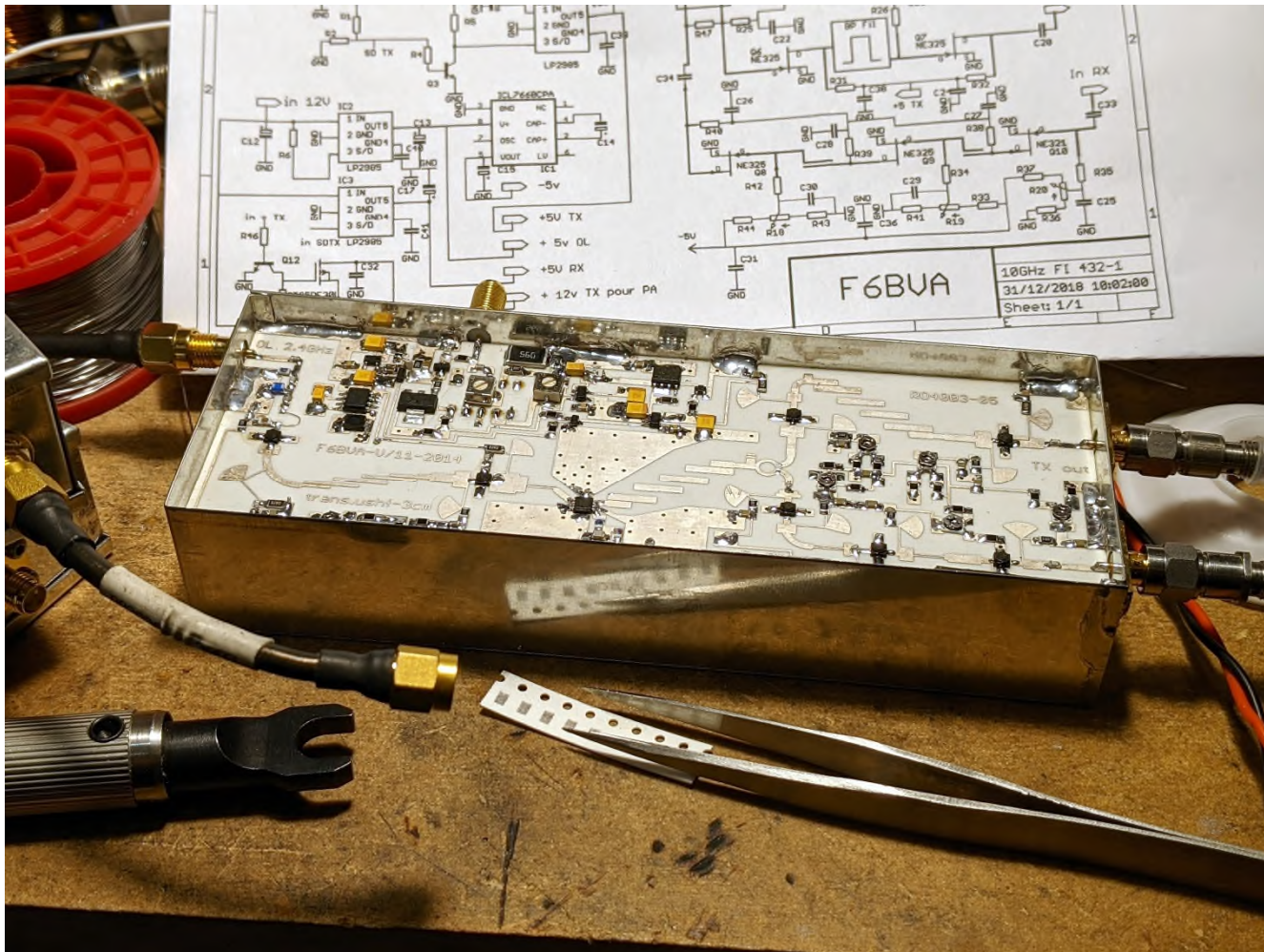
I have a regular sked on Monday evenings with Adrian, G4UVZ and others. On the 29th of March I checked the GB3KBQ beacon on 10368.870MHz. It is normally 529 over the obstructed 100km path between Taunton and Salisbury, but that evening it was 599 + a lot. When we worked on 3cm (using FM) Adrian's signal was so strong, the S-meter was pinned against the end stop. Both Adrian and I have Digital Amateur Television (DATV) capability and had been waiting for over a year for conditions to be good enough to try a TV contact. On the 29th March we finally made the contact, exchanging HD pictures in a 2MHz bandwidth. The picture attached shows a screenshot of Adrian G4UVZ (Taunton) as received by Neil G4LDR (Salisbury) over a 100km path on the 3cm band.

From Noel G8GTZ



I made my first portable outing of the year on April 6th and it was probably one of the coldest. It was certainly the first time I've ever operated in the middle of a snow storm! See the photos. I worked Dave G8GKQ over a 40km path on 146 MHz and 5.7GHz DATV.

From Neil G4DBN's Twitter Feed



Neil is currently test building one of the F6BVA 10 GHz to UHF transverter kits he's putting together. (Photo) He's found a few issues such as two of the Cs are a bit too small, and two pots need changing for a model with insulated underside as it's crossing tracks, but otherwise looking promising for all you who've ordered them.

First of the F6BVA 3cm-UHF transverters having a small modification after some advice just received from Michel F6BVA.

Over 500 of the transverter PCBs have been sold now. The recent UK group purchase reached 91 PCBs and 87 sets of components, boxes and absorbers, along

with more than 60 DF9NP LOs. Home construction is alive and well. In addition to G/GM/GU/GI, kits are going to Australia, New Zealand, Austria, Israel, Canada, Norway, Switzerland, Malta, Turkey and Guadeloupe.

Hope we can see more activity on 10GHz in the near future. Once you get your kit from Neil and build it, email G4BAO and the Scatterpoint editor with details of your first QSO and I'm sure they'll feature how many of these 85 kits make it to air by the end of the year.

From John G4BAO

My work on the new driver for the 1.3GHz ATV repeater for the Cambridgeshire Repeater Group continues. The new transmitter and receiver are built, and the next stage is to integrate them with the existing logic and video tray as a first phase, before working with Camb-Hams software and networking guru, MOVFC to connect the TX and RX digitally. I had 3.4GHz contest QSOs with "the usual suspects" in March, namely G4ZTR, G4LDR, G4CLA and G8CUL, but nothing else of note to report. I'm still waiting for some decent weather to put my 1.3GHz system back up on the second mast. New 10GHz activity from JO02

During and after the March SHF UKAC, I enjoyed a 10GHz "initial" QSO with local, G6KWA who's now up and running on the band from just South of Cambridge. Nice to have a bit of a "ragchew" with him, as he is the only other station in the Cambridge area who is active on 10GHz. It's worth noting that David was doing wideband on 10GHz many years ago so I'm pleased he's made the move. He worked Neil G4DBN in Yorkshire during the March SHF UKAC which is more than I managed to do!

From Clive GW4MBS

UNLOCKED!

At last, I was able to take the opportunity to enjoy the delights of portable operation again. Living in a valley in IO71XW with no mobile phone signal, 3cm operation is challenging. I have to rely on scatter in all its forms (including for the first time snow) to work G4VUZ and hear GB3KBQ, GB3SCX, GB3LEX and the personal beacon of GW4NOS.

Denied portable working for so long, I have spent the winter improving the portable set up. I am lucky to be able to travel only a couple of miles to a site with a good take off to the South and East, although so many things are in the way, the Brecon Beacons are far into the horizon. This picture may look much like the one I sent in last year but there have been significant changes.



I have removed Clark PU-8 mast and re-engineered a more substantial mounting for a 6m Hilomast. Unlike the PU-8, the Hilomast has a keyway and is raised pneumatically, the compressor is resting on the rear bumperette. It is much more substantial and less prone to bending. The idea is that I can take advantage of sites where the dish can see over local obstructions.

The mast leans significantly, there are three reasons for this. (1) The shape of the Land Rover and the need for the mast clamps to be anchored to the internal role cage. (2) This vehicle was upgraded in service to carry a Bowman radio system, which is very heavy. Uprating the suspension has jacked up the vehicle at the rear. (3) I have had to park on sloping ground.

This lean has significant implications when using a dish especially now I have upgraded from a Sky dish to a Gibertini 65cm dish. Even compensating for this at ground level before pumping up would cause difficulties for other beam headings. So, a tilt ram was the answer, not only to correct the dish tilt but to enjoy the satisfaction of being able peak it to optimum.

These tilt rams are fitted with a reed relay and a magnetic disc to feed a counter display below. This works well enough but merely gives an arbitrary readout with no indication of true elevation or depression. I fitted a pendulum driven sensor that via a Cat 5E cable to a digital readout to 0.1 degree and was impressed with the results.



The other improvement that can be seen is the IC-705. I bought it solely as a microwave IF, I have never even listened on HF with it. I especially like the waterfall, the memories and the recorder. I have built an aluminium frame for it that gives some protection for life in the back of a Land Rover.

The lower section of the mast supports a modified protractor on a white plastic disc supported by a stainless-steel collar to give a direct display of the bearing.



The idea is that the collar being a stiff fit is adjusted to a known bearing of a beacon and thereafter is calibrated. There is problem with this that only a field trial revealed! It is that when turning the mast, the calibration moves in the opposite direction so constant mathematics is needed to get the correct heading. I was very annoyed with myself for making that mistake especially as the construction of this protractor ring was rather tedious. The solution is to refit the disc with it inverted. This has the advantage that I can look up at the protractor whilst stood at ground level, without having to stand on the rear step and look down.

Apart from enjoying the freedom of three hours out in the Sunshine with only two cars passing by it was a delight to work G4UVZ Taunton who can always be relied on to give me a signal and to receive GB3KBQ that Adrian has worked so hard in rebuilding. We worked on SSB and FM, Adrian was 57 and gave me 55. Now with the IC-705 it is all captured in the recorder together with times and modes to help me record it all in the log.

Clive Elliott GW4MBS

From Barry G8AGN

This morning (Wed 7 April), I went to visit Bob G4APV who has a very long garden to try out the 30THz gear. Using my electrically heated hot plate source running at 130W input and 260C, signals were reliably received at a measured distance of just over 50m. This was verified by using a hand operated shutter placed over the source.

We then switched to the QRSS modulated rotating dish source whose cartridge heater was running red hot at 36W input. QRSS signals were heard from this at 45m but the signal was marginal. This was due to wind cooling the cartridge heater. A cardboard wind shield was tried over the Tx dish and this helped to reduce cooling so that when the wind dropped, QRSS could be read but was still not consistent enough for a formal contact.

Air temperature was about 7C with a moderate gusty breeze.

Improvements will be made to the modulated source and further tests carried out in the near future. Bob's garden is longer than 50m!

My receiver sensitivity is not a problem at 50m but also picking up a signal from the background behind the source as well as the source itself. This interference may also include the radiation from the operator at the other (Tx) end of the path if one is not careful. The "squelch" or detection threshold control is proving to be an essential receiver mod,



GBAGN Rx looking towards Tx at 45m at G4APV QTH



GBAGN Tx looking towards Rx at 45m at G4APV QTH



GBAGN Tx looking towards Rx at 45m at G4APV QTH



GBAGN Tx looking towards Rx at 45m at G4APV QTH

Contests

Portable operation from single operators is now allowed. However it is probably best to monitor news on the Microwave Group & RSGB websites, for the latest information, regarding contest entry.

UKuG MICROWAVE CONTEST CALENDAR 2021

Dates, 2021	Time UTC	Contest name	Certificates
11-Apr	1000 - 1600	2nd Low band 1.3/2.3/3.4GHz	F, P,L
2-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz	F, P,L
16-May	0900 – 1700	1st 24GHz Contest	
16-May	0900 – 1700	1st 47GHz Contest	
16-May	0900 – 1700	1st 76GHz Contest	
30-May	0600 - 1800	1st 5.7GHz Contest	F, P,L
30-May	0600 - 1800	1st 10GHz Contest	F, P,L
6-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
20-Jun	0900 - 1700	122-248 GHz	
27-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
27-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
11-Jul	0900 – 1700	2nd 24GHz Contest	
11-Jul	0900 – 1700	2nd 47GHz Contest	
11-Jul	0900 – 1700	2nd 76GHz Contest	
25 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
25 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
29-Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
29-Aug	0600 - 1800	4th 10GHz Contest	F, P,L
12-Sep	0900 - 1700	3rd 24GHz Contest & 24GHz Trophy	
12-Sep	0900 - 1700	3rd 47GHz Contest	
12-Sep	0900 – 1700	3rd 76GHz Contest	
26 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
26 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
10-Oct	0900 - 1700	122-248 GHz	
17 -Oct	0900 - 1700	4th 24GHz Contest	
17 -Oct	0900 - 1700	4th 47GHz Contest	
17 -Oct	0900 – 1700	4th 76GHz Contest	
15 -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)	

2021 Contest Calendar

Month	Contest name	Certificates	Date 2021	Time GMT	Notes
Jan	1.3GHz Activity Contest	Arranged by RSGB	19-Jan	2000 - 2230	RSGB Contest
Jan	REF/DUBUS EME 2.3GHz	Arranged by REF/DUBUS	23 to 24-Jan	0000 - 2400	REF/DUBUS EME 2.3GHz
Jan	2.3GHz+ Activity Contest	Arranged by RSGB	26-Jan	1930 - 2230	RSGB Contest
Feb	1.3GHz Activity Contest	Arranged by RSGB	16-Feb	2000 - 2230	RSGB Contest
Feb	2.3GHz+ Activity Contest	Arranged by RSGB	23-Feb	1930 - 2230	RSGB Contest
Mar	Low band 1.3/2.3/3.4GHz	F, P,L	7-Mar	1000 - 1600	First 4 hours coincide with IARU
Mar	1.3GHz Activity Contest	Arranged by RSGB	16-Mar	2000 - 2230	RSGB Contest
Mar	REF/DUBUS EME 3.4GHz	Arranged by REF/DUBUS	20 to 21-Mar	0000 - 2400	REF/DUBUS EME 3.4GHz
Mar	2.3GHz+ Activity Contest	Arranged by RSGB	23-Mar	1930 - 2230	RSGB Contest
Apr	Low band 1.3/2.3/3.4GHz 2	F, P,L	11-Apr	1000 - 1600	
Apr	REF/DUBUS EME 10GHz & Up	Arranged by REF/DUBUS	17 to 18-Apr	0000 - 2400	REF/DUBUS EME 10GHz & up
Apr	1.3GHz Activity Contest	Arranged by RSGB	20-Apr	1900 - 2130	RSGB Contest
Apr	2.3GHz+ Activity Contest	Arranged by RSGB	21-Apr	1830 - 2130	RSGB Contest
May	432MHz & up	Arranged by RSGB	1 to 2-May	1400 - 1400	RSGB Contest
May	10GHz Trophy	Arranged by RSGB	2-May	0800 - 1400	Sunday, to coincide with IARU
May	REF/DUBUS EME 1.2GHz	Arranged by REF/DUBUS	15 to 16-May	0000 - 2400	REF/DUBUS EME 1.2GHz
May	24GHz/47GHz/76GHz		16-May	0900-1700	
May	1.3GHz Activity Contest	Arranged by RSGB	18-May	1900 - 2130	RSGB Contest
May	2.3GHz+ Activity Contest	Arranged by RSGB	25-May	1830 - 2130	RSGB Contest
May	5.7GHz/10GHz	F, P,L	30-May	0600-1800	
Jun	Low band 1.3/2.3/3.4GHz 4	F, P,L	6-Jun	1000 - 1600	Aligned with some Eu events
Jun	REF/DUBUS EME 5.7GHz	Arranged by REF/DUBUS	12 to 13-Jun	0000 - 2400	REF/DUBUS EME 5.7GHz

Jun	1.3GHz Activity Contest	Arranged by RSGB	15-Jun	1900 - 2130	RSGB Contest
Jun	122-248GHz		20-Jun	0900-1700	
Jun	2.3GHz+ Activity Contest	Arranged by RSGB	22-Jun	1830 - 2130	RSGB Contest
Jun	5.7GHz/10GHz	F, P,L	27-Jun	0600-1800	
Jul	VHF NFD (1.3GHz)	Arranged by RSGB	3-Jul to 4-Jul	1400 - 1400	RSGB Contest
Jul	24GHz/47GHz/76GHz		11-Jul	0900-1700	
Jul	1.3GHz Activity Contest	Arranged by RSGB	20-Jul	1900 - 2130	RSGB Contest
Jul	5.7GHz/10GHz	F, P,L	25-Jul	0600-1800	
Jul	2.3GHz+ Activity Contest	Arranged by RSGB	27-Jul	1830 - 2130	RSGB Contest
Aug	1.3GHz Activity Contest	Arranged by RSGB	17-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	Arranged by RSGB	24-Aug	1830 - 2130	RSGB Contest
Aug	5.7GHz/10GHz	F, P,L	29-Aug	0600-1800	
Sep	24GHz/47GHz/76GHz		12-Sep	0900-1700	
Sep	1.3GHz Activity Contest	Arranged by RSGB	21-Sep	1900 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	F, P,L	26-Sep	0600-1800	
Sep	2.3GHz+ Activity Contest	Arranged by RSGB	28-Sep	1830 - 2130	RSGB Contest
Oct	1.3 & 2.3GHz Trophies	Arranged by RSGB	3-Oct	1400 - 2200	RSGB Contest
Oct	432MHz & up	Arranged by RSGB	3 to 4-Oct	1400 - 1400	IARU/RSGB Contest
Oct	122-248GHz		10-Oct	0900-1700	
Oct	24GHz/47GHz/76GHz		17-Oct	0900-1700	
Oct	1.3GHz Activity Contest	Arranged by RSGB	19-Oct	1900 - 2130	RSGB Contest
Oct	ARRL Microwave EME	Arranged by ARRL	23 to 24-Oct	0000 - 2359	ARRL EME 2.3GHz & Up
Oct	2.3GHz+ Activity Contest	Arranged by RSGB	26-Oct	1830 - 2130	RSGB Contest
Nov	Low band 1.3/2.3/3.4GHz 5	F, P,L	14-Nov	1000 - 1400	
Nov	1.3GHz Activity Contest	Arranged by RSGB	16-Nov	2000 - 2230	RSGB Contest
Nov	ARRL EME 50-1296MHz	Arranged by ARRL	20 to 21-Nov	0000 - 2359	ARRL EME Contest
Nov	2.3GHz+ Activity Contest	Arranged by RSGB	23-Nov	1930 - 2230	RSGB Contest
Dec	ARRL EME 50-1296MHz	Arranged by ARRL	18 to 19-Dec	0000 - 2359	ARRL EME Contest
Dec	1.3GHz Activity Contest	Arranged by RSGB	21-Dec	2000 - 2230	RSGB Contest

EVENTS 2021

Events may be subject to cancellation due to the Coronavirus
For latest information consult <https://microwavers.org>

2021		
April 18	UKuG AGM – online	see AGM notice in this issue
April 24	CJ-2021, Seigy - cancelled	www.cj.r-e-f.org/
April 24	RSGB AGM - online	www.rsgb/agm
May 21-23	Hamvention, Dayton - cancelled	www.hamvention.org
June 25-27	Ham Radio, Friedrichshafen - online	www.hamradio-friedrichshafen.de
August 19-22	EME 2021, Prague – rescheduled from 2020	www.eme2020.cz
September 24-25	National Hamfest	www.nationalhamfest.org.uk
October 10-15	European Microwave Week, London, Excel	www.eumweek.com
October 17-21	IARU-R1 Conference, Part-2 Novi Sad	conf.iaru-r1.org

2022		
May 20-22	Hamvention, Dayton	www.hamvention.org
June 24-26	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de
September 25-30	European Microwave Week, London, Excel	www.eumweek.com

80m UK Microwavers net

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

73 Martyn Vincent G3UKV