An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Noel G8GTZ/P & Roger GW8CUB/P 122/134GHz 67km

Motorised waveguide switch Hugh VA3TO

UK Microwave Group

Subscription Information

The following subscription rates apply

UK £6.00 US $9.00 Europe €9.00

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

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

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome

Please send them to

editor@microwavers.org

The CLOSING date is

the FIRST day of the month

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

Please submit your articles in any of the following formats:

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

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

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

UK Microwave Group Contact Information

Chairman:	Paul Nickalls G8AQA	chairman@microwavers.org	
General Secretary:	John Quarmby G3XDY	secretary@microwavers.org	tel: 01473 717830
Membership Secretary:	Bryan Harber G8DKK	membership@microwavers.org	
Treasurer:	David Millard M0GHZ	treasurer@microwavers.org	
Scatterpoint Editor:	Roger Ray G8CUB	editor@microwavers.org	
Beacon Coordinator:	Denis Stanton G0OLX	beacons@microwavers.org	
Contests Manager:	John Quarmby G3XDY	g3xdy@btinternet.com	
Scatterpoint Activity news:	John Worsnop G4BAO	scatterpoint@microwavers.org	
Trophies & Awards Manager:	Heather M0HMO	m0hmo@microwavers.org	

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 Nickalls	SDR	M0HMO	m0hmo@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	GI6ATZ	gi6atz@qsl.net
Peter Harston	Wales	GW4JQP	pharston@gmail.com

International

Kent Britain	USA	WA5VJB/G8EMY	wa5vjb@flash.net

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

New 122 & 134GHz UK Record of 67km

On 26th April, having decided that this might be the last day with suitably low Dew point of the season. Noel G8GTZ went to Birdlip IO81WU71, and Roger G8CUB travelled to the Blorenge IO81LS19.

Weather Data from Met office:
14.00 Friday 26 April

	Birdlip	Blorenge
Visibility	E	VG
Temp	7C	6C
Humidity	55%	59%
Pressure	1004	1005
Dew point	-1.4	-1.4

In practice the weather was not as good as the forecast and data suggested. Visibility at times reduced markedly, and there were showers at each end, sometimes simultaneously!

As usual with millimetre contacts, there was a fair bit of setting up to do. At the Blorenge end a 122GHz transmitter was set up running 20mW to a 140mm horn. This was not initially found using the 'VK' receiver at Noel's end. But once a dual band receive converter was used with 24GHz IF and 30cm dish, the signal was there. In fact it remained audible throughout. Roger had difficulty getting Opera to load up, but once sorted, signals were sent on the horn. After a couple of tries it was successfully decoded at the Birdlip end.

The return signal received at the Blorenge was quite weak, so it was decided to try a two way contact on 134GHz first. The 134GHz signal was stronger, but nowhere near the predicted 14dB increase (at the same power level) with the decrease in path loss.
Noel's keyline from the computer refused to work, removing the option of sending Opera. So slow (very slow) CW was sent instead.
The return transmitter was a dual band TX producing 5mW (9mW before the wg switch) to a 140mm horn on 122GHz, and 3mW on 134GHz.

On 122GHz -12 Opera was received by G8GTZ/P, who gave it a 53 report sent on CW.
On 134GHz -13 Opera was received by G8GTZ/P, who gave it a 55 report on CW.

On both bands GW8CUB/P responded with a 519 report.

For 122GHz reception, and 134GHz TX & RX, G8CUB used a dual band transverter. Transmit power being 5mW on both bands to a 30cm Cassegrain dish.

Signals dropped as visibility reduced. Which was generally from the 1pm start onward. But no faster QSB was in evidence.

So after some initial struggles a new distance was set for both bands.

Calculated path loss was as follows:
122GHz free-space loss 171dB + 50dB atmospheric loss = 221dB
134GHz free-space loss 172dB + 36dB atmospheric loss = 208dB

GW8CUB/P IO81LS19 The peak of the Blorenge in the background

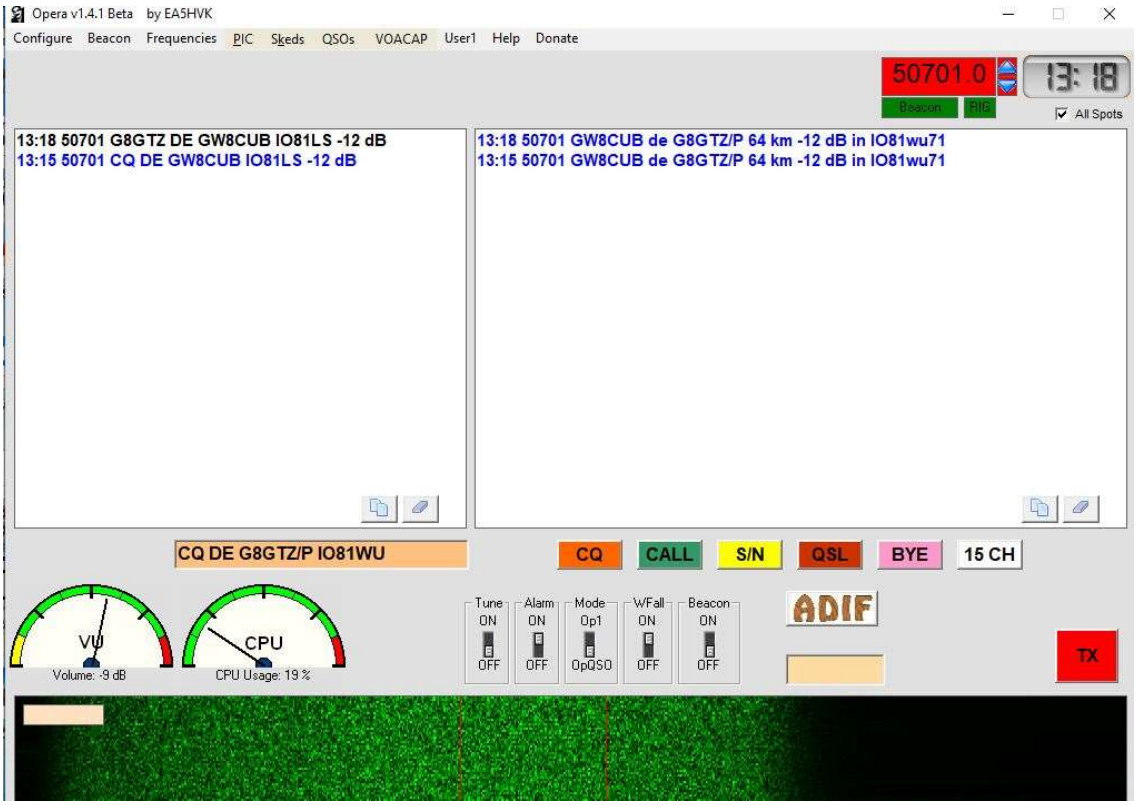
G8GTZ/P IO81WU71 Birdlip looking toward Wales

G8GTZ/P Birdlip carpark

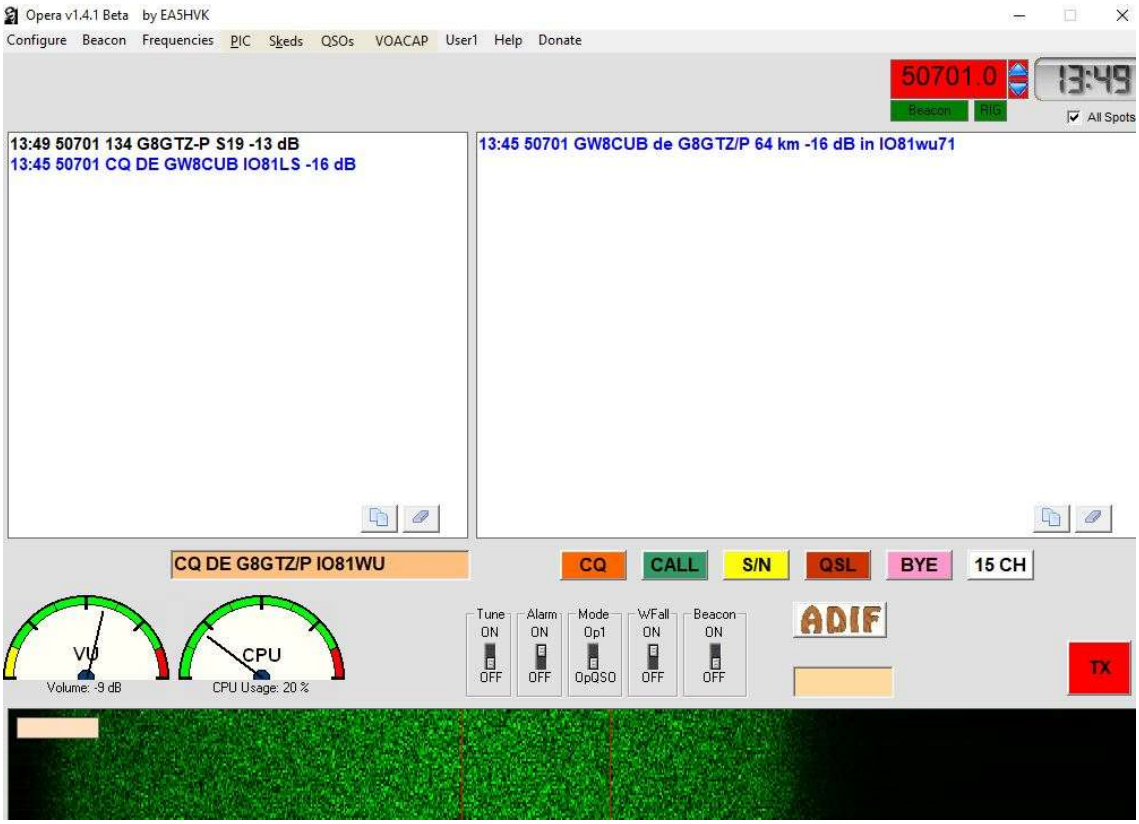
GW8CUB/P Fox hunter carpark at the Blorenge

134GHz signal received at Birdlip

122GHz received at the Blorenge car park



122GHz received



134GHz received

Going further on 122GHz?

Roger G8CUB

To see how much changing frequency would alter things. I looked at moving frequency to the top of the band. This is because the peak oxygen absorption line is at 118.75GHz. This absorption peak is very sharp, so that moving away in frequency reduces loss. Using the same weather data, in Mike Willis's 'radio path estimation' tool. I changed the frequency from 122.4 to 123 (122.99) GHz. At 67km the difference was 6dB, which is pretty significant! The advantage of 134 over 122 then lowering to circa 9dB. At short distances there is no real advantage in changing frequency. But as distance increases, the advantage becomes more significant.

Atmospheric pressure makes a difference as well. Over the 67km distance the loss would be 7dB lower at 950mb, than at 1050mb. Increasing height reduces atmospheric pressure. But, we are probably at the high point to get the line-of-site distance anyway.

As with all millimetre contacts. Finding a low a day with low Dew Point is key. Dropping the weather data of temperature and humidity into the Radio Path Estimation program, shows how rapidly the loss reduces with low Dew Point.
Probably finding a day with low Dew Point, low pressure, and no wind is near unobtainable. However getting close to it is the goal.

Improving radio performance comes down to increasing antenna gain, and increasing power. I have left out receive performance, as what we already have is pretty good. Certainly until 122GHz low noise amplifiers become available. My dual band transverter is probably a dB or so poorer than a VK board. It uses a biased wr-10 mixer, after a wr-10 waveguide switch. The VK board includes an LNA, but has coupling losses.
Interestingly a separate receiver using 24GHz as IF, with the same mixer type, performs much better. The waveguide gave image rejection. Though without an LNA, and low atmospheric noise, it is unclear how that is an advantage. Possibly the mixer works better, with an LO in its normal working range. Adding a DU3T 24GHz LNA with 3dB NF improvement, directly improved the overall NF by 3dB with the passive mixer.

A 30cm Cassegrain antenna is near optimum at this frequency. Going to 60cm with the 6dB increased gain is certainly possible. However alignment become even more critical. Using a lower frequency for alignment would make things easier. A proven technique that has been used in the European mountains for setting DX records.

The dual band transmitter used for the 67km QSO, used a 140mm horn. Changing to a 30cm dish would give a 6dB improvement in TX ERP.

Powers used were around 5mW. Which is around 17dB up on the 100uW or so measured at the coupler on a VK board.

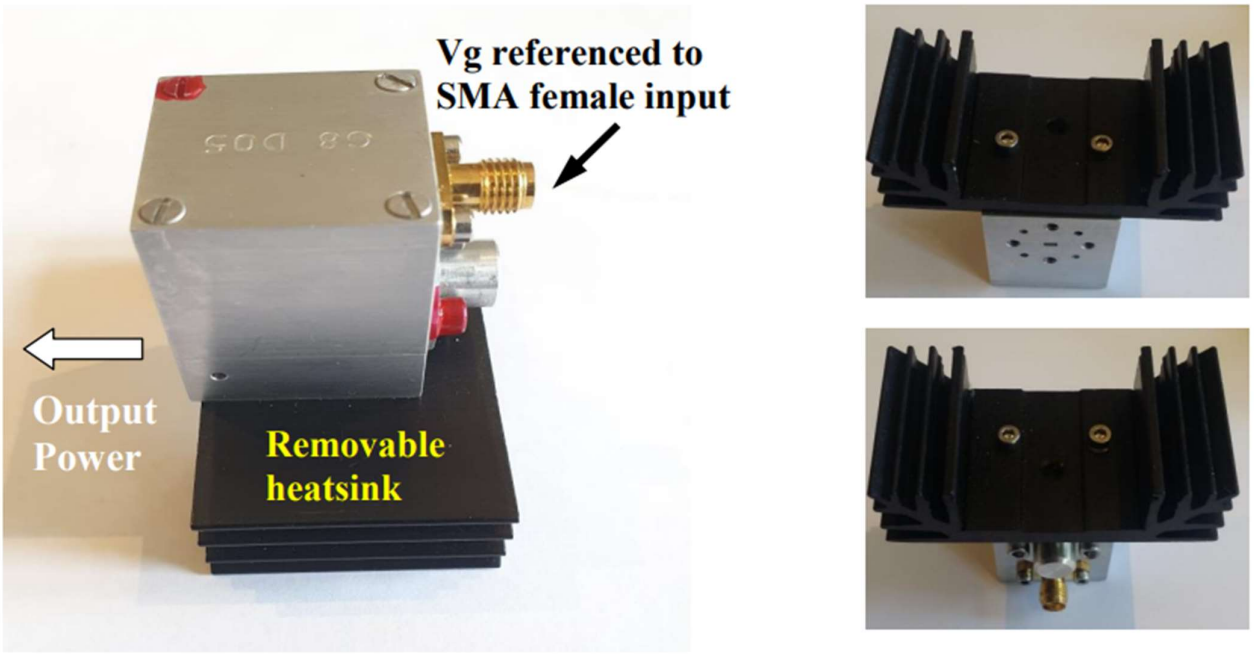
To obtain powers in the mW region, required a high power doubler.

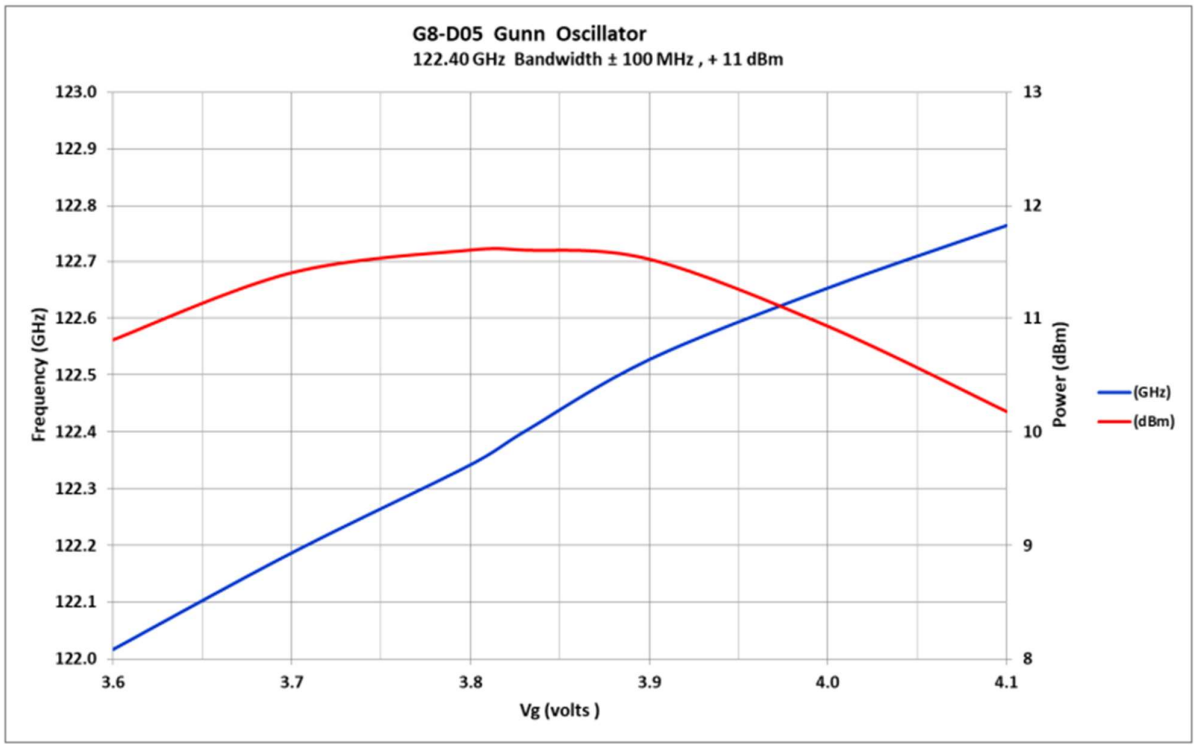
There is however an alternative solution……

A recent talk with Waheed at Osctek Ltd in London. Resulted in him producing a protype Gunn oscillator at 122.4GHz with +11dBm output.
To be of use, it will be necessary to phase lock the Gunn. Lehane G8KMH has been looking at this, and has done an initial board layout.
Waheed will be able to produce production Gunn oscillators with around 20mW output. Nudging the frequency up to cover 122.4 -122.99 looks like a good idea. Cost from him will be dependent on quantity. So that I can get some idea of interest. Please email me directly.

So, maybe 100km next Winter…….

Picture of actual unit: -



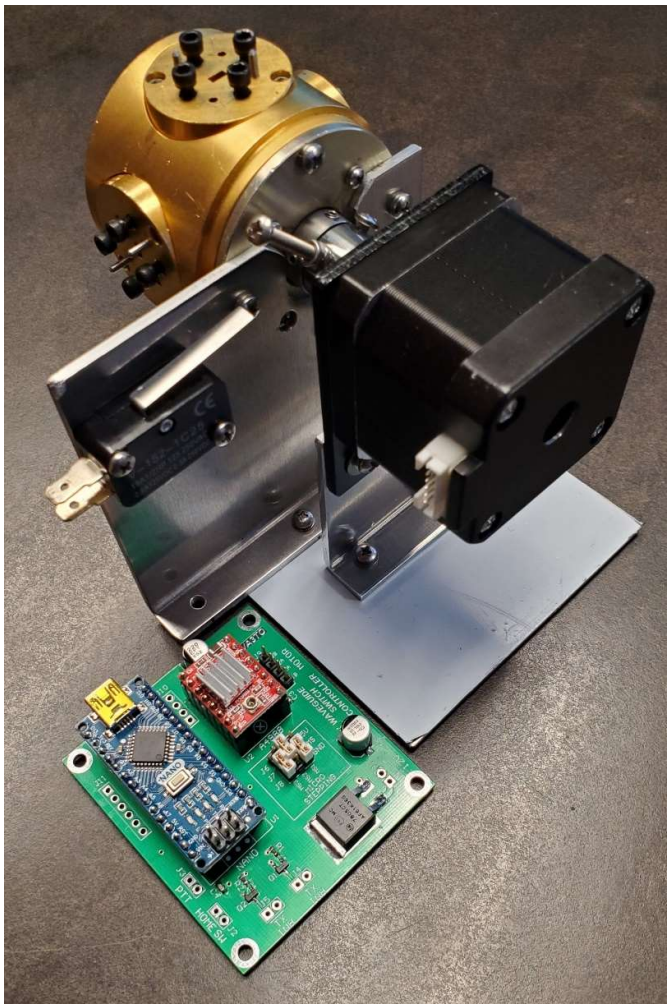


Data from prototype Gunn oscillator

Motorizing a Manual Waveguide Switch using a Stepper Motor

Hugh Duff VA3TO Mar. 2023
radeohedca@hotmail.com

Affordable surplus motorized waveguide switches for the millimeter-wave bands are virtually unobtanium so I decided to try my hand at motorizing a manual WR-15 switch that I was lucky enough to acquire using a stepper motor. I used a standard 42 x 38mm NEMA 17 stepper motor with an Arduino NANO microcontroller and an A4988 stepper motor driver on a custom carrier board.



CONTROLLER BOARD & STEPPER MOTOR

A custom carrier board was designed to mount the NANO microcontroller and A4988 stepper controller board, along with a 5V regulator. A schematic diagram of the board is shown at the end of this document. SIP female headers should be used for the NANO to facilitate programming as it needs to be programmed while it is off the carrier board. I also used them for the A4988.

The Arduino NANO (or compatible) board easily handles the task at hand. It contains an 8 bit ATmega328P microcontroller, a USB to serial converter I.C. and a 5V regulator, and comes pre-loaded with the Arduino bootloader firmware. Be sure to order a 16 MHz 5V version with the 328P microcontroller as there are some bad knock-offs that use a 12 MHz oscillator that will not run properly with the code as written. Also make sure you don't order a board that uses the less capable Tiny88 processor or some other NANO variant.

The A4988 stepper motor driver board reduces the amount of software required and takes some of the processing load off the microcontroller by cycling the correct phasing sequence to rotate the motor. The interface is reduced to a Direction pin (Hi or Lo) and a Step pin which gets pulsed to turn the motor. It also has built-in FET drivers and manages the current to the stepper motor windings. Be sure to affix the included heatsink onto the IC on the A4988 board as it can get warm, and install it onto the carrier board in the correct orientation otherwise it will be damaged.

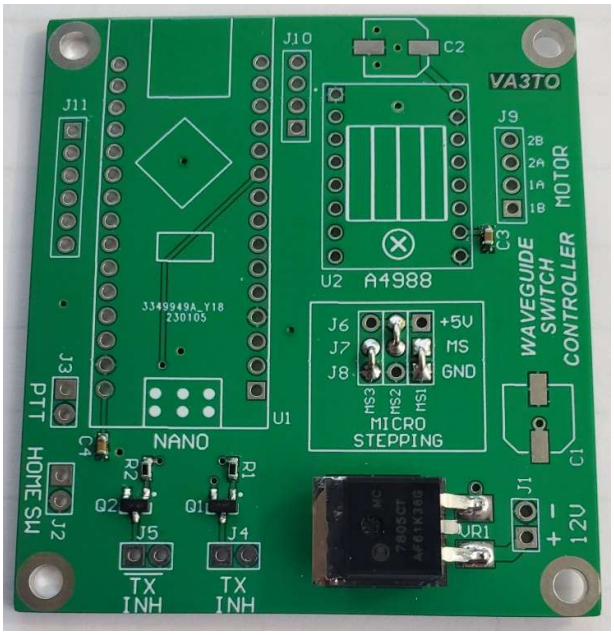
Both the NANO and A4988 boards are inexpensive and can be ordered from many online sources.

The Nema 17 stepper motor has a native step size of 1.8° but the A4988 stepper controller allows the motor to microstep in 1/2, 1/4, 1/8 or 1/16 steps. Microstepping can be configured by strapping the MS1, MS2 and MS3 jumpers accordingly. The trade-off of microstepping is speed so I chose to use 1/4 step microstepping so not to sacrifice too much speed. That provides 0.45° precision to position the rotor in the RX and TX positions. Strap MS1 to GND, MS2 to +5V and MS3 to GND for 1/4 step microstepping using some bus wire.

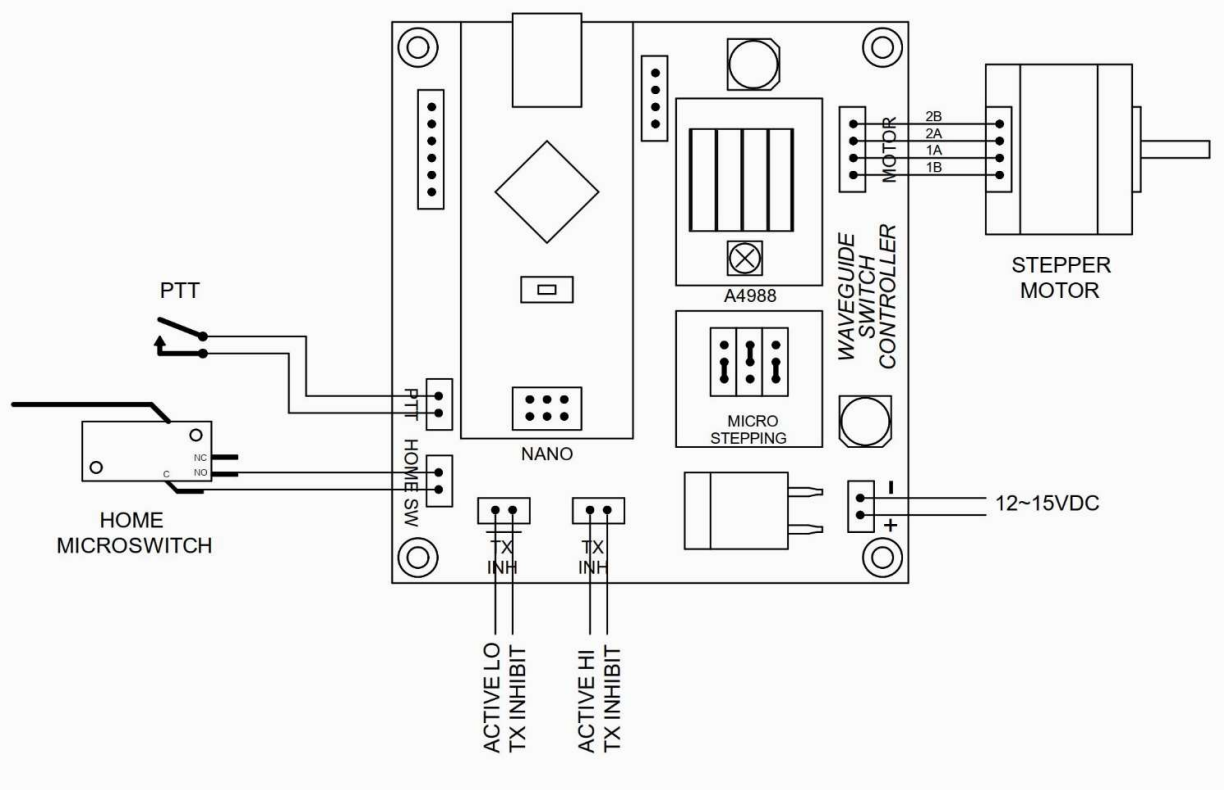
There are a few variations of NEMA17 stepper motors offering different torque ratings. I tested three different models; 42 x 20mm, 42 x 38mm and 42 x 48mm, and found that the 42 x 38mm had a suitable amount of torque for this project. The 42 x 38mm motor I chose is a model number 17HS4401, branded "SIMAX3D" that I ordered from Amazon.com.

The A4988 stepper motor controller has a current adjust pot that needs to be adjusted according to the specified current requirement of the chosen motor. There are a couple of different methods to accomplish this. A quick web search will turn up several sites and video links that describe the process. Most of these motors come out of Asia so the specifications can be ambiguous or inaccurate. They also come specified to work at different voltages however it seems to be less important as they are current driven off the A4988 controller. I followed one of the procedures but found that the motor and A4988 board were getting quite warm at idle, so I experimented a little to reduce the current while ensuring it still operates properly. The motor now operates cool to the touch with sufficient torque.

Active HI and LO TX Inhibit outputs are provided to holdoff the transmitter until the switch reaches the TX position, however this is a simulated output derived in software, not a true indication of the physical position of the WG rotor. The builder could add a second microswitch that can be activated when the switch is in the TX position if positive indication is desired.



CARRIER PC BOARD with SMD parts installed.
Note the correct strapping of the jumpers for 1/4 microsteps.



CONNECTION DIAGRAM

MECHANICAL DETAILS

Brackets made from 0.100” aluminum plate were fabricated to mount the WG switch and stepper motor based on the physical requirements of a Kuhne 76 GHz transverter with the additional height of a short straight piece of waveguide connecting the TX port to the switch. The WG Switch bracket was made wide enough to mount the home position microswitch. Some of the bracket holes were slotted to allow the motor to be aligned to the WG switch with minimal rotational friction.

The manual WG switch normally uses a detent mechanism to position the rotor precisely but it requires a fair bit of torque to overcome. I was able to disengage the detent mechanism on this particular WG switch and let the precision of the stepper motor position the rotor, and it's a lot easier for the motor to turn.

The large knob used to manually rotate the waveguide switch position was removed and a 3/8" to 5mm shaft coupler was made from a piece of stainless-steel rod to couple the waveguide switch to the stepper motor. This WG switch is fully manual with no motor or optical sensors so I used a microswitch that is triggered by a long 4-40 screw on the shaft coupler (idea borrowed from W5LUA) to establish a reference “Home position”. Any N.O. microswitch with a long activator arm can be used.

Since waveguide switches come in various shapes and sizes with different physical arrangements of shaft sizes & port orientation, and individual layout requirements will vary, mechanical mounting details and shaft coupler design are left to the builder.

SOFTWARE

The C code was written and programmed into the NANO microcontroller board using the Arduino IDE environment. It runs a Home/calibration procedure at power-up, rotating back until it triggers the microswitch then slowly forward until the switch is released (“Home” position), then offset to the RX position of the WG switch, which can be fine-tuned in firmware for perfect alignment. The motor is slowed down for the homing procedure so that the trigger point of the microswitch is consistent with no recoil. In the worst-case situation, if the unit was previously powered down with the rotor sitting at the TX position, then it will only need to rotate a little over 90° to trigger the microswitch, so the complete cal procedure takes place within a second or two after power-up. Grounding the PTT pin moves the rotor of the WG switch 90° to the TX position.

Every build will have mechanical variations in the placement of the microswitch and possibly a different rotational angle between RX and TX of the WG switch, so some values in the code will need to be altered to suit. The code is well documented with details of which values will need to be changed.

Programming the NANO is a simple task. Remove the NANO from the carrier board and connect it to a computer USB port using an appropriate cable. The board is sufficiently powered by the USB bus for programming so it does not need to be connected to a power supply.

Download and install the latest version of the Arduino IDE onto your computer.
Run the Arduino IDE and configure it as follows:

Tools - Port – COMx (use Device Manager to determine which port is being used).
Tools – Board – Arduino AVR Boards - Arduino Nano
Tools – Processor – ATmega328P. *

*Note that some Nano compatible boards come with an old version of the bootloader so you may need to select “ATmega328P (Old Bootloader)” if you encounter any errors when attempting to program the board.

A sketch containing the C code for this project can be downloaded from this link:
va3to.com/Articles & Documents.htm

Open the sketch in the Arduino IDE and upload it to the board using the round icon with the right arrow. The IDE should report “Done uploading” when programming is completed. Remove the programming cable and re-install the NANO into the carrier board.

CALIBRATION

Calibration should be done before the waveguides are fastened to the WG switch so that the rotor aperture can be visually lined up with the port. To calibrate the RX position, I temporarily altered the "RXoffset" constant in the software to move the switch roughly 180° from the reference point after power up so that I could sight the opening across the two horizontal ports (this WG switch also has "thru" positions). With a little trial and error by tweaking the offset value, I was able to get the aperture perfectly aligned. Then I subtracted the number of steps that it takes to put the WG switch back at the RX position (- 135°). This new value is the number of steps (1/4 microsteps) it takes to move the rotor from the "home" reference point to the RX position.

FINAL WORDS

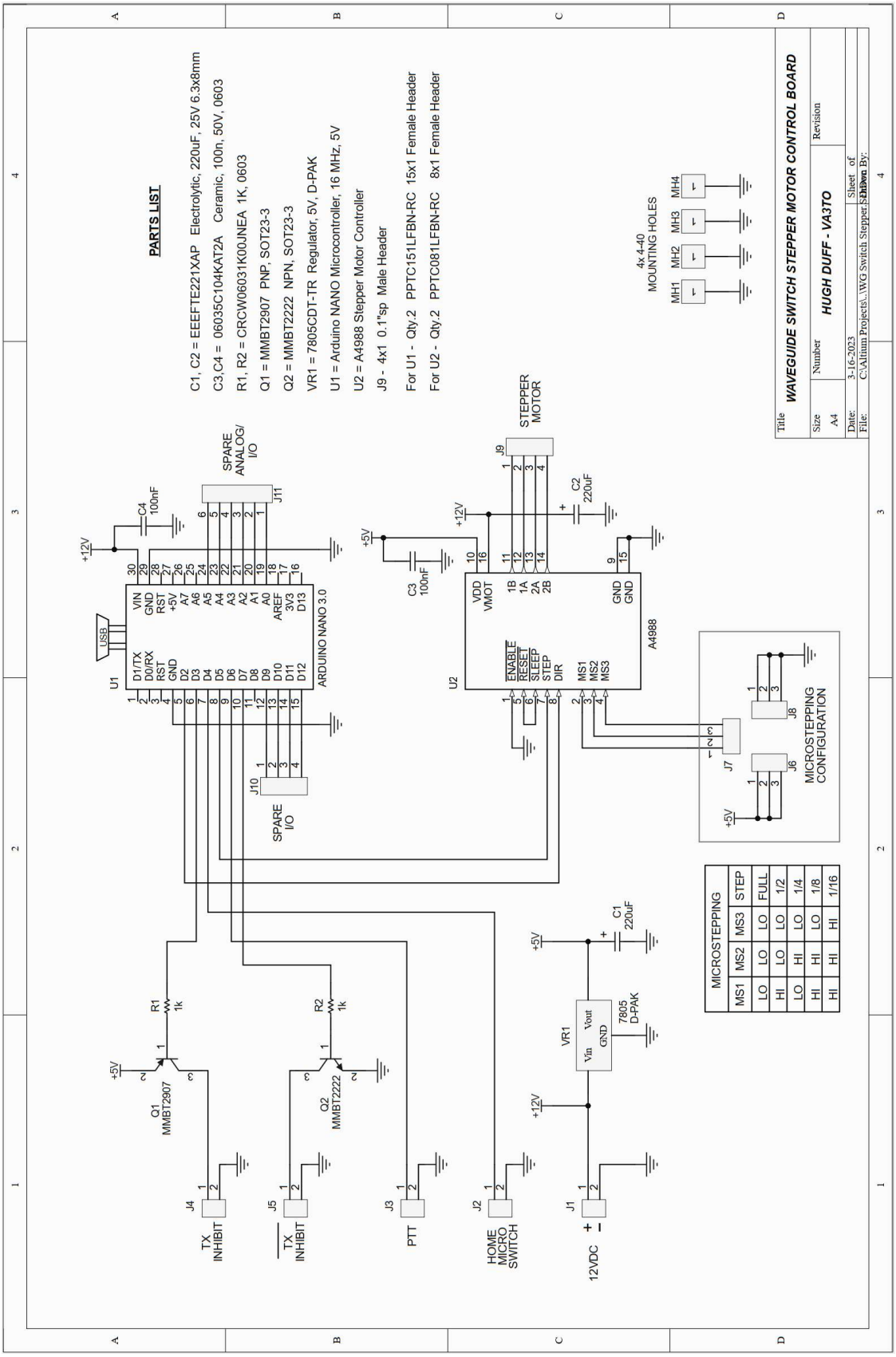
The WR-15 waveguide switch assembly constructed here will be installed into my new 76 GHz transverter but almost any manual rotary waveguide switch for other bands can be motorized in the same manner. I found the mechanical aspect of this project to be the most challenging part. Of course there are different ways to approach the physical requirements of mounting and coupling the stepper motor to the waveguide switch depending on the configuration and layout requirements. Hopefully the control part described here will make it more inviting for others to consider taking on such a project.

A video showing the assembly in operation can be viewed at this link:
https://www.youtube.com/watch?v=AOKYyWwhkv8

A limited number of controller pc boards are available for sale. Contact the author for availability.

Waveguide switch in complete 76GHz Transverter

Hugh Duff VA3TO 2024


PARTS LIST
C1, C2 = EEEFTE221XAP Electrolytic, 220uF, 25V 6.3x8mm
C3,C4 = 06035C104KAT2A Ceramic, 100n, 50V, 0603
R1, R2 = CRCW06031K00JNEA 1K, 0603
Q1 = MMBT2907 PNP, SOT23-3
Q2 = MMBT2222 NPN, SOT23-3
VR1 = 7805CDT-TR Regulator, 5V, D-PAK
U1 = Arduino NANO Microcontroller, 16 MHz, 5V
U2 = A4988 Stepper Motor Controller
J9 - 4x1 0.1"sp Male Header
For U1 - Qty.2 PPTC151LFBN-RC 15x1 Female Header
For U2 - Qty.2 PPTC081LFBN-RC 8x1 Female Header
4x4-40 MOUNTING HOLES
MH1 MH2 MH3 MH4
Title WAVEGUIDE SWITCH STEPPER MOTOR CONTROL BOARD
Size A4
Number HUGH DUFF - VA3TO
Revision
Date: 3-16-2023
File: C:\Altium Projects\..\WG Switch Stepper.SchDoc
Sheet of
Drawn By:
ARDUINO NANO 3.0
A4988
STEPPER MOTOR
SPARE ANALOG/ I/O
SPARE I/O
MICROSTEPPING CONFIGURATION
MICROSTEPPING
MS1 MS2 MS3 STEP
LO LO LO FULL
HI LO LO 1/2
LO HI LO 1/4
HI HI LO 1/8
HI HI HI 1/16
TX INHIBIT
TX INHIBIT
PTT
HOME MICRO SWITCH
12VDC
7805 D-PAK

LIFETIME ACHIEVEMENT AWARD FOR CHRIS WHITMARSH G0FDZ

Chris Whitmarsh G0FDZ was honoured with the award of an RSGB Lifetime Achievement Award by RSGB President John McCullagh GI4BWM and RSGB Chairman Stewart Bryant G3YSX at Cray Valley Radio Society's March mid-monthly meeting.

It had been a secret well-kept by a few for a number of months and Chris was clearly overwhelmed initially, but it was a great honour for Chris to receive the award from John and Stuart.

Chris G0FDZ receiving the Lifetime Achievement Award from John McCullagh and Stewart Bryant Dave G4BUO mentioned in the March QUA that we decided to schedule the prestigious visit to coincide with the 21 March meeting at which Ian G0AFH was to give a presentation on VHF DXing. Ian's talk was a huge success and contributed to a great evening. The attendance of 55 was the highest attendance at a Cray Valley meeting for quite some time. It was swelled by members of the Windmill Contest Group of which Ian (and Chris) are members. It was also good to see a number of club members in attendance who we do not see that often. Overall it was a great night particularly for Chris, but also for the club.

The President was unable to read the entire citation in the time available, so I am pleased to reproduce it here for all to see. "Chris was originally licensed as G8CIU. He has the unique distinction of being the only amateur in the UK to have had a two-way QSO on single every amateur band for which we are licensed. This is from the old 73kHz band, no longer available, through LF, HF, VHF and all the way up to what he and other microwavers refer to as 'topband' - 288GHz. He holds the current UK distance record on 288GHz with Roger, G8CUB. He has also built gear for 30THz and

has had QSOs on that 'band' though it is light frequency, not radio. Of course, equipment for the higher microwave bands has to be entirely home-brewed, and Chris's excellent construction skills have been critical to his success. The standard of construction of his microwave equipment is outstanding, and his construction skills were the main reason that he was recruited to work at Inmarsat. Very sadly, his health problems mean that ground-breaking microwave operation is now out of the question. Nevertheless his achievement in making QSOs on every single amateur band stands supreme and is something that is unlikely ever to be equalled. Chris has also served the VHF/UHF community for many years as beacon keeper for the 2m and 70cm beacons at Fairseat in Kent. Several years ago he rebuilt both GB3VHF and GB3UHF to modern standards and he also managed the move of both beacons from the Arqiva site at Wrotham to the BT tower at Fairseat. Chris served for several years on the RSGB Microwave Committee. He has always been an enthusiastic member of Cray Valley and served as Chairman in the 1980s. He is currently a Vice President of the Society, a position he has held for over twenty years. When the three-tier licence was introduced he put together Cray Valley's training programme and oversaw updates over the years at all three levels. He was chief instructor and course organiser until forced to step down by ill health two years ago." The RSGB President, who was staying overnight at the Fiveways Premier Inn, joined a few members in the Park Tavern and told me how delighted he was to make the presentation and to meet so many club members. We will all hold fond memories of a very successful and enjoyable evening. More photographs of Chris's presentation and the mid-March attendance, Credit: Cray Valley Radio Society

Maxicom CAT display for Yaesu FT8xx radios has a new firmware release V1.3

The main new features are:
1) Default QTH locator defined in config file. This locator will be used when no GPS signal is available (ie: at home QTH)
2) New IF at 28MHz can be selected for low bands transverters
3) CUSTOM band can be configured in config file for any transverter between 30Mhz and 400GHz
4) Transverter drift dial compensation, per band, can be defined in config file

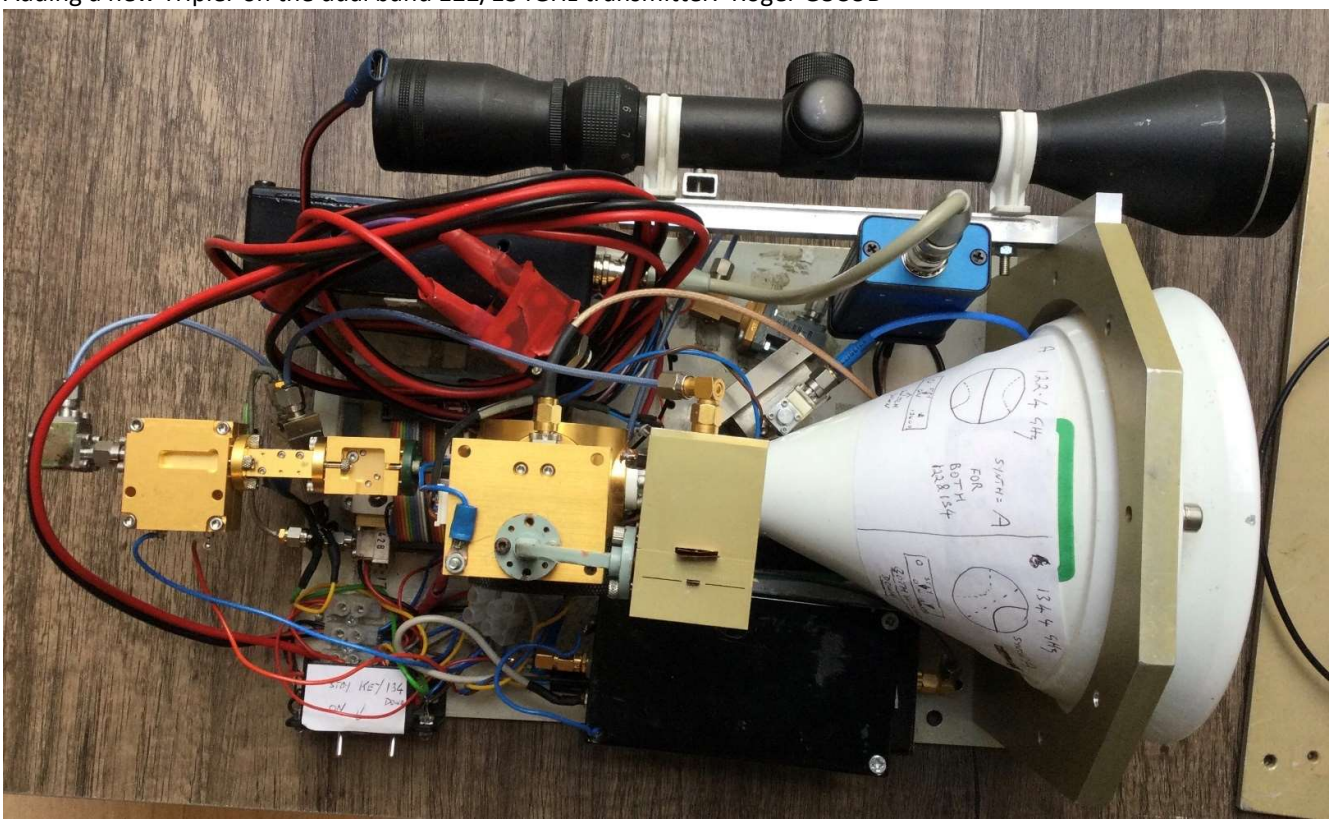
Existing kits can be freely upgraded to V1.3. Details will be published in the Telegram group

Added also a new video to my YT channel showing Maxicom at FT8 in 70MHz using a transverter and FT857
To use it along with the interface for digital modes just need a MiniDin 6pin cable splitter. Easy to find
https://youtu.be/c9ik0IWgvbE?si=E3G7FuQw1NfcIjHN

73 de Luis
EA5DOM

This Month I have been…..

Adding a new Tripler on the dual band 122/134GHz transmitter. Roger G8CUB



The +18.5dBm Tripler is on the left, with an SMA isolator attached. This upped the power on 122GHz from around 3mW to 9mW.
It needs some further development of the phase (matching) between the Tripler and output doubler. At present a phase shift is provided by a '63GHz HPF'.
The next stage is to use the Tripler output to drive the 134GHz doubler as well. This will need another WG switch and plumbing.

The 122GHz mod was done a couple of days before the 67km test. Without it, it is unlikely a two way QSO would have been possible!

Activity News March - April 2024

By Sam G4DDK standing in for John G4BAO

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

From Peter VA3ELE

Over the span of this week I've been working on getting the dish system ready for 78GHz. Last night I called Kevin VE3KH for a test run without success, not even a single dot hi. I guess 78GHz is a completely different beast from the other bands.

Unwilling to accept defeat, we tried again today. Kevin had some time to verify his gear was working, so it was all up to me to make this happen, well, it did.

I drove out to FN03kg just around the corner from where I was working and we gave it a go.

Of course we did the lining up with some dashes, but that didn't take long at all. Kevin's rotatable tower is working FB and super accurate in both azimuth and elevation. Once we had each other pegged, literally right where we started(not bad for only 0.7degrees beamwidth) we switched over to SSB and FM and of course some experimentation as well.

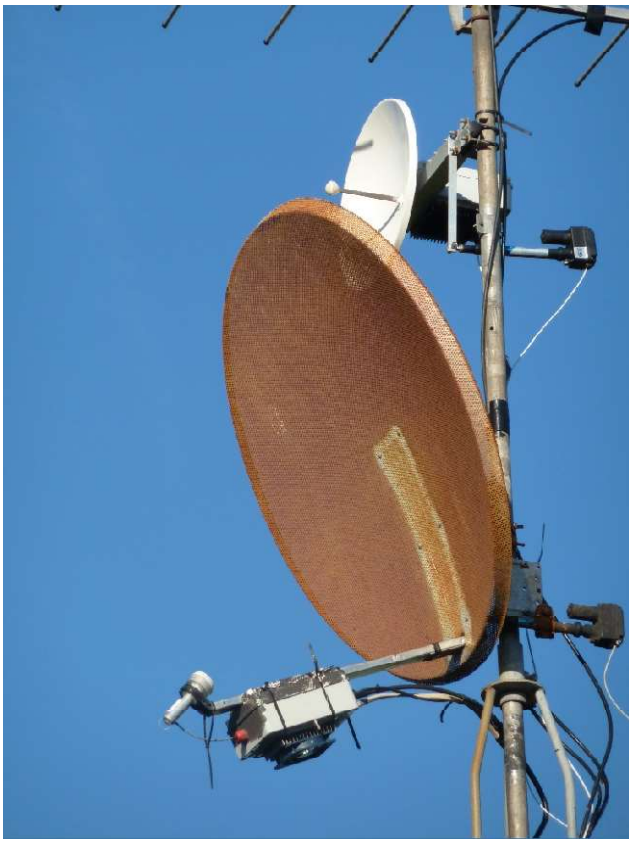
We did try a near 90degree bounce shot off of Toronto high-rise buildings, but no luck at all.

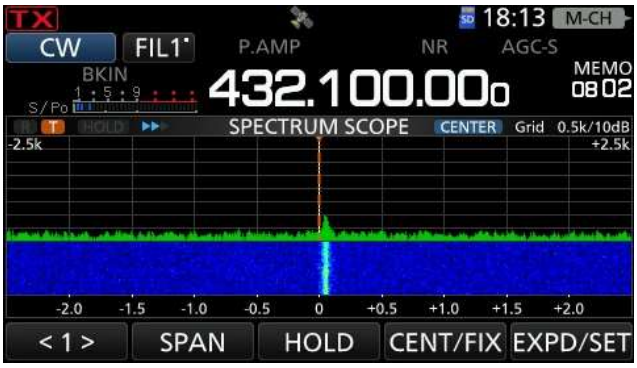
Enjoy the videos:

https://youtube.com/shorts/3TTnuT-pouE?feature=shared

https://youtu.be/fl7Qnc3SIWQ?feature=shared

From Adrian G4UVZ





After the mayhem of multiple mwave contests on the same day with poor conditions prevailing throughout, there was a little bonus after the contests had concluded.
Most /P stations seemed to disappear by lunchtime on Sunday 5th. Clive GW4MBS attempted to work myself and GW3TKH/P on 24GHz from three separate locations but not today, presumably due to incoming moisture for him from the South East. As these were paths that had worked before Clive decided that the chance of working more distant stations on 24GHz was remote, so he gave up and went home mumbling that trying to do anything on 47GHz would be pointless.

I phoned Clive at our normal 5 pm sked time to confirm that we would give it a miss. Having taken afternoon tea Clive decided to pop into his shack where GB3KBQ, SCX and RPE were all coming in at good strength.
So we had our usual 10GHz QSO with signals today S9+ due to local rain in GW.
Having failed to work on 24GHz when Clive was at his /P sites and having never worked from his home location via any propagation mode on 24GHz just on the off chance Clive put his 24GHz dish on a tripod in his garage and plugged into the set up still in his Land Rover and put out a signal, then lo and behold he was there on the screen! After some optimisation at both ends we eventually exchanged 52 SSB signals! Clive found that the dish adjustment on 24GHz considerably sharper than on 10GHz.

Path profile predicts 30 dB difference between 10 and 24 GHz. On 10GHz we both run 10 watts and 2 watts on 24GHz.
The perfect end to a rather disappointing day, just shows how important it is to have a setup from home to seize these opportunities!

Microwave Meetings 2024

Next on the calendar – Finningley Saturday and Sunday July 15-16th

https://g0ghk.com/home/uwrt24/

Trader tables
Test & demo areas across the site. Portable stations welcome
Test lab NF measurement
VNA HP 8510 -26Ghz
Power measurements
SMD soldering & practice areas.

If you've not visited us before, we're 10 minutes from either of the motorway junctions J1, and J2 of the M180, please look at the map below.
The closest postcode for us is DN8 5SX
https://g0ghk.com/home/visit/

Editors Comments

Many thanks to Hugh VA3TO for allowing his article on 'Motorising a Manual Waveguide Switch' to be published here. Also a big thankyou to all those involved in making the Martlesham RT a success.

A report on Martlesham and the AGM will appear in the next Scatterpoint.

Hopefully with the improvement in the weather, there will be more activity to report…….

Plus a plea for more constructional articles, and 'This Month I have been'…….

Contest Results 2024

April 1.3GHz Contest 2024. Activity low, high winds and poor conditions reported by most entrants.
Well done to John G4ZTR as winner and M0HNA/P as runner up and John G3SQQ as the highest placed low power entrant.
March 2.30GHz Contest 2024. Only one entrant on this band! Well done to Barry M0HNA/P as winner.
March 2.32GHz Contest 2024. Activity low on this band, that said a few new callsigns amongst the entries many thanks.
Well done to Barry M0HNA/P as winner and David M0GHZ as runner up. Well done to Dave G0FEH/P Leading low power section.
March 3.4GHz Contest 2024 Activity low on this band
Well done to Barry M0HNA/P winner and David M0GHZ runner up

73 Chris G0WUS

Low Band Cumulatives 1.3 GHz 2024

Section All 1.3 GHz

Pos	Call	03/03/24	07/04/24	Total
1	G4ZTR	823	938	1,761
2	G3TCU	1,000		1,000
2	M0HNA/P		1,000	1,000
4	M0GHZ	338	481	819
5	G3DCT/P	685		685
6	G4LDR	513	114	627
7	GM4JTJ	625		625
8	G3SQQ	398	180	578
9	G0WZV	495		495
10	G4BRK		385	385
11	G8CUL	330		330
12	EI8KN		303	303
13	GW4JQP	295		295
14	PE1EWR	178	116	294
15	G6GVI	131	134	265
16	F4VRB		187	187
17	GM4DIJ/P		108	108
18	G4CSD	102		102
19	G4XYW		69	69
20	G4RGK/P		26	26
21	G1YFG		19	19
21	G8AIM		19	19

Low Band Cumulatives 2.30 GHz 2024

Section All 2.30 GHz

Pos	Call	03/03/24	07/04/24	Total
1	M0HNA/P	780	1,000	1,780
2	G4LDR	1,000		1,000
3	G8CUL	731		731

Low Band Cumulatives 2.32 GHz 2024

Section All 2.32 GHz

Pos	Call	03/03/24	07/04/24	Total
1	M0GHZ	1,000	823	1,823
2	M0HNA/P	498	1,000	1,498
3	G3SQQ	908	549	1,457
4	G4LDR	609		609
5	G8CUL	471		471
6	G1YFG		296	296
7	G4BRK		290	290
8	PE1EWR	214		214
9	G0FEH/P		73	73
10	G4RGK/P		23	23
	GM4DIJ/P		0	0
	G8AIM		0	0

Low Band Cumulatives 3.4 GHz 2024

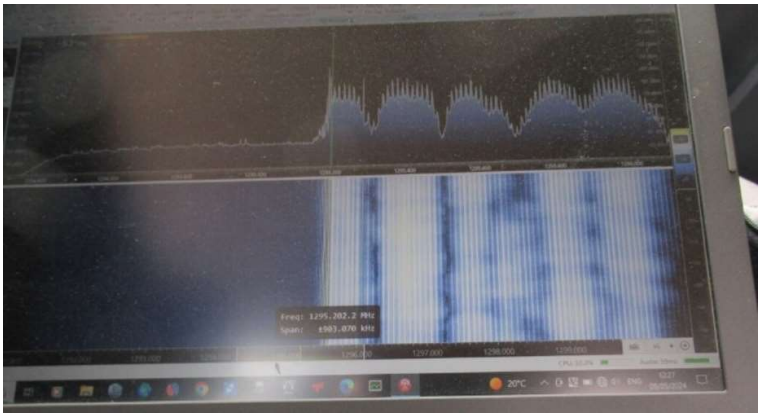
Section All 3.4 GHz

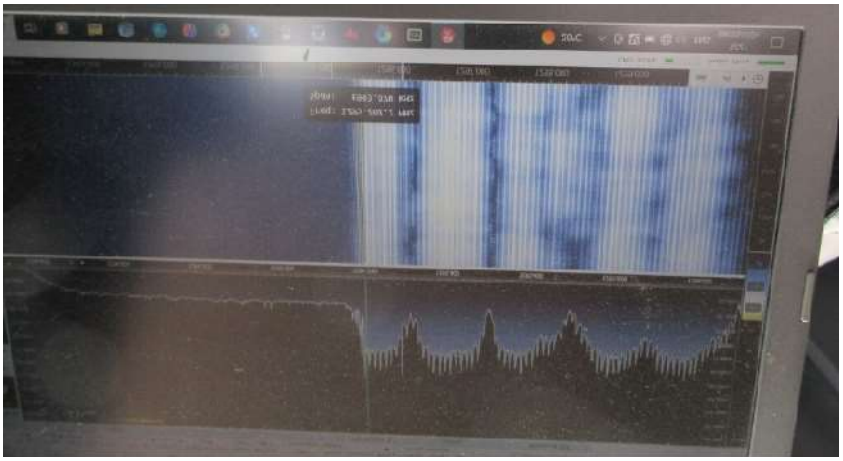
Pos	Call	03/03/24	07/04/24	Total
1	M0GHZ	916	964	1,880
2	G4LDR	1,000	488	1,488
3	M0HNA/P		1,000	1,000
4	G8CUL	699		699
5	G4BRK		434	434
6	G8AIM		270	270

Section All

Pos	Call	2.32 GHz	3.4 GHz	1.3 GHz	2.30 GHz	Total
1	M0HNA/P	1498	1000	1000	1780	5278
2	M0GHZ	1823	1880	819		4522
3	G4LDR	609	1488	627	1000	3724
4	G8CUL	471	699	330	731	2231
5	G3SQQ	1457		578		2035
6	G4ZTR			1761		1761
7	G4BRK	290	434	385		1109
8	G3TCU			1000		1000
9	G3DCT/P			685		685
10	GM4JTJ			625		625
11	PE1EWR	214		294		508
12	G0WZV			495		495
13	G1YFG	296		19		315
14	EI8KN			303		303
15	GW4JQP			295		295
16	G8AIM	0	270	19		289
17	G6GVI			265		265
18	F4VRB			187		187
19	GM4DIJ/P	0		108		108
20	G4CSD			102		102
21	G0FEH/P	73				73
22	G4XYW			69		69
23	G4RGK/P	23		26		49

23cm QRM





I set up 23cm portable at IO91GI44 (Walbury Hill) last Sunday for the 'Low Microwave Bands' contest and found the band to be just about unusable due to a high level of interference across the whole band. There was no point in continuing as I could only hear strong signals.
I went back to the area yesterday with some basic portable kit; a 35 ele Tonna on a 10' pole feeding an RSP2 or a Tiny SA ultra.
The RSP2 may not convey the details of the spectrum accurately but it showed that interference ranged from 1295.2 to 1302.8 and was a significant strength.
The noise peaked at about 75 degrees so if anyone can listen on 23cm, ideally just South of Newbury or possibly as far away as Reading, it would be very interesting to get some more headings to triangulate on.
I've attached screenshots of the LF & HF edges of the signal.
It would also be interesting if anyone recognises the nature of the signal. I am aware that there have been other incidences of wideband QRM on 23cm, I think one around Coventry recently. Did that look similar?

Thanks & 73, Phil G3TCU

UKuG MICROWAVE CONTEST CALENDAR 2024

Dates, 2024	Time UTC	Contest name
5-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz
5-May	0900 – 1700	1st 24GHz Contest
5-May	0900 – 1700	1st 47GHz Contest
5-May	0900 – 1700	1st 76GHz Contest
26-May	0600 - 1800	1st 5.7GHz Contest
26-May	0600 - 1800	1st 10GHz Contest
2-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz
30-Jun	0600 - 1800	2nd 5.7GHz Contest
30-Jun	0600 - 1800	2nd 10GHz Contest
14-Jul	0900 – 1700	2nd 24GHz Contest
14-Jul	0900 – 1700	2nd 47GHz Contest
14-Jul	0900 – 1700	2nd 76GHz Contest
28 -Jul	0600 - 1800	3rd 5.7GHz Contest
28 -Jul	0600 - 1800	3rd 10GHz Contest
18-Aug	0900 – 1700	24GHz Trophy Contest
25-Aug	0600 - 1800	4th 5.7GHz Contest
25-Aug	0600 - 1800	4th 10GHz Contest
15-Sep	0900 - 1700	3rd 24GHz Contest
15-Sep	0900 - 1700	3rd 47GHz Contest
15-Sep	0900 - 1700	3rd 76GHz Contest
29 -Sep	0600 - 1800	5th 5.7GHz Contest
29 -Sep	0600 - 1800	5th 10GHz Contest
6 -Oct	0900 - 1700	4th 24GHz Contest
6 -Oct	0900 - 1700	4th 47GHz Contest
6 -Oct	0900 - 1700	4th 76GHz Contest
10 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz

MICROWAVE CONTEST CALENDAR 2024

Month	Contest name	Organiser	Date 2024	Time GMT	Notes
Jan	1.3GHz Activity Contest	*Arranged by RSGB*	16-Jan	2000 - 2230	RSGB Contest
Jan	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Jan	1930 - 2230	RSGB Contest
Feb	122GHz Contest	UKuG	4-Feb	0900 - 1700	New event
Feb	1.3GHz Activity Contest	*Arranged by RSGB*	20-Feb	2000 - 2230	RSGB Contest
Feb	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Feb	1930 - 2230	RSGB Contest
Mar	Low Band 1296/2300/2320/3400MHz	UKuG	3-Mar	1000 - 1600	First 4 hours coincide with IARU event
Mar	REF/DUBUS EME 3.4GHz	*Arranged by REF/DUBUS*	17-Mar	0000 - 2400	REF/DUBUS EME 3.4GHz
Mar	1.3GHz Activity Contest	*Arranged by RSGB*	19-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Mar	1930 - 2230	RSGB Contest
Apr	Low Band 1296/2300/2320/3400MHz	UKuG	7-Apr	0900 - 1500	
Apr	REF/DUBUS EME 2.3GHz	*Arranged by REF/DUBUS*	14-Apr	0000 - 2400	REF/DUBUS EME 2.3GHz
Apr	1.3GHz Activity Contest	*Arranged by RSGB*	16-Apr	1900 - 2130	RSGB Contest
Apr	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Apr	1830 - 2130	RSGB Contest
May	*432MHz & up*	*Arranged by RSGB*	4-May to 5-May	1400 -1400	RSGB Contest
May	*10GHz Trophy*	*Arranged by RSGB*	5-May	0800 - 1400	Sunday, to coincide with IARU
May	Low Band 1296/2300/2320/3400MHz	UKuG	5-May	0800 - 1400	Aligned with IARU event
May	24GHz/47/76GHz	UKuG	5-May	0900-1700	Aligned with IARU event
May	REF/DUBUS EME 1.2GHz	*Arranged by REF/DUBUS*	11-May to 12-May	0000 - 2400	REF/DUBUS EME 1.2GHz
May	1.3GHz Activity Contest	*Arranged by RSGB*	21-May	1900 - 2130	RSGB Contest
May	5.7GHz/10GHz	UKuG	26-May	0600-1800	
May	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-May	1830 - 2130	RSGB Contest
Jun	Low Band 1296/2300/2320/3400MHz	UKuG	2-Jun	0900 - 1500	Aligned with some Eu events
Jun	REF/DUBUS EME 24GHz	*Arranged by REF/DUBUS*	8-Jun	0000 - 2400	REF/DUBUS EME 24GHz
Jun	REF/DUBUS EME 10GHz	*Arranged by REF/DUBUS*	9-Jun	0000 - 2400	REF/DUBUS EME 10GHz
Jun	1.3GHz Activity Contest	*Arranged by RSGB*	18-Jun	1900 - 2130	RSGB Contest
Jun	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Jun	1830 - 2130	RSGB Contest
Jun	5.7GHz/10GHz	UKuG	30-Jun	0600-1800	
Jul	VHF NFD (1.3GHz)	*Arranged by RSGB*	6-Jul to 7-Jul	1400 - 1400	RSGB Contest
Jul	24GHz/47/76GHz	UKuG	15-Jul	0900-1700	
Jul	1.3GHz Activity Contest	*Arranged by RSGB*	16-Jul	1900 - 2130	RSGB Contest
Jul	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Jul	1830 - 2130	RSGB Contest
Jul	5.7GHz/10GHz	UKuG	28-Jul	0600-1800	
Jul	REF/DUBUS EME 5.7GHz	*Arranged by REF/DUBUS*	28-Jul	0000 - 2400	REF/DUBUS EME 5.7GHz
Aug	24GHz Trophy Contest	UKuG	18-Aug	0900 - 1700	New event
Aug	1.3GHz Activity Contest	*Arranged by RSGB*	20-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Aug	1830 - 2130	RSGB Contest
Aug	ARRL Microwave EME	*Arranged by ARRL*	24-Aug to 25 -Aug	0000 - 2359	ARRL EME 2.3GHz & Up
Aug	5.7GHz/10GHz	UKuG	25-Aug	0600-1800	
Sep	24GHz/47/76GHz	UKuG	15-Sep	0900-1700	
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	17-Sep	1900 - 2130	RSGB Contest
Sep	ARRL Microwave EME	*Arranged by ARRL*	21-Sep to 22-Sep	0000 - 2359	ARRL EME 2.3GHz & Up
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Sep	1830 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	UKuG	29-Sep	0600-1800	
Oct	*432MHz & up*	*Arranged by RSGB*	5-Oct to 6-Oct	1400 - 1400	IARU/RSGB Contest
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	5-Oct	1400 - 2200	RSGB Contest
Oct	24GHz/47/76GHz	UKuG	6-Oct	0900-1700	
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	15-Oct	1900 - 2130	RSGB Contest
Oct	ARRL EME 50-1296MHz	*Arranged by ARRL*	19-Oct to 20-Oct	0000 - 2359	ARRL EME Contest
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	22-Oct	1830 - 2130	RSGB Contest
Nov	Low Band 1296/2300/2320/3400MHz	UKuG	10-Nov	1000 - 1400	
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	16-Nov to 17-Nov	0000 - 2359	ARRL EME Contest
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	19-Nov	2000 - 2230	RSGB Contest
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Nov	1930 - 2230	RSGB Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	17-Dec	2000 - 2230	RSGB Contest

Sections		
	F	Fixed / home station
	P	Portable
	L	Low-power <10W 1.3/2.3/3.4GHz, <1W 5.7/10GHz)

Added 24GHz and 122GHz events, rescheduled 24/47/76GHz events for 2024

EVENTS 2024

May 17-19	Hamvention, Dayton Ohio	www.hamvention.org
June 28-30	Ham Radio, Friedrichshafen	www.hamradio-friedrichafen.de
July 15-16	Finningley Roundtable, Finningley	www.g0ghk.com
August 4	BATC Convention, Midland Air Museum, Coventry	www.batc.org.uk
August 9-11	20th EME Conference, Ewing NJ, USA	EME2024Trenton.org
September 22	Crawley Roundtable	https://carc.org.uk/
September 22-27	European Microwave week, Paris	www.eumweek.com
October 3-5	Microwave Update, Vancouver, Canada	microwaveupdate.org
November 9	Scottish Roundtable	www.gmroundtable.org.uk
November 30	Midlands Roundtable SY6 7DH	