An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Midlands Round Table 2023.

DU3T 24GHz Pre-amplifier review

UK Microwave Group

Subscription Information

The following subscription rates apply

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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

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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

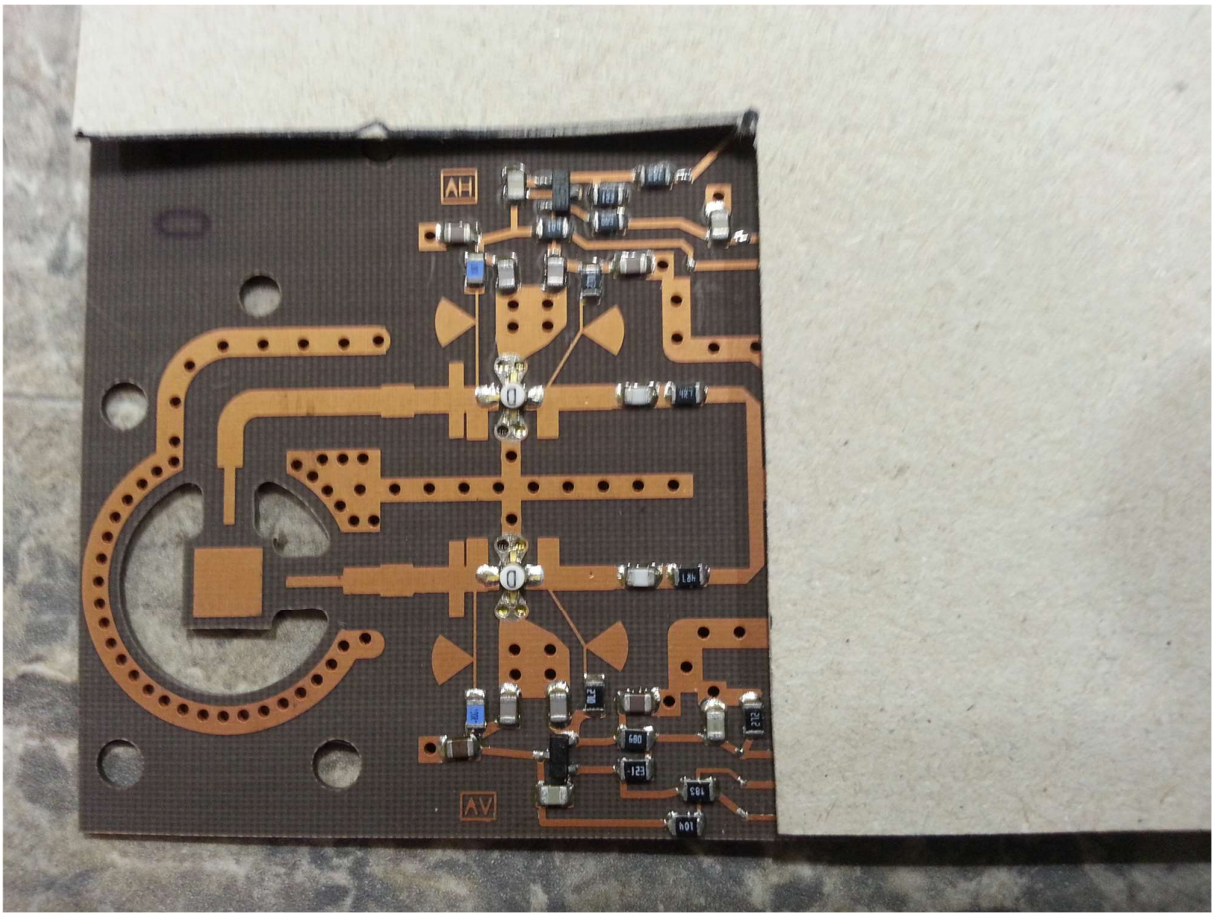
A 100mW Driver Amp for 10 GHz

Geoff Pike GI0GDP

The following describes a fairly simple 5mW in 100mW amplifier for 10 GHz and well suited to F6BVA transverters to give driver power for a GaAS Fet to achieve an useful increase in power.

The basis of the amplifier is a reworking and repurposing the “Franco” pcb and retaining one NE325 Fet and adding a MGF1601 output Fet.
The pcb is housed in a Schubert tin box (from Alan) with sma connectors and some feedthru’s for -5V and +8V, the -ve supply could well be generated from an ICL7660.

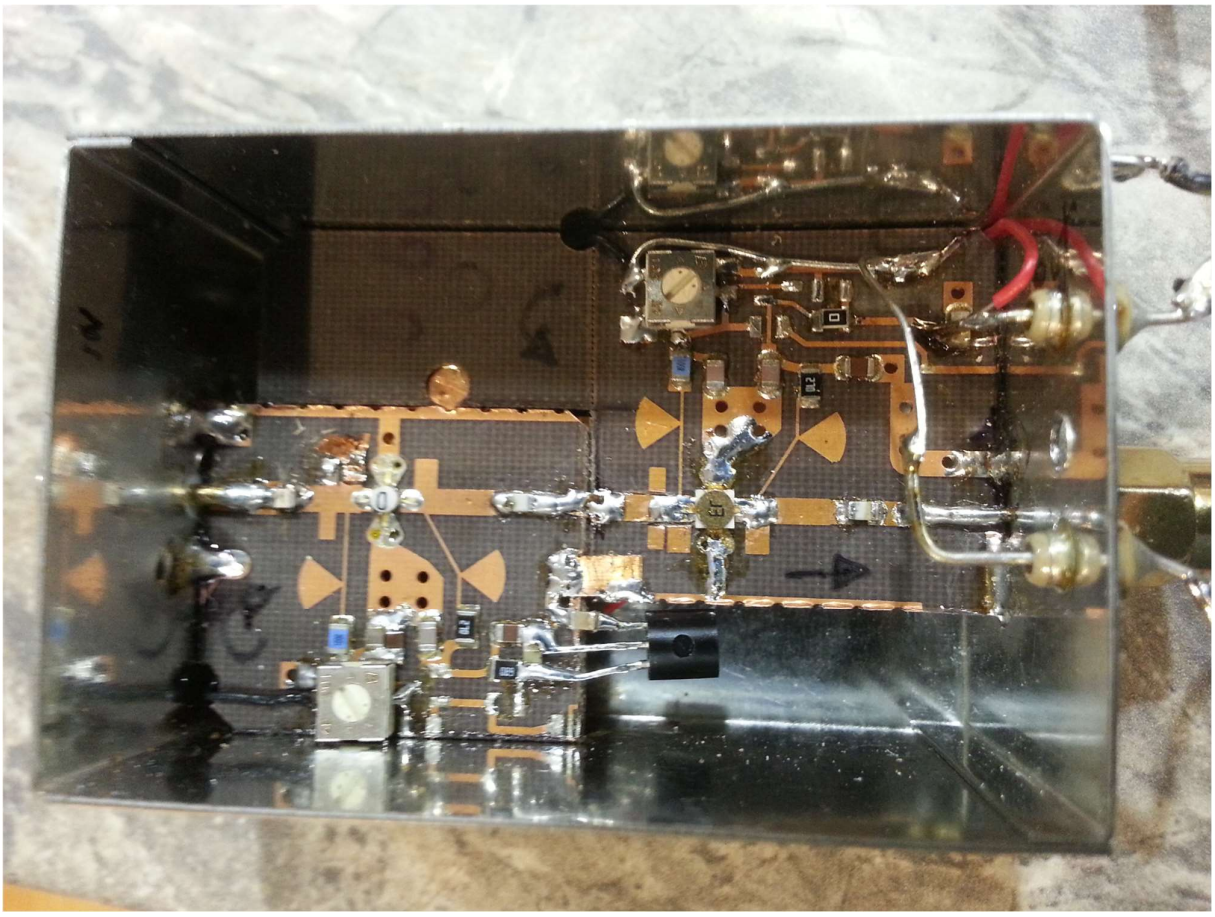
The Franco board needs the pcb cut in two places to release two of the amplifier stages and one will retain the NE325 whilst the other will have it removed and replaced with the “MGF1601”, in quotation because the case is not quite right for a genuine Mitsubishi version but that isn’t a show stopper. (see pic of sub amp delineation).
The top sub amp becomes the output stage with the MGF1601 whilst the bottom one is the input stage.



So you need a sharp modelling knife for this process and also a cocktail stick with a 2mm x 1mm copper strip super glued to one and a 3mm x 1mm on the other end for tuning later on, however there isn’t a whole lot of flaking needed and it seems the MGF1601 is not at all fussy about matching but for that extra mW you can have a go. The NE325 is already in a 10 GHz environment so it’s likely that only a small amount of flaking will be needed.

Once the sub amplifiers are removed from the main board they are rejoined as in the photograph, care is needed that the new board will fit the tin box (55x30x35mm).
It’s best to drill the box for SMAs and feed throughs and then fit the pcb.
The ground plane side of the two new sub boards need some copper foil soldering to it to maintain the ground integrity.
The top sub amp becomes the output stage with the MGF1601 whilst the bottom one is the input stage.

The component side obviously needs some modifications to it and most of these can be seen in the picture below. To summarise you need to add 2 bias pots 10K, a 2p ATC style capacitor at the input and replace the drain resistor in the MGF1601 from 27R to 15R.
Also a 5v 78L05 regulator for the NE325 and perhaps a ICL 7660 for the -ve supply but I choose to supply the box with +8V and -5V.
The 3 input stubs on the MGF1601 gate are cut through with a sharp knife, see pic.

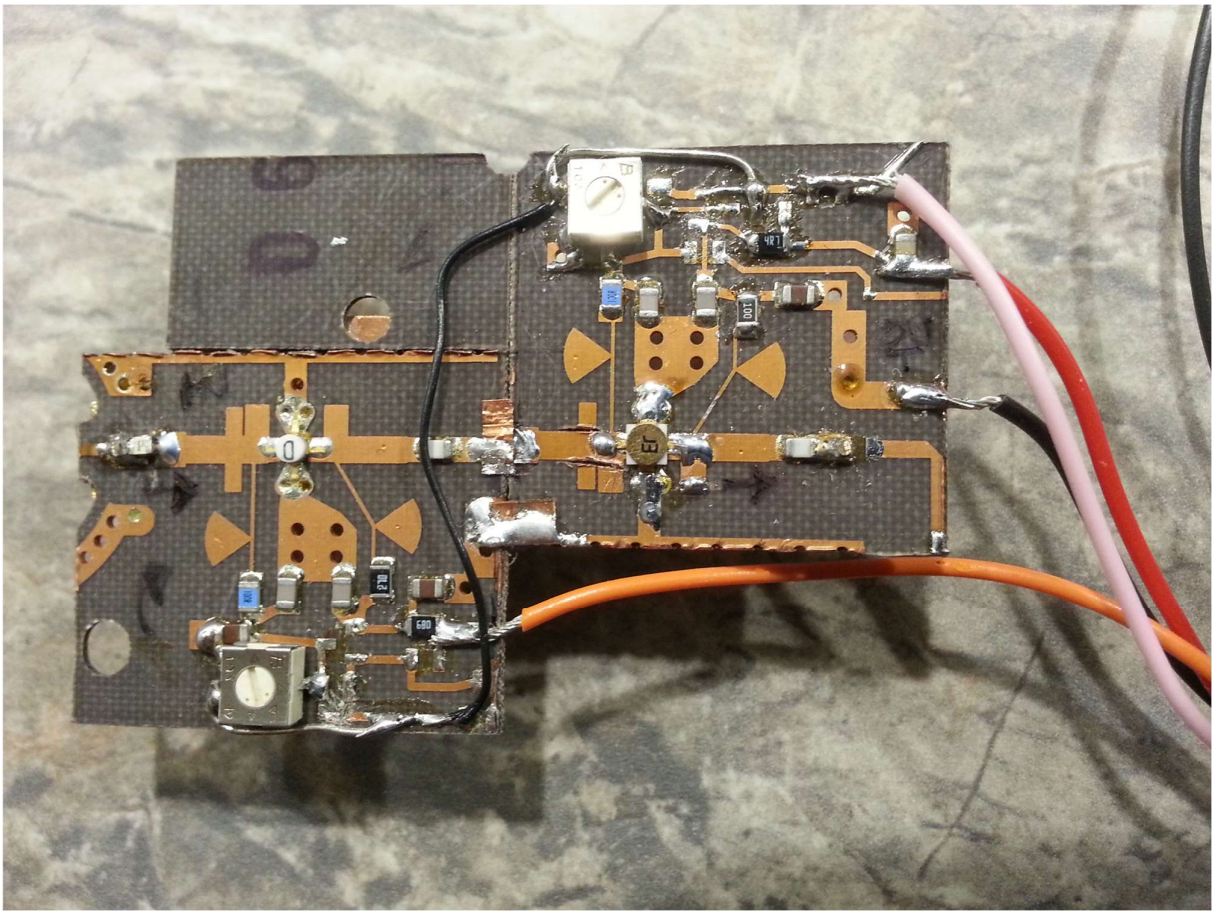


The above has the original 27R fitted in the drain.

The initial set up requires the in/out to be terminated in SMA 50R loads, then only apply the gate bias and check there is bias on the pcbs to thr gates, I set at -3V to start with.
Then arrange for the NE325 drain supply to be on and set the drain current for 20mA, its drain resistor is 27+82R as per the board.
Then apply the 8v to the MGF1601 and set the drain current to 70 mA. Switch off and make sure that the gate bias is left on, DO NOT apply drain volts with the bias removed or there will be no point in continuing!

With about 5mW in you should get 100mW out HOWEVER you may equally get this with 2.5mW drive, max drive is 10 mW. Depending on your layout some flaking of the NE325 gate may be needed and this is where the cocktail stick comes in handy.
Also its worth varying the bias to the NE/MGF devices for an increase in output.

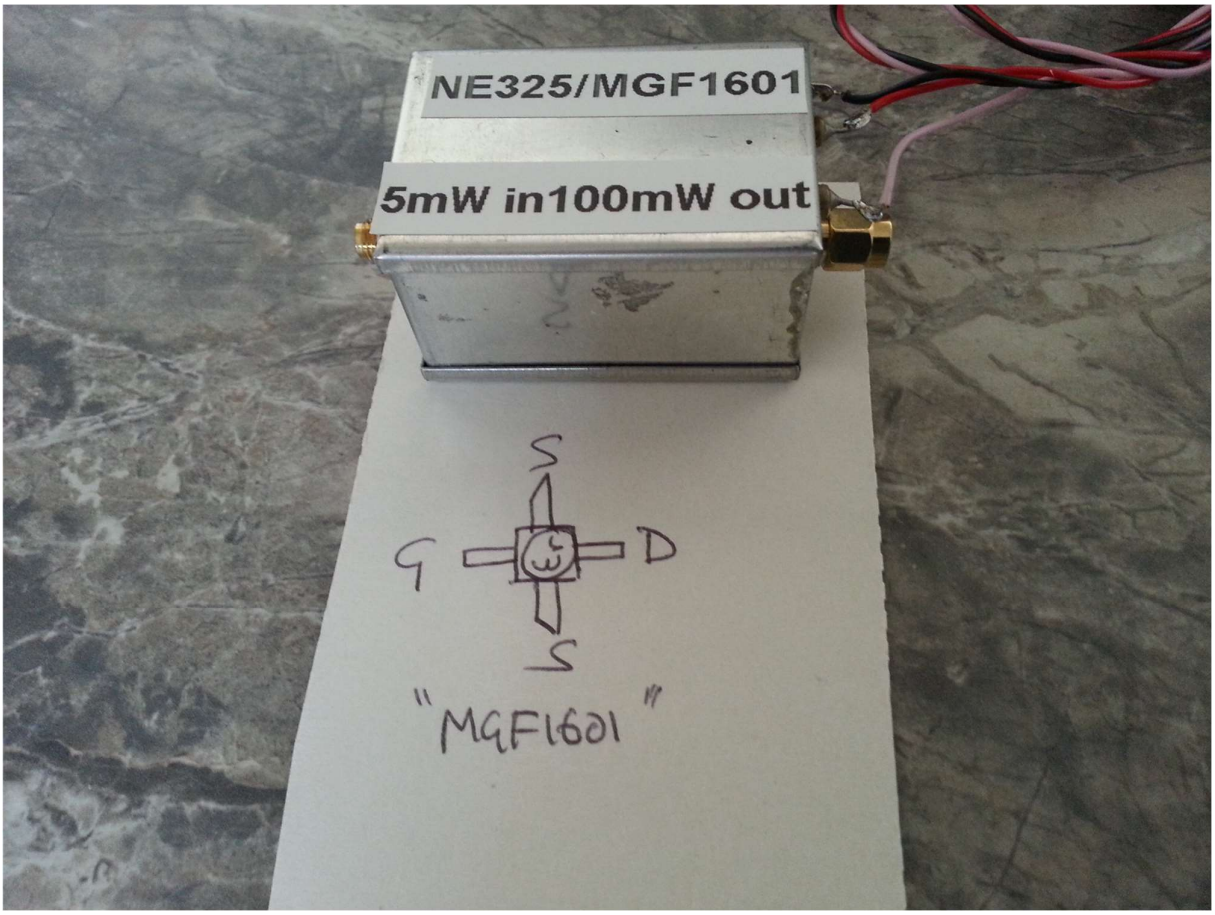
That's about it really but do expect drive variations and also there is about a 1dB gain drop once the box lid is put on, If it takes off then some damper material will be needed under the lid or just simply forget about the lid altogether.
An unboxed variant



The above has a 15R drain resistor fitted.

I hope the pictures explain what is needed clearly enough, my testing was done at 10.475 GHz because it was handy to use an HB100 as a signal source and then the HP432 as power meter and a HP8562A to look at the spectrum.

Where to get the bits:-
The 4x4mm 10K pots 3314G-10K from www.enigma-shop,com
SU-02 pcb from www. rf-microwave.com
The issue with the SU-02 pcb is shipping cost and a group purchase would make sense
MGF1601 from Ebay.com Chips Gate 3722 4729 2760
Schubert boxes from Alan at https://alanradiog3nyk.ddns.net/componen.ht



I have a few of these and the results vary a few dB, the only thing is that I haven't been able to get 200mW out of these MGF1601s but here you go
cheers

Geoff Pike
GI0GDP
24/11/23

WRC-23 Summary Report

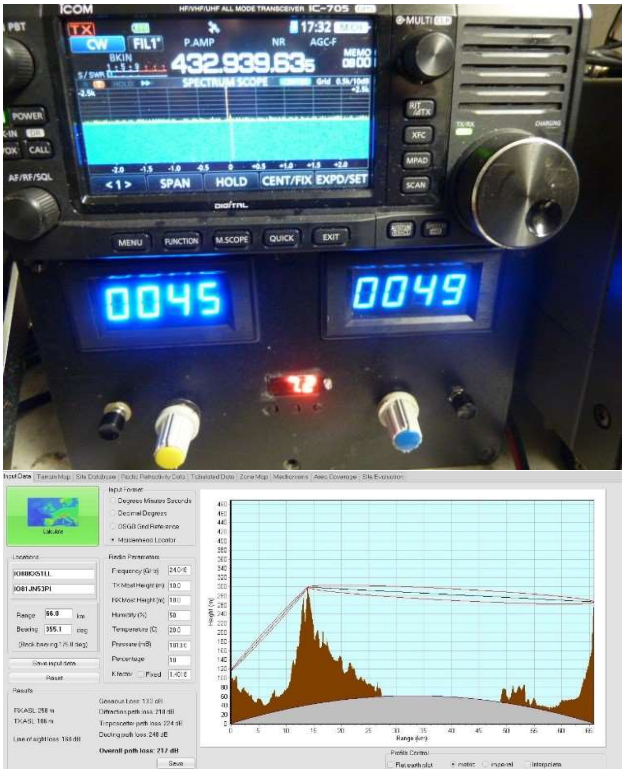
These reports from Barry G4SJH summarize the outcome from the conference regarding the 23cm band.
Barry is to be congratulated on his achievements in this respect. By his actions we have a usable section, for narrow band operation, at full power.

https://www.iaru-r1.org/2023/itu-r-recommendation-m-2164-on-23cm-amateur-service-and-rnss-operations-now-published-in-time-for-wrc-23-discussions/

https://www.iaru-r1.org/2023/wrc-23-summary-report-on-the-23cm-agenda-item-9-1-topic-b/

24GHz my Journey so far - continued

Adrian G4UVZ



Last month we featured Adrian G4UVZ's Wavelab setup. After initial tests /P he was keen to see how things would work out from the home QTH IO80KX.

Adrian is located on the north side of the Blackdown Hills in Somerset 1 km north of GB3KBQ 10 GHz beacon. He has a good line of sight take off for over 40 km from north through to 70 degrees east.

The Wavelab transceiver uses a close coupled Procom Dish complete with 'bird cage feed' From the initial portable tests it was clear that some way would be required to adjust the elevation of the dish. It was decided that the whole transceiver enclosure and antenna would need to rotate as one assembly.

To achieve the elevation, the assembly is mounted onto a cross arm on the main mast, above the 10 GHz 1.2 M dish. The transceiver is housed in a polycarbonate IP65 box (as used for the 10GHz home station and the head end of GB3KBQ) *(5)* The dish and the box are mounted onto 50 x 50 x 6 mm piece of 'L' section alloy which extends horizontally on one side of the assembly.

My initial thoughts were that some square section alloy could be machined to sleeve over the 1.5 inch cross arm, allowing the whole assembly to tilt up and down. I discussed this idea on the phone with Roger G3IUZ *(4)* …He had a much better idea …why not print the bearing in PETG material …..several hours later working CAD drawing arrived in my inbox. 7 days later the finished articles arrived on my doorstep!

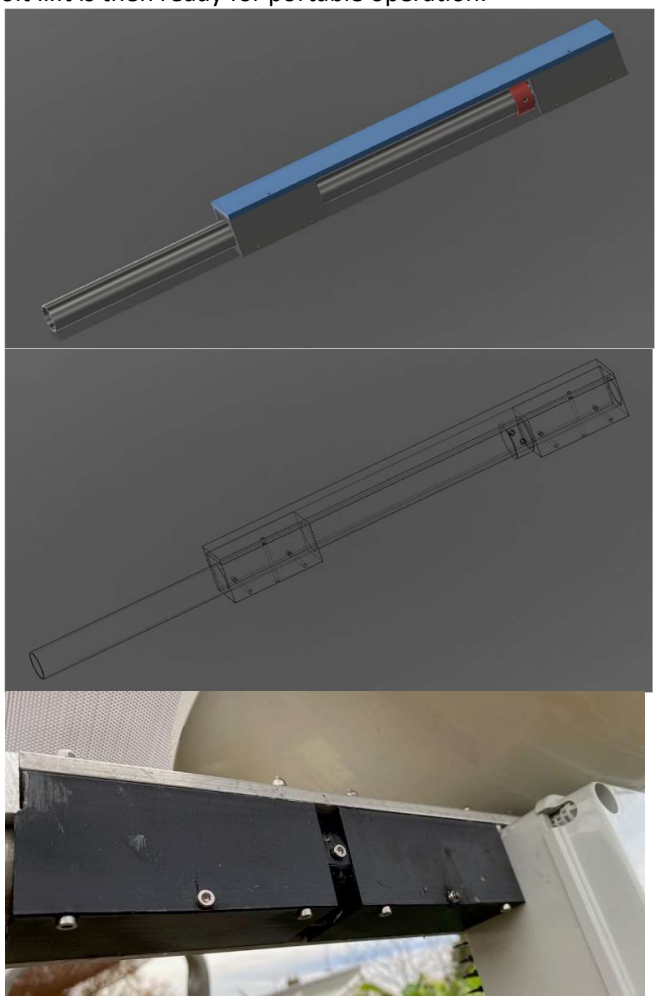
The bearings were exactly as I had envisaged, Roger had even printed a chamfer on the blocks to fit nicely into the corner of the L section, He also printed me a collar so that the assembly could be locked onto the cross arm.

I decided to use the same six inch 'Super Jack' (3) as used on my 10 GHz dish. The jack has a 36 volt motor but gives good smooth control operating from 15-20 volts. The linear position of the jack can be read out in the shack using an Up Down Counter (1) fed by the pulsed output from the reed switch in the jack. The counter is 'steered' up and down from the rotary switch in the control box which also reverses the polarity of the supply to the jack motor. Over a period of time the counter can build up an accumulated error of a few counts. This is easily addressed by driving jack

to its starting position and then resetting the counter. The resolution of the system is approx. 15 counts per degree but is obviously dependent on the geometry of the individual system. I have the system set up to drop below the horizon, horizontal is indicated at around 40 on the display.

Initially I fitted the assembly on the gable end of my bungalow but having established that I could hear a beacon and at least one other home station, I decided to mount the system on the tower. Waterproofing thus far has been successful …including the table tennis ball radome!

My path to GB3AMU is over a single obstructed path of 66 km. The beacon thus far is always there and on a good clear day up to S 3. I am looking forward having more QSOs from the home station in 2024. Equally the whole system can be unmounted by removing one cap screw and a nut and bolt …It is then ready for portable operation.



24 GHz Parts List

1. **Up Down Counter. eBay 403280860969**
2. **Temperature Monitor Controller. eBay 122155754963**
3. **Actuator Jack. https://www.satellitesuperstore.com/satellite_diseqc_motors_36_volt_motors.htm#6inch**
4. **Elevation Bearing detail … Roger Davis G3IUZ Rogerg3iuz@gmail.com**
   Roger has indicated that he is happy to print similar bearing assemblies, at cost
5. **Polycarbonate Enclosure eBay 25345507469**

Adrian G4UVZ
December 2023

Out and About on 10GHz with the Flat Array Antenna – Rampisham, Dorset

Jen Easdown G4HIZ

Having planned a trip to Dorchester from the home QTH in Kent (JO01fg), it was decided to take the new 10GHz flat array antenna to do a bit of beacon spotting. En-route we visited the Royal Signals Museum at Blandford Camp, which is well worth a visit. See: https://www.royalsignalsmuseum.co.uk/

We then went onto Rampishham in Dorset. To set the scene, back in the eighties I was an engineer working on the re-engineering of BBC Rampisham HF Transmitting Station, located adjacent to the A356 just outside of Dorchester. At the time, we were upgrading to 500kW output HF transmitters. Sadly though, by 2011 the site had made its last transmission and was decommissioned and the buildings have now been re-purposed as a small business centre. For details of the old BBC site see: https://en.wikipedia.org/wiki/Rampisham_Down

As well as for nostalgia from my viewpoint, the site was located at roughly 220m ASL and provided a good viewpoint to look for signals emanating from the GB3SCX 10GHz beacon located at Bell Hill, Dorset transmitting on 10368.905MHz. Ably assisted by my other-half Joan (2E0HIZ), we chose to set up the antenna on the road to Rampisham village, about 0.5km from the main road. The view pointing ENE towards the beacon looked good apart from clouds and intermittent rain.

Photo 1. Rampisham - view looking ENE towards GB3SCX

Photo 2. Joan (2E0HIZ) with the 10GHz antenna

As usual, the occasion prompted a bit of interest from passers-by, but no great issues. Signal reception from GB3SCX was good with a S/N of about 28-30dB, using a Funcube Dongle Pro+ SDR with SDR# software running on a laptop in the back of the car. The distance was about 25km.

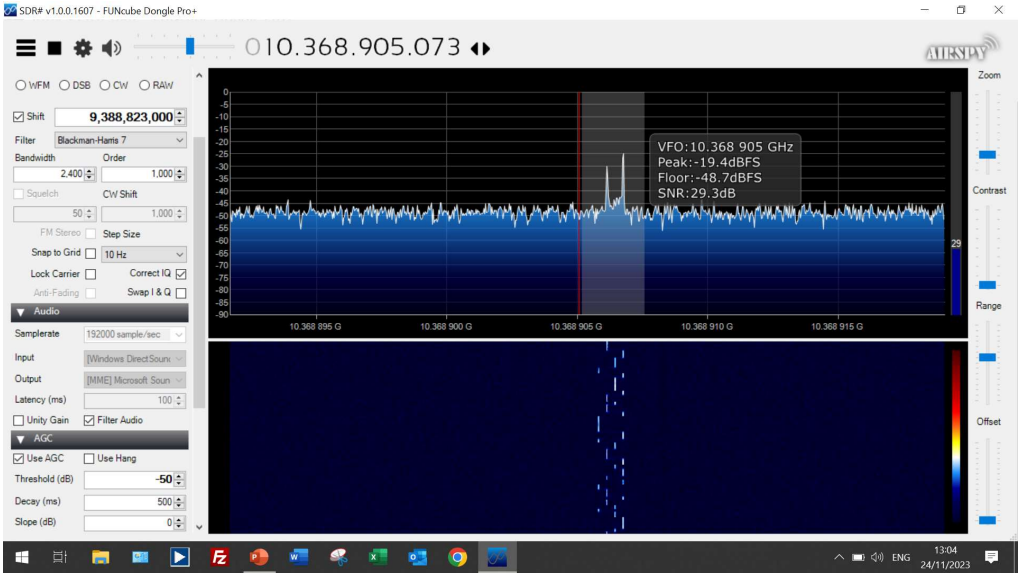


Photo 3. Reception of GB3SCX 10GHz beacon at Rampisham

Since my article in the October Scatterpoint, the antenna (ex-Squarial) has evolved with an added WR75 waveguide switch allowing switching between reception and transmission.

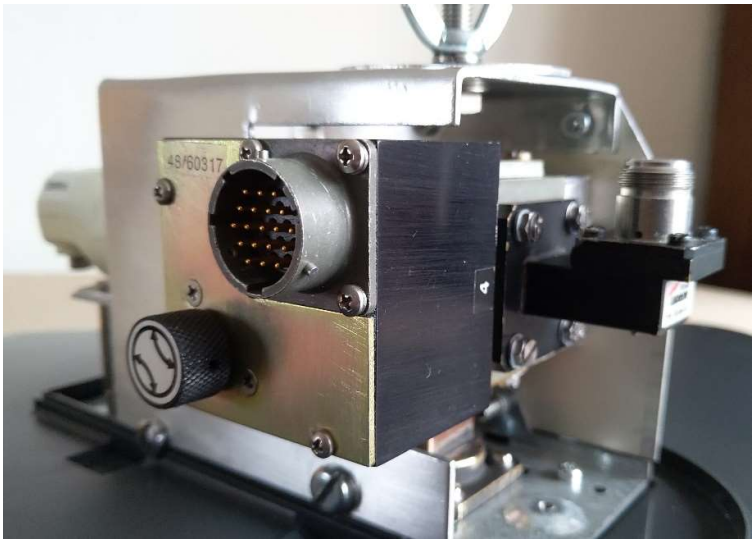


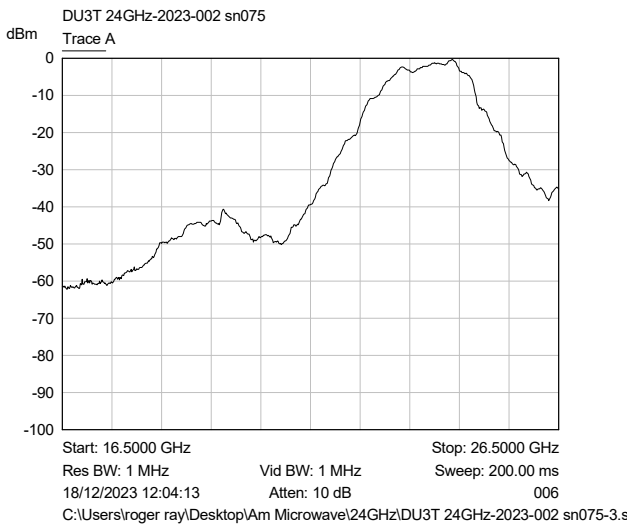
Photo 4. 10GHz flat plate antenna with added Tx/Rx waveguide switch

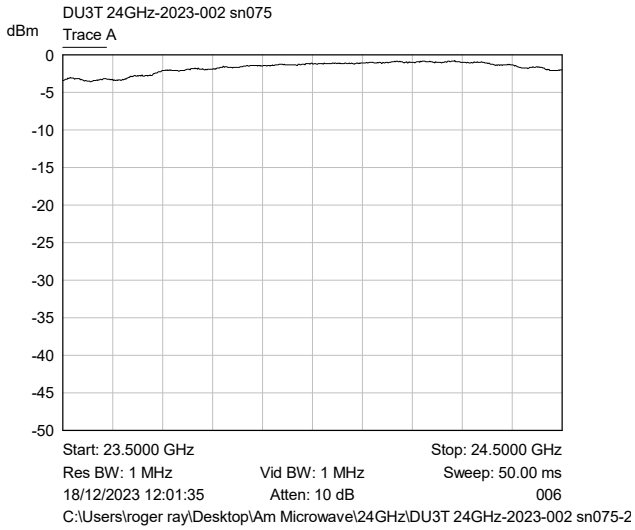
Thus far, successful transmission tests have been performed locally from one flat antenna to another using DATV, with about 0.8W input.

DU3T 24GHz Pre-Amplifier Review

Roger G8CUB

The DU3T 24GHz pre-amplifier arrived from PA0PLY.
The measured spec with it, was as follows:
Gain: 31.0dB
NF 1.31 +/-0.1dB
Supply: 9-15V
Current: 105mA
Size: 92x38x18mm
Input connector: WR-42
Output connector: sma





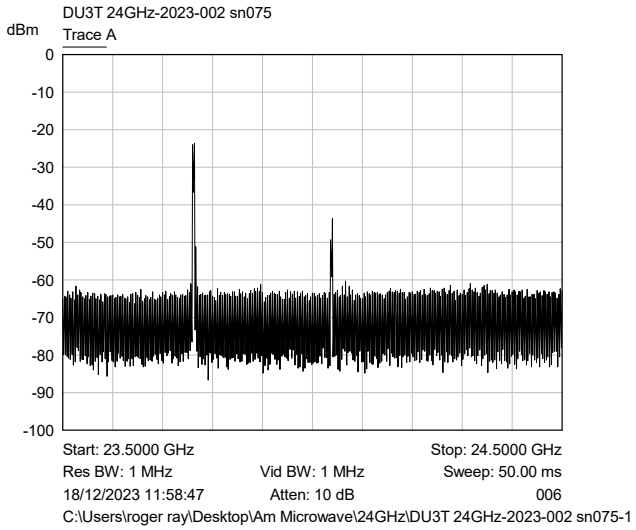
Initially I looked at the swept response, with an input level of -30dBm. The wideband response is as measured on the analyser. The closer in response, was normalised to a straight line, before the amplifier was connected.

The measured gain was 30.8dB, allowing 0.25dB for a WR-42 to 2.92mm transition.
The noise figure is the critical parameter.
Putting the amplifier on an HP noise figure meter using a 50GHz Noise head and 6dB attenuator,
gave 1.62dB uncorrected. 1.60 corrected. Taking off the loss of the WR-42 transition and 2.4/2.92mm adaptor (0.3dB).
Gave a measured figure of 1.32 / 1.30dB. Very much agreeing with the supplied data, a good figure.
I used an Eyal Gal 24GHz module to down-convert to 432MHz. The Eyal Gal on its own measured 4.6 – 0.3 = 4.3dB.

For the measurement I used another 6dB attenuator after the lna, thus the indicated gain is around 24dB.

I did not make an accurate 1dB compression measurement. But, it was around 10dBm at the output, giving circa -20dBm at the input.

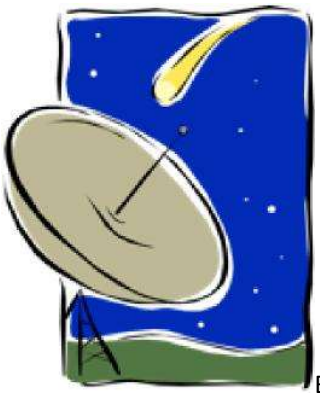
I then looked to see if I could make it go unstable. Waving anything in front of the input port, did not have any effect. However with a WR-42 transition connected, with sma unconnected. It produced the spectrum below.



It took a fair bit of effort to make it unstable. So if an instability occurs when connected. A minor change in input waveguide or coax length should sort it out.

In conclusion I think that the DU3T pre-amplifier, performs very well, with good noise figure. The high gain would make it necessary to use something like a 10dB attenuator, in front of an existing transverter.

Activity News November 2023



By John G4BAO

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

From John G4BAO

No GHz activity to report from me this month other than the usual weekly propagation report to GB2RS news and preparing the GHz Bands column for RadCom. By the lack of much other input, it seems like many are in the same situation due to the Winter weather and lack of DX opportunities since October.
My operating activities have been focussed elsewhere on catching the brief 50MHz F layer propagation and DX chasing on 7MHz CW. Project-wise I've been busy rebuilding my 70MHz transverter and PA for the upcoming Geminids meteor shower.
I need new challenges to keep me interested in the hobby these days and I have probably done all that I can do from this QTH on the GHz bands with the exception of making an EME QSO on 24GHz.
With so little to work on GHz other than the same stations every month in contests, my enthusiasm for the GHz bands is currently at rock bottom, but the joy of our hobby is that there's always something new to try! Despite this, I will be travelling to the Netherlands in January for the wonderfully sociable Heelweg Microwave meeting, so I hope to see some of you there.

From Geoff G3TQF

Beacon GB3LEX 10368.955MHz at Markfield Leicester developed a fault some ten days ago, first intermittent but now permanently off air.
Recent high winds have caused damage to the coaxial cable supplying power and the VHF drive signal to the mast mounted assembly housing the frequency multiplier, PA and antenna. Unfortunately repair work cannot be attempted until there is better weather in early 2024.

From Denis G0OLX

Activity news from my moon bounce activities of recent. 1.2m offset dish

Sept 30th RA3EME, OZ1LPR, F2CT. October 7th OK2AQ, PE1CKK, October 22nd UR3VKC, IK0HWJ. The last one was my fastest contact so far, taking just 5 minutes to complete. DL0SHF decoding -7 with Noise reduction -12 without NR.

From Clive GW4MBS

The Midlands Round Table was an ideal opportunity to test my new 47GHz set up. This was built around a Kuhne transverter, into a waveguide relay all feeding from WG22 into a 10in nosecone dish with a Cassegrain feed made from the base of an aerosol can. Similar to a dish system that had worked for me on the old 21GHz band. Normally a 47GHz setup would be mounted on a tripod together with the driving transceiver, allowing easy adjustment of heading and elevation.

In the part of Wales where I live there are no convenient pull-ins that give a clear take off towards distant fields. Here I have to pull into muddy verges and fire over the tops of walls, hedges and small trees.
An ex-military Land Rover with a 5m Hilomast is ideal for this, but it does require a tilt motor and numerous cables to operate the system.
I was hoping to put the system into full use at the Round Table as I had a promise from G8CUB that he would be bringing his set-up. Unfortunately, it was getting very cold outside, and my mast was frozen, so I had to lay my rig on the ground.
This was not ideal, but Roger was in the main hall and a strong FM QSO proceeded. To my delight G4FRE and G4LDR had kindly brought along their gear so I had three consecutive QSOs on my new band of 47GHz.
This exceeded my expectations, and it was reassuring that we were all stable and on the same frequency, essential to know before tackling any more ambitious paths!

Midlands Microwave Round Table 2023 Report

Robin G1YFG gave a talk on measuring phase noise. Not being able to afford the R&S FSPN8 (~60k), his set up included HP11848A, HP11729C, HP3561A and HP8592L.

Phil Crump gave another excellent talk on Goonhilly.
32m GHY-6 Deep Space Antenna - Status
https://status.ghy6.goonhilly.org/

Derek Kozel MW0LNA did an excellent job explaining Doherty amplifiers, with his talk titled 'Load Modulation in Doherty Amplifiers'

Neil G4DBN's talk was on the AN/APX-6 IFF 1215MHz Transponder. Neil stepped in at short notice, as Paul Marsh was ill and could not make the round-table.

Graham G3VZV chaired a discussion on ideas for a new Amateur satellite.

Another excellent event. Thanks to Dave G8GKQ for manning the BATC stand, and making measurements. Also to Brian for running the antenna measurement range out in the cold of the Archery range. And very special thanks to the organisers headed by Paul G8AQA, and especially John G7ACD & Nicky for hosting the event.


Sunday morning was a surprise with the snow!

https://www.pamicrowaves.nl/website/

The 8th Iberian Microwave Enthusiasts Annual Meeting

MicroMeet 2024

Radio-Communications ▪ Experimentation ▪ Techniques ▪ EME ▪ AmateurDSN

Program

Friday, February 16

Guided Tour of European Space Agency (ESA) Madrid Facilities

Keynote Speech and Colloquium
Microwaves in NASA's Apollo Program , *Alberto Martos (former NASA engineer)*

Workshops and Live Practical Demonstrations (Session I)

Saturday, February 17

Oral Presentations (confirmed) and Seminars

- Instrumentation and Measurements in Microwaves
  Iban Cardona, EB3FRN
- EA3HMJ Tracking System: Track it, get it!
  José Antonio Soler, EA3HMJ
- Cross-Correlation for Phase Noise Measurement
  Luis Cupido, CT1DMK
- AmateurDSN: Beyond Residual Carrier
  Antonio Fernández, EA4LE
- Proper Measurements with SigDigger: SNR, Doppler and Drift
  Gonzalo Carracedo, EA1IYR
- Observation Techniques in Radioastronomy
  Daniel Estévez, EA4GPZ

Micro-Fleamarket and Posters Session

Workshops and Live Practical Demonstrations (II)

- 10 GHz Beacons. EA4BFK
- 10 GHz Moon Bounce (EME), Portable Station. EA3HMJ
- QO-100 Satellite, Portable Station. EA4GIG
- S-Band Amateur DSN, LRO Monitoring. EA4BFK
- RF Measurements, EA1BLA, EB3FRN

For more Information and Registration visit https://www.micromeet.es

MicroMeet 2024
Fray Luis de León Convention Center
Paseo de la Alameda, 39. Guadarrama, Madrid
Colabora URE SC Sierra de Guadarrama

EA4URG
www.ureguadarrama.es

Beacon News

ON0UCL (formerly known as ON0VHF) on new QRG 2320.880 (locked) has
been returned to service today (7/12/2023).

Dave, G1OGY

GB3LEX 10368.955MHz at Markfield Leicester developed a fault some ten days ago, first intermittent but now permanently off air.
Geoff G3TQF

GB3MHZ The beacon on 10368.830 MHz is currently on test at Sam G4DDK's QTH. A time slot to have it re-installed at Martlesham is awaited.

GB3BED G4BAO reports reception of this new 24GHz beacon located at IO92SD26, on 24.048830 GHz.

GB3CSB
A servicing mission was carried out during the week to GB3CSB microwave beacon cluster.
A freezing cold night, but dry with low wind.
The frozen ground meant I could drive right up to it rather than trudge back and forth through the mud....

Primary task was to reinstate the rebuilt 9cm beacon following the failure of the original.
Rather than repair, a whole new chassis built, so the old one can become a backup.

A repair also to the building cooling, a new thermostat fitted to the room cooling, after the original decided not to switch the fans on during the summer heat (remember that heat ?), causing the various parts to turn themselves off last summer to self-protect..
Some other plans in the pipeline to prevent the building getting hot in the first place.

Secondary task, the 10GHz antenna shroud was failing after so many years in service (Originally used for GB3TC 3cm FM repeater).
Its life extended by the use of a bag over the top, crude but effective, needing a new bag every couple of months while a new antenna was being built (Thanks Mark GM4ISM).
The antenna and mounting hardware removed so Mark can mount the new antenna and feeder before returning it to site.
(If there are any complications with the rebuild, I have a lesser antenna I could put up short term).

Also some measuring up for the 24GHz and 47GHz beacon gear - some physical shuffling in the bay to make space.
(another Thanks to Mark who took on the task to build them).

THE BILL
An issue affecting most Beacon keepers is electricity.
It's time to pay that bill to the site owner, so if anyone would like to contribute, my PayPal address is...
aware@freeuk.com

Don't email using that address though, its sends all mail to the bit bucket.
Alternatively, contact me at gm6big@gmail.com

With the considerable hike in electricity costs, I am planning to shutdown some of them overnight.
---- I am interested in views/comments/ideas on this.

Shutdown will be by remote control, so can be changed should there be any special requests to keep any on or if there is unusual propagation.
The remote controller will also look at the room temperature.
----Too high, some will be forced off.

----Too low, it will override the shutdown to keep them warm(er).
Ideally, the status will show on a web page --- but first, save the cash.

As well as Mark, another Thanks to Brian GM4DIJ for remote confirmation all was well after reinstating the 9cm.

Cheers & 73 David GM6BIG 9th December
gm6big@gmail.com

GB3VHF / GB3UHF. After a considerable struggle with changes at Wrotham. Chris G0FDZ has just announced that the beacons are now back on the air.

240GHz Combined TX/RX chip

Silicon Radar now acquired by Indie Semiconductor, have launched a 240GHz radar chip. It is TRA240091.
https://siliconradar.com/products/#240ghz-radar-chips

Data sheet:
https://siliconradar.com/datasheets/Datasheet_TRA_240_091_V0.1.pdf

The architecture looks very similar to the now well-known 122GHz chip. If the quoted output power is really 2dBm, that is very high for this frequency. Chris G0FDZ and I made an SSB 241GHz, 7km contact across the Thames with around 30uW.

Editors Comment

Another year draws to a close. Some really good long distance propagation on the lower bands this year. Though all too brief.
Good to see plenty of activity in the contest when the weather did not intervene. Thanks to all the contributors. As always Scatterpoint is only as good as the content sent in…..

Best wishes to everyone for Christmas and the New Year.

UKuG MICROWAVE CONTESTS – 2024

The Calendar will be here in January

UKuG MICROWAVE CONTEST CALENDAR 2024

The Calendar as well will be here in January

EVENTS 2024

January 13	Heelweg, Netherlands	www.pamicrowaves.nl
February 16-17	MicroMeet 2024, Spain	www.micromeet.es
March 30	Blomard 2024, France	ref03blog.wordpress.com/blomard-2024-vhf-uhf-shf/
April 14	Martlesham Roundtable / AGM, Ipswich	
May 17-19	Hamvention, Dayton Ohio	www.hamvention.org
June 28-30	Ham Radio, Friedrichshafen	www.hamradio-friedrichafen.de
August 9-11	20th EME Conference, Ewing NJ, USA	EME2024Trenton.org
September 22-27	European Microwave Week, Paris	https://www.eumweek.com
October 3-5	Microwave Update, Vancouver, Canada	microwaveupdate.org

80m UK Microwavers net

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

73 Martyn Vincent G3UKV