An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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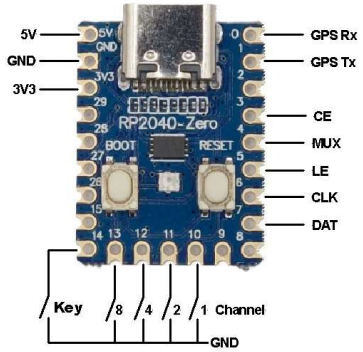
In This Issue



Synthesiser controller Colin G4EML

523m on 30THz Barry G8AGN

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 DropboxAlso, **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

payukug@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@microwaversorg

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

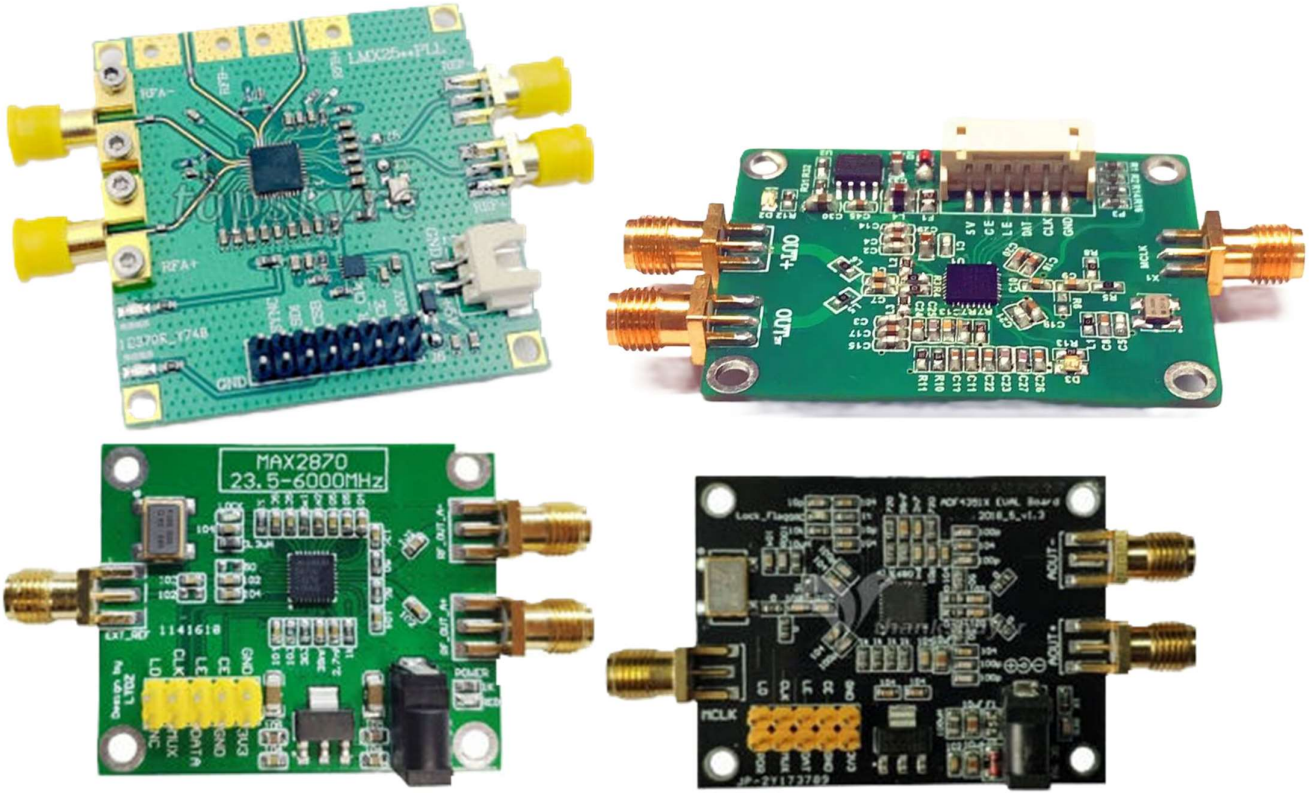
Don't forget, UKuG has loan kit in the form of portable transceivers available to members for use on the following bands: **Contact Neil G4DBN for more information**

5.7GHz 10GHz 24GHz 76GHz 122GHz

Yet another synthesiser controller

Colin G4EML

We are all probably aware of the various Fractional N Synthesiser boards available from China and from SV1AFN. All of these are capable of producing frequencies in the microwave range and can be used as a local oscillator for a receive converter or Transverter, a personal beacon, a drive source for the higher bands, or a piece of test equipment.



Probably the most popular of these modules is based on the ADF4351 chip which can generate frequencies from 34.375 MHz to 4.4 GHz. These cost about £15 for the Chinese boards and £40 for the SV1AFN version.

An alternative is based on the MAX2870 chip which can produce frequencies from 23.5MHz to 6 GHz and costs slightly more at about £30.

Recently some newer devices have become available such as the LMX2595 which can produce frequencies from 9.766 MHz to 20 GHz. However the cost is higher at around £100.

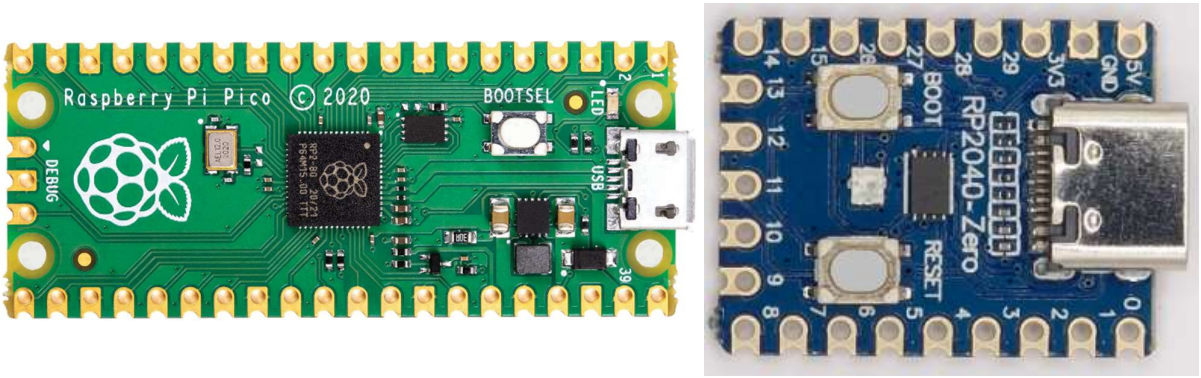
The RP2040_Synth firmware described here currently supports all three of these chips.

One common feature of these boards is that on their own they don't actually do anything. They all need to be programmed using their SPI interface by some external controller.

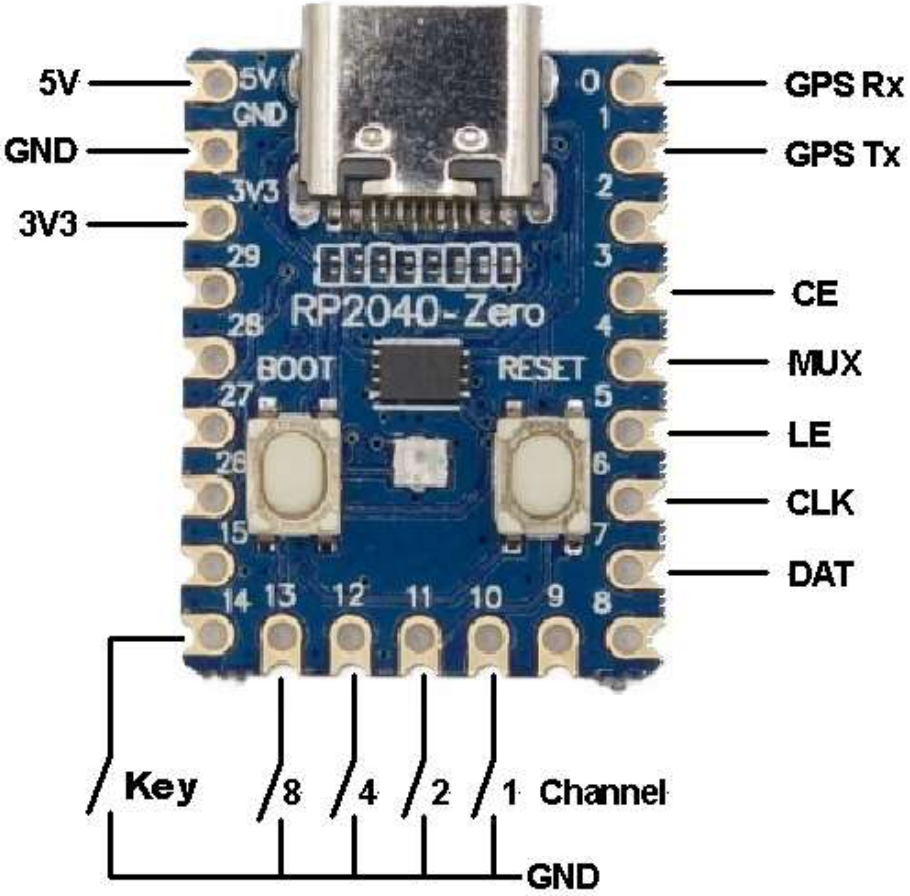
Andy G4JNT has produced several controller designs based on the popular PIC microcontrollers and many of these are already in use. However as I have recently been experimenting with a relatively new microcontroller chip produced by Raspberry Pi. I decided I would try to write some firmware to make use of this chip.

The RP2040 chip was released by Raspberry Pi as a new, low cost, high performance microcontroller. Compared to many PIC chips this device has much more available program and data memory, a much faster clock speed and dual ARM cores. And it is available at a price of about 80 pence each. However due to the small surface mount package it makes sense to buy the chip already assembled into a ready built PCB module.

Raspberry Pi originally released the 'Pico' module built around the RP2040, this available for about £4 (or about £2 for a Chinese copy). My preference however is to use a module called the 'RP2040 Zero' which is physically much smaller and uses the slightly sturdier USB-C connector. The price is about the same as the Pico. This project will work with either board, and probably with many of the other available alternatives.



It would be possible to make a PCB to provide the required connections between the RP2040 module and the synthesiser module. Unfortunately each of the synthesiser board types uses different connectors and pin-outs for their control signals. It is probably easiest to make wired connections to suit.



The RP2040_synth firmware currently has the following features:-

Supports the ADF4351, MAX2870 and LMX2595 synthesiser chips.
Automatically calculates register values for the required output frequency.
Supports 10 channels which can be selected by external switches.
Supports an external Key for FSK Morse when used as a transmitter.
Supports Morse Ident and JT4 and JT65 modes for use as a beacon.
Allows direct live editing of synthesiser parameters using the names from the data sheet to experiment with different settings.
Allows optional direct entry of register values calculated by other programs.

Full details, instructions and source code are available on my Github repository at
https://github.com/g4eml/RP2040_Synth

Whilst you can download the source code and build your own version of the firmware you do not need to do that. The latest ready to go firmware file can be downloaded from
https://github.com/g4eml/RP2040_Synth/releases

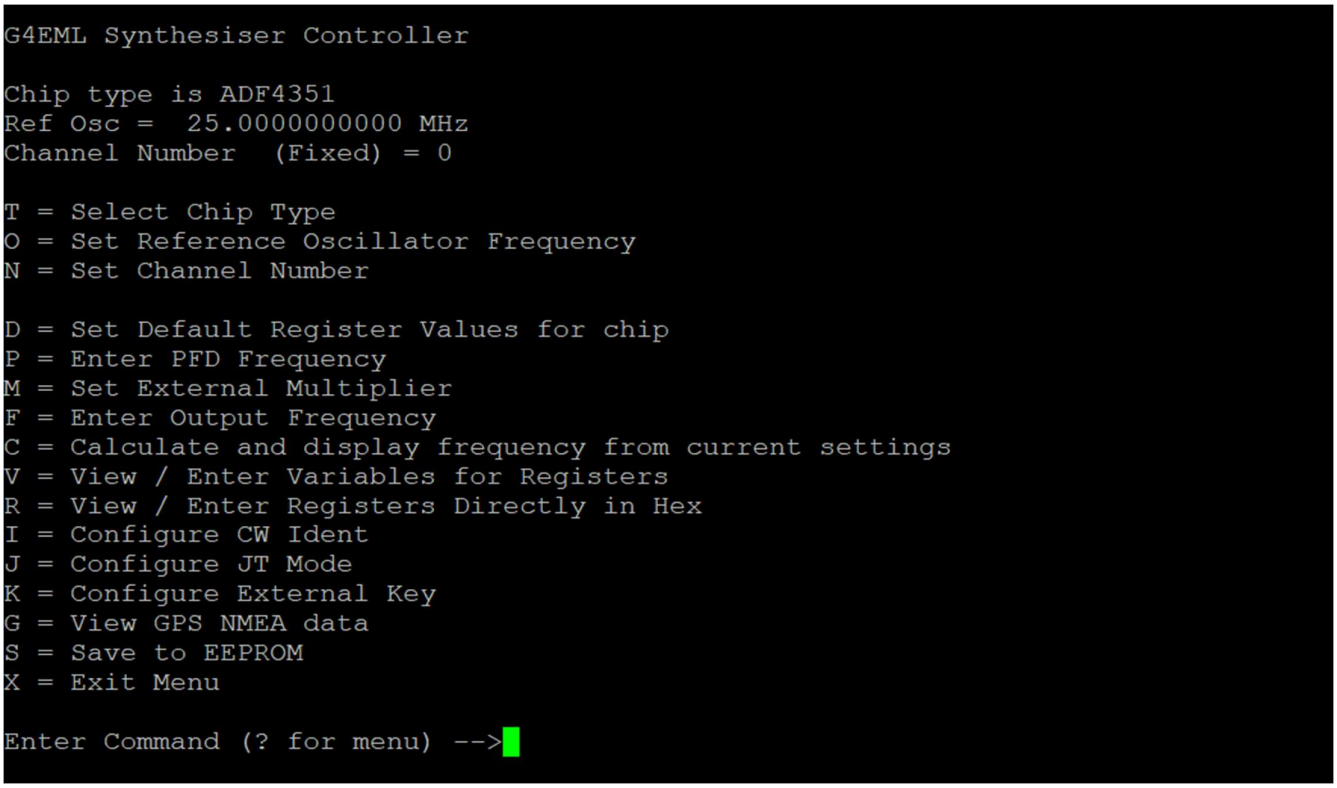
Just download the latest .uf2 file and then do the following….

While holding down the 'BOOT' button on the RP2040 module connect its USB port to your computer. It should appear as if it was a USB disk drive.

Drag and drop the .uf2 file downloaded above onto this USB Drive.
The RP2040 will immediately load the firmware and reboot itself. The PC should then display a pop-up indicating the Serial COM port that has been assigned to the RP2040. Make a note of this for later.

The Rp2040 will need to be configured to suit your application. This is done by using a terminal program such as Putty which can be downloaded from
https://the.earth.li/~sgtatham/putty/latest/w64/putty-64bit-0.81-installer.msi

Connect to the serial port assigned to the RP2040 noted earlier and press any key. The following menu should be displayed. If you just want to experiment with the program you can still do this without a synthesiser board attached.



Descriptions of the various options are included on the Github Page. However a typical sequence when initialising a new board would be as follows:-

Note:- Before removing the power you must use the 'S' command to save all settings to EEPROM. If you forget to do this the settings will be lost on cycling the power.

Select 'T', accept the warning that this will reset all channels, and then select the chip type. You will then be asked for the reference oscillator frequency and the required output frequency. All of the register values will then be calculated and downloaded to the chip. All 10 memories will initially be programmed with the same settings. The synthesiser module should start to output RF on its A port at this point.

To program additional channels use the 'N' command to enter the channel number then use the 'F' command to enter the new frequency.

If you want to enable CWID, JT modes or the external Key input you need to do this for each channel. Note that these keying modes do not run when the menu is active. If you want to test them you should select 'X' to exit the menu.

When you have configured all of the channels you should use the 'N' command again to set channel number 255. This enables the external channel switches. If you only need one channel then leave the channel number set to the required value. That channel will be automatically loaded on power up.

At any point the 'C' command will display the current chip settings used to generate the required frequency. This is a useful confirmation check that the chip has been correctly programmed.

The other menu commands allow you to fine tune the register settings. The first of these to try would be to adjust the PFD frequency using the 'P' command. The output frequency will be automatically re-calculated to use the new PFD value.

The ‘V’ command allows you to enter chip parameters live and immediately see the results. You will need to refer to the chip’s data sheet for the necessary parameters to adjust. Parameter names are the same as defined in the data sheet. For example on the LMX2595 chip you can adjust the output A power level by entering ‘OUTA_PWR = 20’

I am currently working on an LCD touch screen display version of the firmware which will be aimed at making a test signal generator. 3.5” LCD touchscreens with a built in RP2040 are available for about £20 from China. I would also like to support additional synthesiser chip types. However to do this I really need the module to experiment with and it can rapidly get very expensive buying one of each type.

Colin G4EML

Update

Colin has added external FSK keying on the LMX2595 at my request - *Editor*
Version 0.B includes the FSK Key input.
There is a new menu item 'K' which is used to enable the Key input and to set the FSK Shift.
This is independent from the FSK Shift used for the CW Ident.

V1.00 Improved PFD Calculation

Improve PFD calculations. Especially for the LMX2595 which has a complicated arrangement of multipliers and dividers in the PFD chain.
Previously some of the settings generated were outside the data sheet specifications. This should now be fixed.
The LMX2595 really needs a high frequency reference oscillator. Anything below 30 MHz will have a limited range of PFDs available because the PFD multiplier cannot be used below that frequency.
For example, with a 10 MHz Reference Oscillator, the only valid PFDs available are 5.0 MHz, 6.666666 MHz, 10.0 MHz and 20.0 MHz .

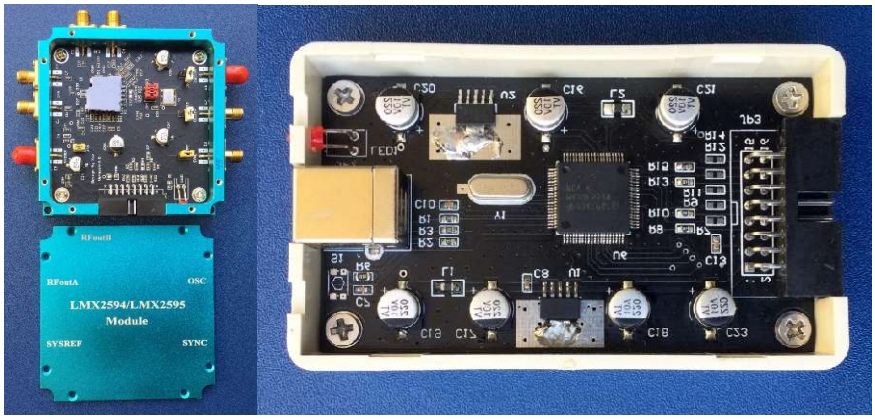
The generic wiring instructions are as follows:-

RP2040	ADF4351	MAX2870	LMX2595
5V	N/C	N/C	5V
3V3	3V3	3V3	N/C
GND	GND	GND	GND
GPO3	CE	CE	CE
GPO4	MUX	MUX	MUXout
GPO5	LE	LE	CSB
GPO6	CLK	CLK	SCK
GPO7	DAT	DATA	SDI

Using the LMX2595 Synthesiser with RP2040 controller

Roger G8CUB

Listening to Colin G4EML's talk at the Crawley Round Table, I heard just what I had been looking for! A simple multi-frequency controller for the LMX2595 Ti synthesiser.

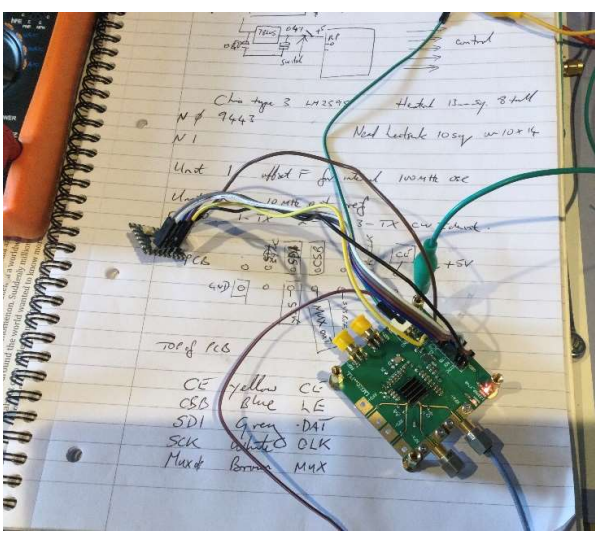


A few years ago I had bought a blue box containing the LMX2595, with interface to a computer. This allowed the Ti TICS Pro software to control the synth. This had shown this was a very good low noise synth, with output up to 20GHz. However it was only useable on the bench, as the frequency programmed was not remembered.
So, I had been waiting for a suitable controller. A reply to a request on the reflector, left me waiting in anticipation…
Looking on the web and eBay. Those blue boxed units were at a silly price.

However a PCB version was available from AliExpress etc. at under £100. The first one I ordered came unexpectedly with a controller on top with LCD. I had wondered why the price had gone up £19.
This does allow you to set a frequency, and it does remember the last frequency set (but only one). It also has a sweep facility, but I have not tried that.

The big difference to the blue box version, is that there is no heatsink on the chip. The one in the box, has a large heatsink, plus a thermal pad to the box lid!
My thoughts are that a heatsink is important, as the chip gets very hot very quickly without. I added a small one on top, as well as under the PCB.

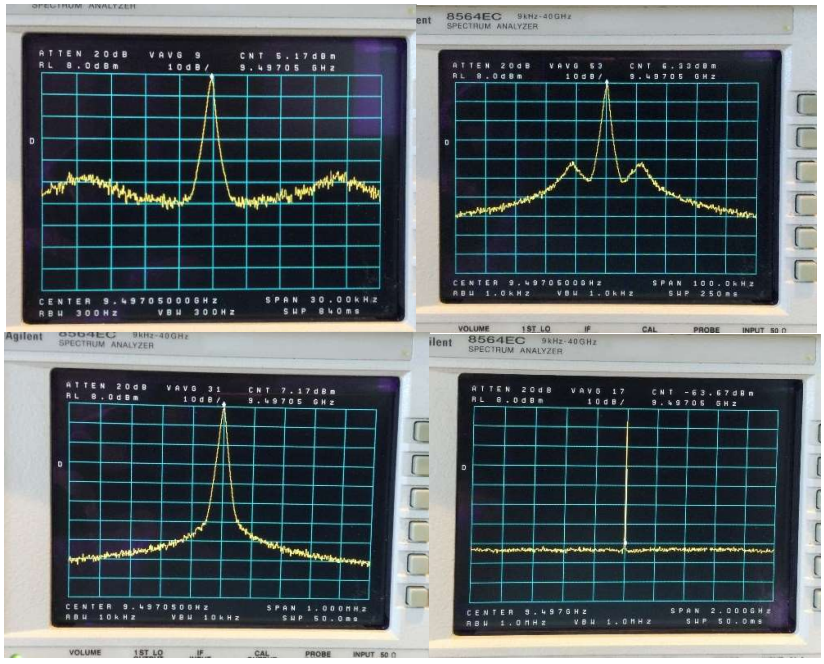
Other differences are that the Blue box version has a 100MHz onboard ref. and that it requires a 3.3 volt supply.
Plus the 16 pin connector has a totally different pinout – of course!



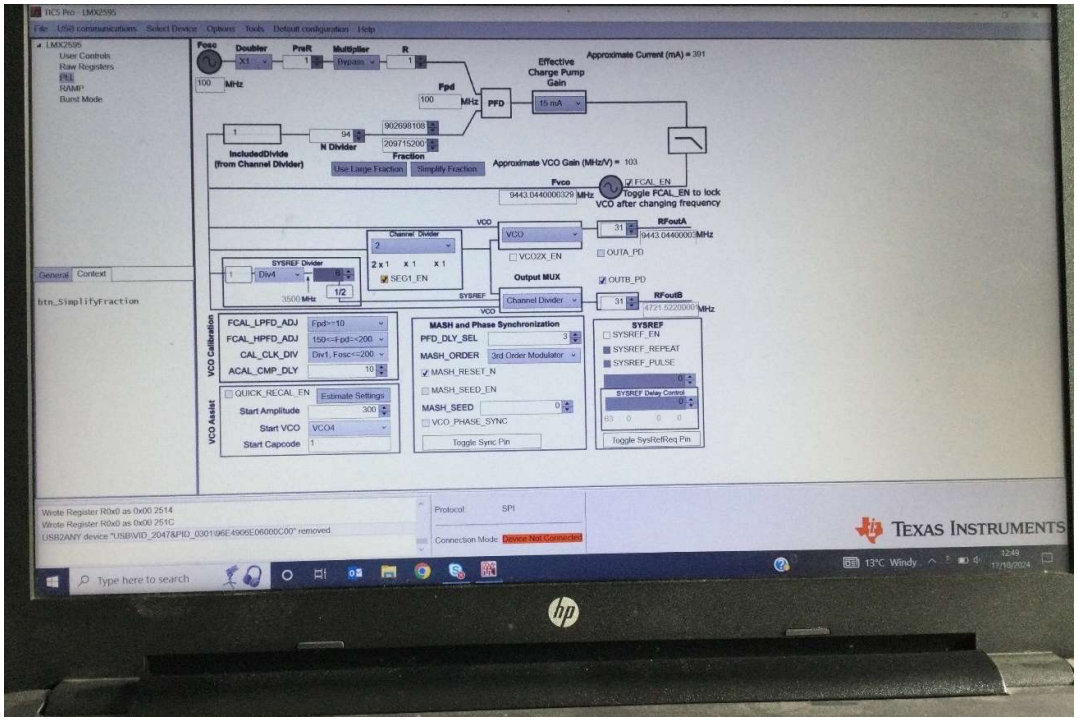
I wanted to use the LMX2595 as LO/TX for the last 76GHz cumulative contest on 6th October. I started building a PSU for the blue box version. Then the new pcb arrived on the Thursday, so I used that.
On the day all worked for one QSO, then it failed. On investigation, it was the external reference dying.
The signal both as LO and TX, had a characteristic wobble. Something like clear carrier for a second, then 4 small shifts in frequency for a second, repeated. This did make receiving a weak SSB signal more taxing than it should have been.

The cause of this, was in part that the internal 10MHz reference on the pcb was still powered. I should have listened to Colin's talk more carefully! Removing the inductor feeding power to the ref 90% fixed it. There were still some bursts of noise, a long way down. This was fixed by removing the blob on the other ref input, and decoupling the 5V out & tune pins on my reference now in the same box.

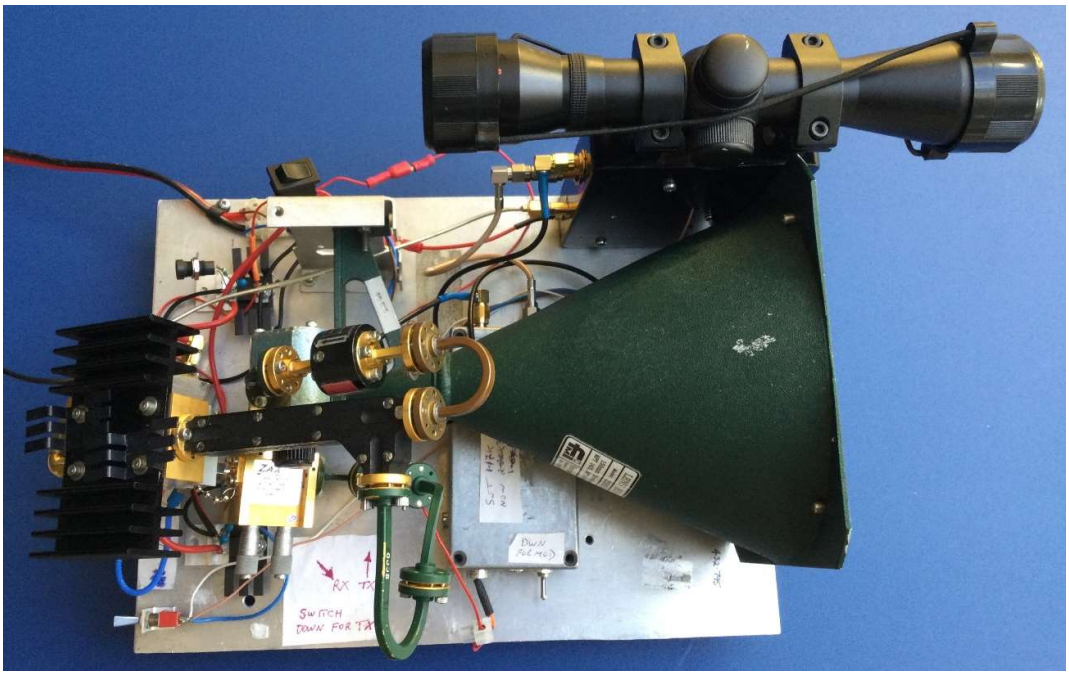
I had tried the internal message FSK. This sounded very clean – I believe just one register is altered for this.
My existing FSK had been by shifting the tune volts on the ref oscillator. This sort of worked, but sounded awful. So I asked Colin if he could add external FSK. This he did, just in time for the contest. The keying now sounds perfect – thanks Colin.
Being able to do FSK directly on the synthesiser, allows the possibility of using digital modes. This could be very useful for future millimetre work.



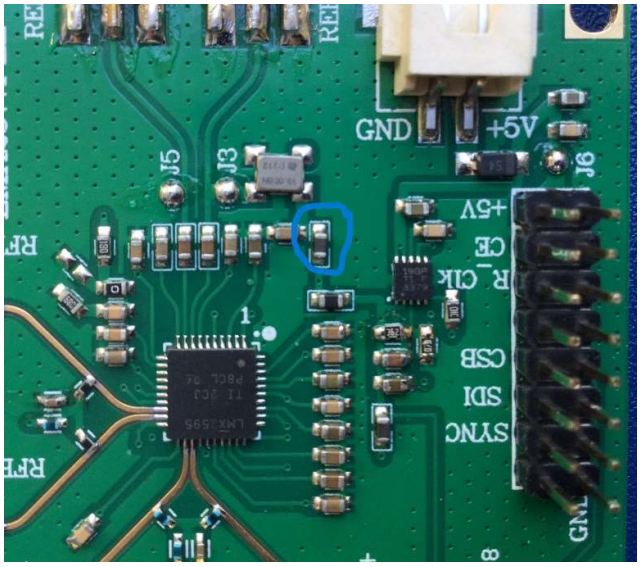
9.49705GHz Signal - Spans 30kHz, 100kHz, 5MHz, 2 GHz



TICS Pro software

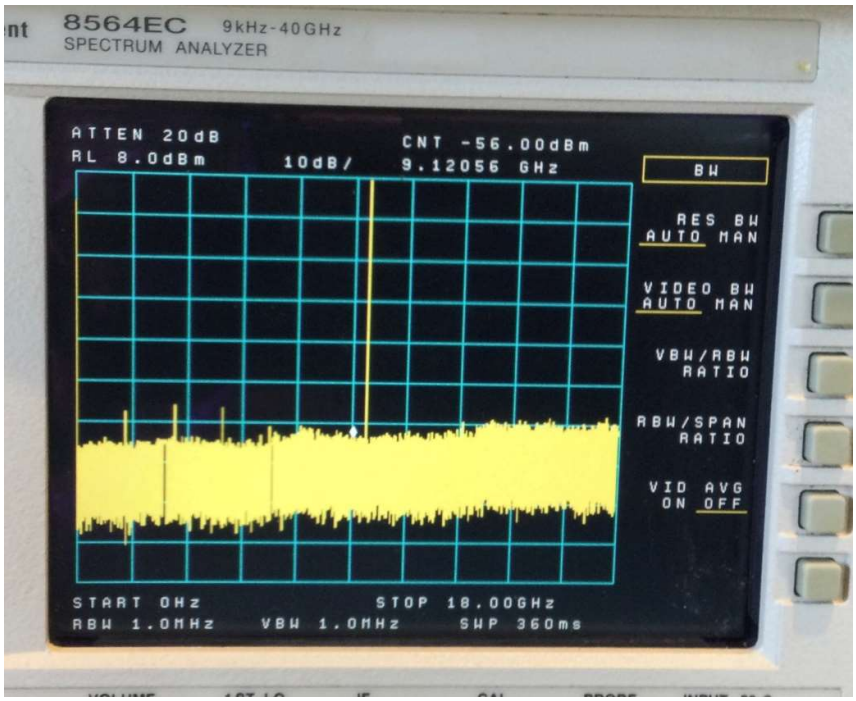


76GHz FM/FSK TX and RX mixer. Phase modulator in box under the horn
The x8 Millitech multiplier under the black heatsink, produces 200mW at 76GHz.
The LO is derived from the 10dB directional coupler output.



Inductor to be removed circled in blue

The LMX2595 pcb uses inductors rather than 50 ohms on the outputs (at the bottom of the picture). This gives a higher output. Up to +10dBm.
However if the unused output is not terminated spurious products are generated. As seen below.



There is plenty of potential in optimising things. Plenty of registers to play with, and get lost in.
Plus the phase noise will be better with a 100MHz reference. The spectrum plots are with a 10MHz reference, and 10MHz PSD, as directly produced with the software without tweaking. Pretty dam good to start with, and fine at 76GHz.

G8AGN and G4APV extend their DX on 30THz to 523m

Barry Chambers, G8AGN

Introduction

On 28 September 2024, Barry G8AGN and Bob G4APV carried out a successful test on 30THz over a 523m path across the Redmires reservoir near Sheffield.
Figure 1 shows the path from the receiver end. The bright red dot in the distance is the 250mm transmitter dish when fitted with a 3-watt red LED during the transmitter and receiver alignment operation. For the actual test, the LED was replaced by the modulated heat source.

Figure 1: View over 523m path from receiver end (the photo is misleading and the path actually was LOS !)

Figure 2 shows the receiver 130mm telescope whose optical eyepiece could be replaced by an adapter housing the PIR thermal detector.

Figure 2: View of the receiving telescope during transmitter-receiver alignment

Transmitter-receiver alignment was carried out in two stages. First, the receiver telescope was fitted with an optical reticule eye-piece and was aimed at the distant transmitter dish. Then the telescope tube end-cap was put in place and since this was covered with 3M prismatic retro-reflecting tape, this “brightened-up” when illuminated correctly by the transmitter dish with the 3-watt red LED in place. Hence the transmitter dish azimuth and elevation were adjusted until this was achieved. Figure 3 shows the path from the transmitter end. The greenish-yellow dot is G8AGN’s high-visibility jacket and the receiver telescope was located close to him.

Figure 3: View along 523m path looking towards the receiver

The transmitter used a directly modulated spiral heat source transmitting a 2-PSK-QRSS6-CW signal with a carrier frequency of 2Hz. The receiver was a SDR using one element of a PIR detector and a low-sample rate 24-bit ADC, followed by a narrow band digital filter and phase sensitive detector (PSD). The transmitted test message was "G4APV G8AGN 280924" and this was sent continuously on an endless loop. Both the transmission and reception were synchronised using GPS 1pps signals. The received signals (before the PSD processing) were logged over a period of about 26 minutes but the starting and finishing times of the logging process were arbitrary and so the received message was actually of the form ……. G8AGN 280924 G4APV …, with some uncertainty about the complete logging of the initial G and final V.

After PSD processing the received data comprised a binary sequence 261 bits in length.

Visual examination of the PSD-processed data revealed "garbles" in places whose cause can only be speculated upon but which might be the effect of QSB due to wind disturbing the atmosphere along the LOS path between the transmitter and receiver.

It is known that the most critical periods during 2-PSK signal reception occur when a 180º phase change is taking place, since if this process is obscured then corruption of the subsequent signal elements is likely. This obscuration is most troublesome when the received S/N is low and this was the case during this particular test.

With experience, some "garbles" in the PSD data may be corrected by eye and this process is aided by the formal characteristics of the CW signal. For example, it is known that the elements in a CW letter are separated by one dot period, letters/numbers are separated by 3 dot periods and words by 7 dot periods. Often, however, the regions of garble may extend over one or more letters/numbers and correction by eye is either not possible or tedious or even dubious. What is needed is a mathematical technique to aid correction and one such possible technique is discussed below. This involves the use of Pearson's Association Coefficient, Φ ; this is also known after a later rediscoverer as Matthews' Correlation Coefficient, or MCC [1].

Pearson's association coefficient φ

When dealing with sequences of binary digits (bits), it is sometimes of interest to compare one sequence with another to estimate the degree of association between them (are the two sequences identical and if not, what is the degree of dissimilarity) .

φ is calculated using the formula

$$\varphi = \frac{AD-B}{\sqrt{((A+B)(C+D)(A+C)(B+D))}} \qquad (1)$$

Where A is the count of cases where a bit in one sequence and the corresponding bit in the other sequence are each equal to 1.

B is the count of cases where a bit in one sequence is equal to 1 and the corresponding bit in the other sequence is equal to 0.

C is the count of cases where a bit in one sequence is equal to 0 and the corresponding bit in the other sequence is equal to 1

D is the count of cases where a bit in one sequence and the corresponding bit in the other sequence are each equal to 0.

Comparison between the two binary sequencies is carried out on a bit-by-bit basis and the results of each comparison recorded according to the set of rules listed above. The sums of the results are combined using Equation 1 to give a φ value which gives an indication of the likelihood that the two sequences are completely identical (φ = 1), completely different (φ = -1) or random (φ = 0). Intermediate values of φ give an estimate of how identical or different the two sequences are. Normally the two sequences to be compared are of equal length but a shorter one may be "slid" across a longer one, by one bit position at a time to see if the longer sequence includes the shorter one. The latter case is of most interest in the present application since, for example, it could help to establish whether a short test sequence representing a callsign (or part of one) appears in a longer sequence which contains garbles. If this is the case, a plot of φ values as the test sequence is slid

across the longer sequence should show a peak at some point in the sliding process and this indicates the starting point of the test sequence in the longer sequence.

Using φ in practice

In previous discussions of 30THz tests [2], [3], the results from the PSD process were printed out as a column of “O” (representing a dot) or “ “ (representing a space) and a dash as “OOO”. Instead, the results could be printed as 1s, 0s and 111s and stored in the elements of an array. Then it would be easy to represent a test sequence in a similar form and slide one across the other to calculate the values of φ at each step.
For example, a test sequence of “AGN” could be recorded in an array as the sequence “000101110001110111010001110100000000”. In this case, the test sequence contains a total of 35 bits. A simple computer program was written to slide the test file bits across the message bits and to record the values of φ at each point. The result is shown in Figure 4.

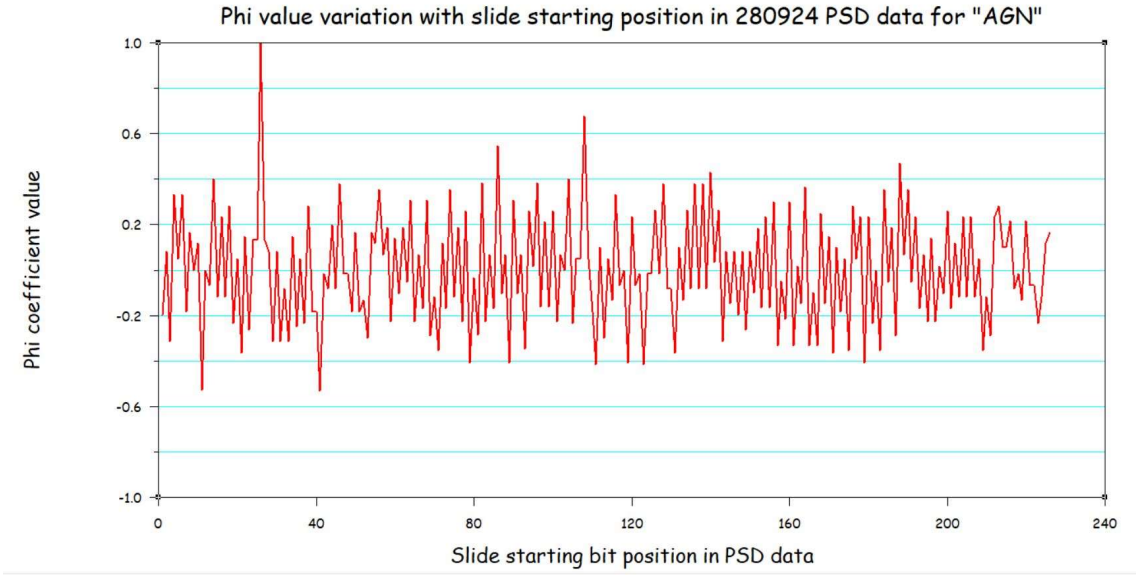


Figure 4: Phi coefficient for PSD bit stream containing “AGN”

Since this was the first test of the Phi processing software, it was already known from a visual examination that the PSD binary data was uncorrupted in this location. Hence a sharp peak with a value of 1.0 was obtained at a slide starting position of 26 in the PSD data which corresponds to the first bit in the “AGN” test sequence. A φ value of +1.0 corresponds to absolute certainty that the searched for test sequence was present in the PSD data in uncorrupted form. A φ value of -1 would indicate that the test sequence was definitely not present in the PSD data and a φ value of 0 would indicate a neutral verdict (neither for nor against the test sequence being present). Bit sequences containing only 0s or 1s contain no information and their φ values are indeterminate.
The next test used the test sequence “8AGN” and the result is shown in Figure 5.

Figure 5: Phi coefficient for PSD bit stream containing “8AGN”

This result differs from that shown in Figure 4 in two respects. Firstly, the maximum peak has moved to the left, since the “8” in the new test sequence occurs in the PSD data before the original “A”. Secondly, the value of this new maximum peak has decreased to about 0.9 indicating a slightly lower level of confidence that the new test sequence has been found in the PSD data. This is due to some “garbled” bits in the PSD data corresponding to where “8” should appear.
Finally, the Phi coefficient was calculated for the test sequence “G8AGN” and the result is shown in Figure 6

Figure 6: Phi coefficient for PSD bit stream containing “G8AGN”

The result for the “G8AGN” search is at first sight surprising as there is no evident peak at the left-hand end of the plot, but this is due to the fact that the complete binary string for “G8AGN” is not in the message data and so its starting position cannot be found. Visual examination of the PSD bit stream data confirms this and also shows that the data at the beginning of the data logging period was very “garbled”.
The Phi coefficient was next calculated for the search bit sequence corresponding to “G4APV” and the result is shown in Figure 7. From remarks made in the introduction, it is expected that the string “G4APV” should be located towards the right-hand end of the PSD data bit sequence and this is

confirmed. The peak φ score in this case was just over 0.7 and this was reduced from 1.0 by some "garbles" in the PSD data.

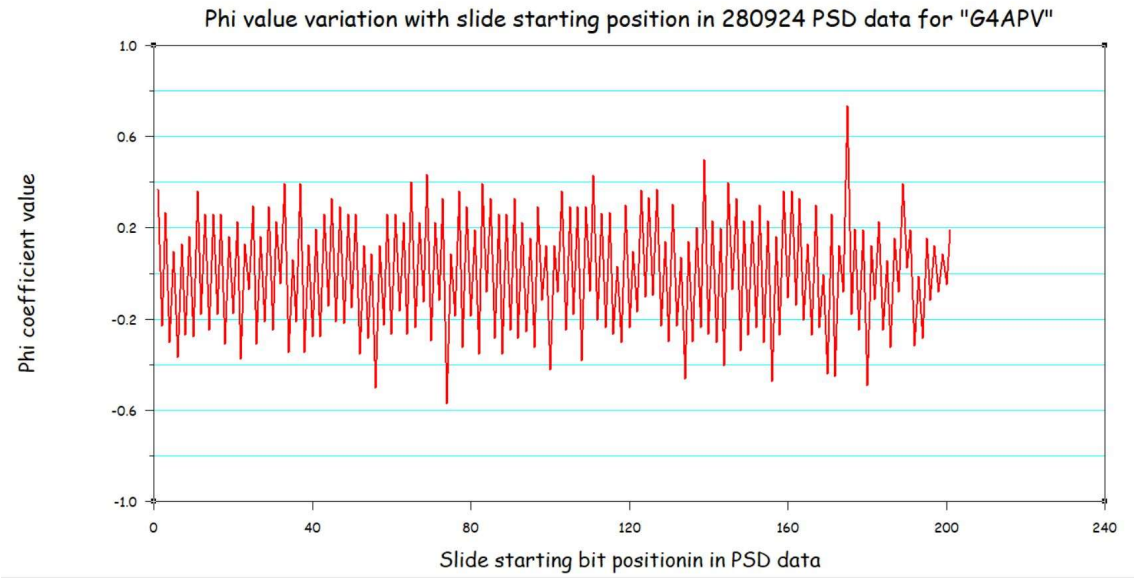


Figure 7: Phi coefficient for PSD bit stream containing "G4APV"

Figure 8 shows the superimposed plots for the three search terms "8AGN", "280924" and "G4APV". All three terms are indicated by φ values of more than 0.7, showing a very high confidence that the terms are present in the PSD data but that some bit errors were also present, as expected.

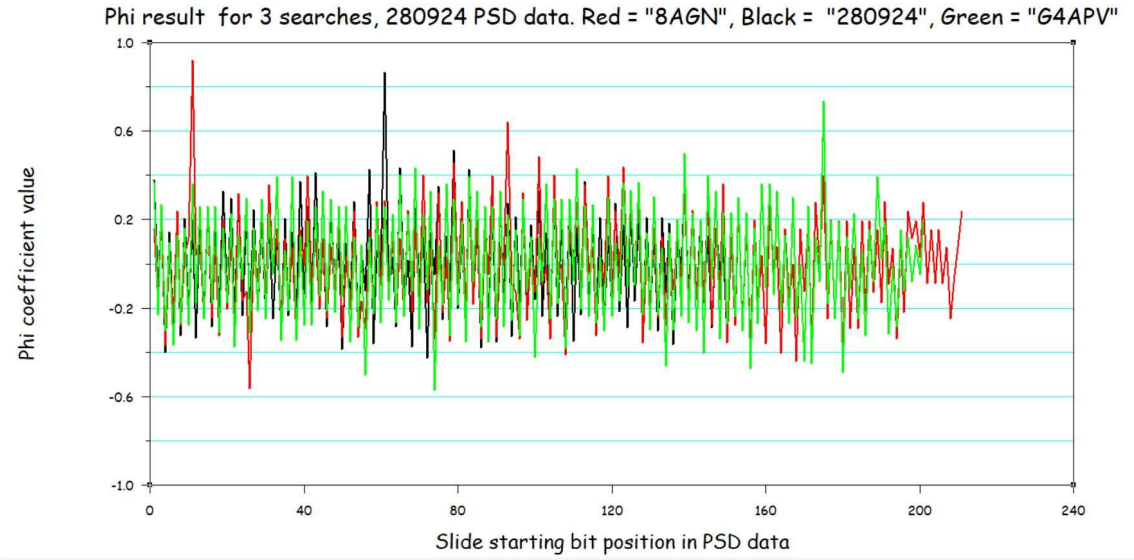


Figure 8: Superimposed Phi plots for all message components in 280924 PSD data

Conclusions

(a) It may have been noticed that the Phi results have only been plotted for approximately 200-240 bits of the available 261 bits of the PSD data. The slide extent will vary since when looking for different pieces of text, the bit sequence for say, "AGN", will be shorter than for "G8AGN" and we have to ensure that the test bit sequence does not slide off the right-hand side of the PSD binary data sequence. It might be thought that this could be avoided by padding the right-hand end of the PSD bit sequence with, say "0000000000….." or "1111111111……" but such strings convey no information and will dilute the Phi result. In

fact the Phi result for a binary string containing only 1s or 0s is indeterminate. In practice therefore, it is essential to log as much received data as possible if very long lengths of text or figures are to be searched for. It would also be possible to do a reverse-slide operation, starting at the right-hand end of the PSD data and the right-hand end of the test bit sequence; this would then give the end bit location of a test bit sequence as well as ensuring that all the PSD data was fully searched.

(b) The Phi search technique is very simple and requires very little computer processing time to implement but it cannot hope to compete with more complex techniques such as those employed in JT modes or Opera which rely on forward error correction and cyclic redundancy checks to correct for errors. Such modes, however, require much more data to operate on and also can only handle very short messages which often have to be rigidly structured. The simple Phi search can only detect text or number sequences which are known to be present in the transmitted message, but a more exhaustive search could be envisaged which employs a dictionary of anticipated phrases or numbers, e.g. callsigns, S reports, locators, etc. If the simple Phi search can identify blocks of bits in a message, then the remaining unsolved blocks can then be subjected to a visual search to try and "decode" them. This approach has some similarity to cryptanalysis.

(c) Perhaps the best application of the Phi search technique might be in one-way tests rather than during actual two-way contacts and this is the application in our case where we are mainly interested in 30THz equipment development and operating techniques. If used for long-term signal monitoring, it might also indicate interesting propagation effects; certainly this is one area of future interest at 30THz where very little data has been collected, even by professionals, across terrestrial or water paths.

References

[1] Phi coefficient - Wikipedia
[2] "A software defined receiver for the 30THz infrared band", G8AGN, DUBUS, 3/2023.
[3] "Operating on the 30THz band, part 4", G8AGN, RadCom Plus, vol 9, no 2.

Activity News September 2024

By John G4BAO

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

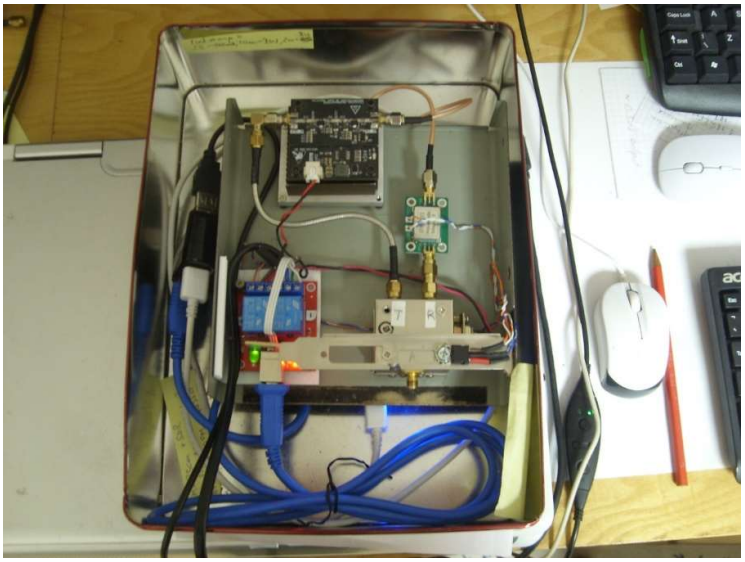
From David G0LBK

I thought your readers might like a short piece about EME possibilities on 23cms and Jac, PA3DZL's recent activity highlights this. I worked PA3DZL on the 22nd September with a -27/-24 report (He was stronger on the 21st but I didn't have time to work him).
He worked 17 QSOs between 15th and 23rd of September on 23cm using Q65
His "best qso" was a remarkable contact with K2SA who was using a 1.9m dish.
Now, so what you ask?
Well. he used just a single 23 ele tonna 1.75m long in with H Pol. Close to the Yagi is a 110w PA and a 0.5dB nf preamp. Coax was a short length of RG213

This system is smaller than what most of you use on a typical UKAC night. Elevation is essential due to ground noise but it's well worth a go even for a short window with fixed elevation. An LNA is also essential at the antenna. Contacts are arranged using the HB9Q logger and there are always keen experienced amateurs there to help and give advice.

From John G0NPI

You don't need much to get on to 23cm, and good results can be had even at 18m ASL. It started with listening to the RSGB activity nights and the regular Bolton Wireless Club FM nets using an Adalm Pluto SDR and a BiQuad antenna into SDRconsole software. A relay was added and an amplifier module that outputs around one watt. A home-made 15 element loop-Yagi with 5m of LMR150 coax on a decorator's pole completes the station. Best SSB DX is from IO74. For FM, an Alinco DJ-G7 (1W) performs well, as far as North Wales, even when reflecting off Manchester's centre.



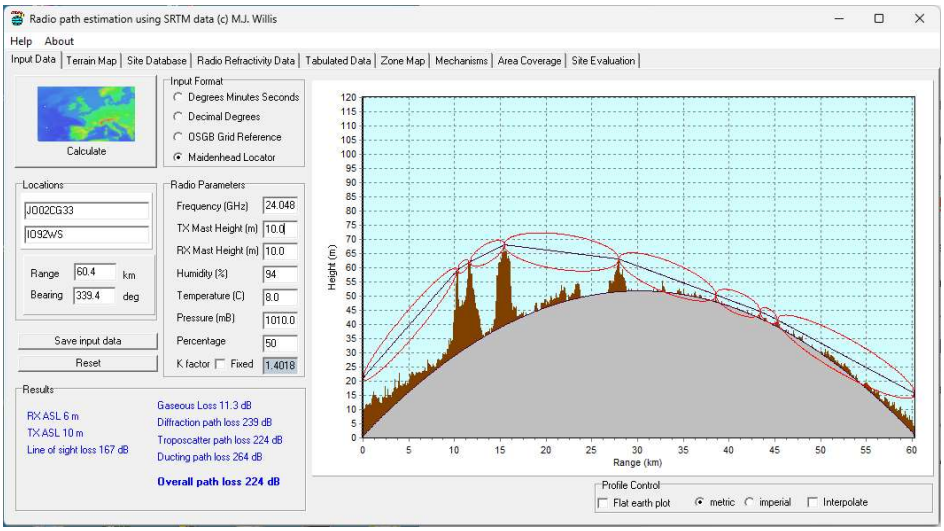
From John G4BAO

My log for the month includes a mix of EME and terrestrial QSOs including that very rare occurrence (for me), a 24GHz QSO.

On 10GHz my highlights in the UKAC on the 27th of August were working PE9GHZ JO11WM at -17/ -18 on Q65 mode at 265km, and G4RQI IO93IH 529/529 on CW at 154km. I was delighted to work a new station, namely G3VZV IO92QA 51S/ 31S on CW via RS. While only 63km the path is very obstructed, and we've never managed it before. I also had only my second ever 10GHz QSO with M0GHZ IO81VK at 55/54on SSB RS at 190km.

On 5.7GHz Q65 EME I worked IK0HWJ JN61HM at -17/-23, PA3DZL JO21HM at -11/-17and PA7JB JO22MD at -16/-20. My "rare" 24GHz QSO was with G4ODA IO92WS via a chance meeting on ON4KST chat. Reports over the were 52S/53S on CW via RS at 60km. This was notable as Keith's first ever 24GHz rainscatter QSO. We also had a second 2 days later on the 26th of September and signals were stronger.

The multiple – obstructed path is shown below. Showing just what can be done on 24GHz between home stations given the patience to pick the right conditions. Keith is a difficult QSO flat band on 10GHz due to the two large obstructions at Haddenham 10km from me, the new location of the GB3CAM beacon, and Sutton 5km further on.



I continue to monitor the new Kent WebSDR but so far only GB3PKT is visible with no sign of any trans- North Sea beacons just yet. The WebSDR has been operating reliably without any outages since the upgraded wireless internet link to site was installed
The GB3CAM 24GHz beacon still needs looking at as it's currently stronger +/-15 and +/30 kHz either side of the main carrier! I suspect an issue with the SMPSU and hope to confirm that soon.

From Adrian G4UVZ

The last time I went out /P on 10GHz working Peter GW4JQP in Milford Haven over 120K 185dB path loss, results were very disappointing, so I wanted to check system against my home station The path from home is 161lm 220dB path loss.
We established on the home station 59 59+ both ways. I have 10 watts and Peter 5 watts. My home antenna is a 1.2m offset dish and the portable kit has a .5 M Procom set up with just 1.5 watts. The heading was slightly obscured by trees at about 400m But signals came through at around 15dB down on the home station as received in Milford Haven which we felt fitted in well with the reduced power and dish size.

From Mark M5BOP

There is now a Martlesham Microwave Round Table YouTube Channel, which contains not only the talks and sessions from the 2024 Martlesham Round Table, but also content from previous years for your edification and viewing pleasure. The channel can be found via the link https://youtube.com/@martleshammicrowave
or by searching for Martlesham Microwave on YouTube.
Users can subscribe to the channel while watching on YouTube to be notified when new content is added, or just check back from time-to-time!

Canada, eh? From Peter VA3ELE

I'm very happy to announce that on September 7th, 2024, Kevin VE3KH and
I completed our first 78GHz Rain Scatter QSO. I'm curious if anyone has ever successfully completed a RS QSO on 78GHz before, whether in Canada, USA or anywhere else in the world.
Anyway, it was very exciting for me as we have tried quite a few times
throughout the year with no success, buy today, even though the weather was
kind of miserable, it was just right to get this completed and in the log.
Some details are written in the description of the YouTube video.
https://youtu.be/NF0FRtZGtbI?feature=shared

Beacon News……..

GB3CAM is back on 24.048870 GHz from our new site at Haddenham, JO01BI74.

I've replaced the original RDDS driver, as it was going a bit strange, and fitted a new experimental driver based on an RFZero board from OZ2M. The original x192 multiplier and new PA are still unchanged at the masthead.

The new beacon runs PI4 digimode instead of JT4G.
This mode is NOT supported by WSJT-X but is by MSHV (on Linux and Windows) and the PI-RX App (on Windows) from Poul-Erik OZ1CKG.

You can download MSHV from
http://lz2hv.org/mshv

and PI-RX from
https://www.rudius.net/oz2m/software/pi-rx/

Any reports to beaconspot.uk and comments to me.

Enjoy 73 John G4BAO

I have today, installed a new PA box at GB3FRS (1296.850, IO91LC58) It should be 6dB up, now running 25W ERP from its Alfold Slot, as originally intended.
Reports would be gratefully received, I'd like to build up the beaconspot coverage map now it has a new antenna & PA.
73, Phil G3TCU

Richard G8JVM reports: GB3FRS is now a good 529 here in Telford, Its not been heard before the antenna and PA were changed.
Thanks
Richard G8JVM IO82SP

GB3GCT is back on air and operating normally on 10.368935 GHz. The problem was water ingress that had caused corrosion to the DC input connector on the bottom of the head-unit. This has now been replaced and a drainage hole added. The hardware had been in place for over three years, so a problem was probably overdue! Fortunately, the electronics was dry and unaffected.

Dave G1EHF 18/10/24

Editors Comments

A great meeting at the Crawley RT this year. Thanks to all those involved. A new Roundtable for next year, will the Ridgeway Roundtable. This will be in February at the venue previously used by RAL just off the A34.

Several of us have ideas for changes in some of the contests for next year. We should be able to put forward some of those shortly for discussion.

I have taken over the role of coordinating the club's hire equipment. More info when available.
However if you currently have club loan equipment, please send me an email as to what you have.

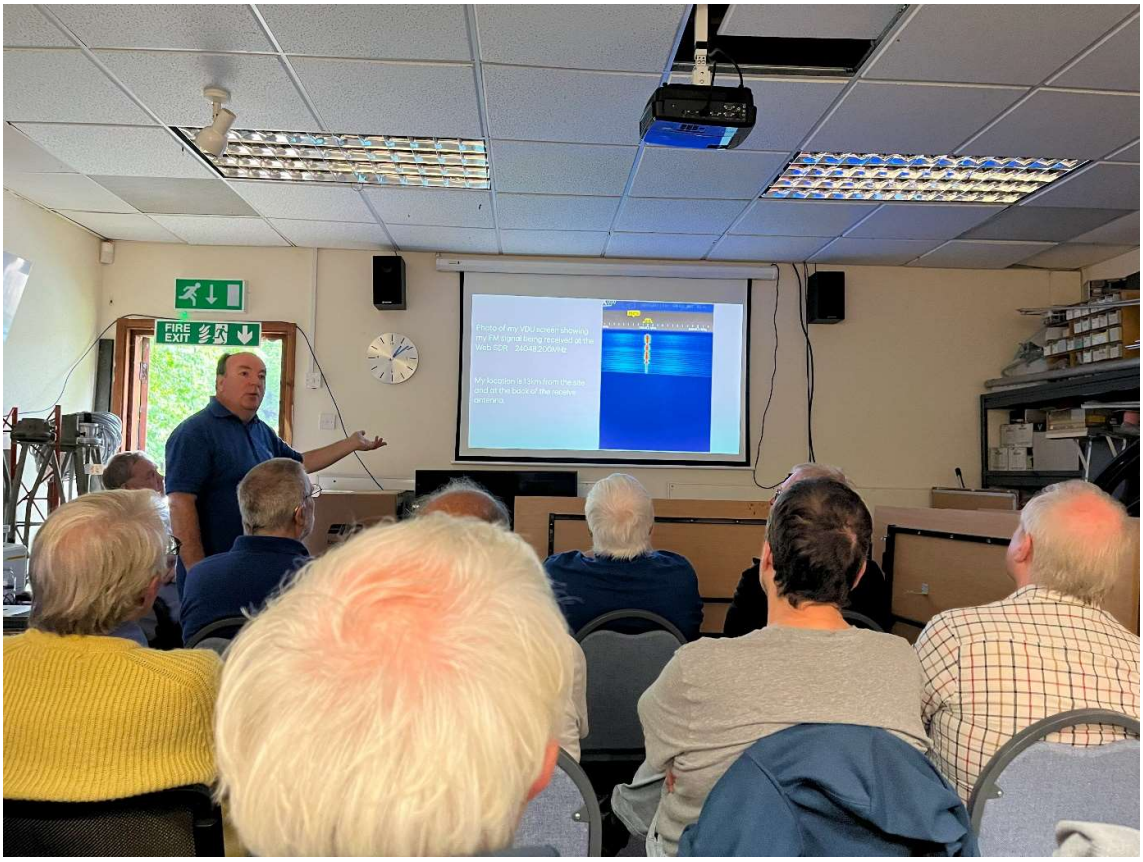
Roger

Crawley Round Table Report

The Crawley club house was packed for the Microwave Roundtable. Additional seating was found, for those present to watch the talks. This meant a quick clear away of the bring and buy items.

A number of interesting millimetre units brought along by Jen G4HIZ, were quickly snapped up.

They were of various frequencies. This one had the usual green Flann horn, that is often marked 57-59GHz. In this case it was marked 53–75GHz. This reinforces the use of these horns at 76GHz.



Phil G0JBA explaining the Thanet SDR operation. This will be a great help in monitoring north sea Propagation at 24GHz.

A map of 24GHz stations worked and beacons heard from home was very impressive

Colin G4EML showing the synthesisers that the RP2040 could control

An additional talk from Lehane G8KMH explained the operation of the new 240GHz chip from Silicon Radar

Chris G0FDZ shown in the picture on the left, produced a talk on Sub-Millimetre waves Operating above 275GHz Chris's health unfortunately is in serious decline. The amount of work that he put into the presentation is incredible. Roger G8CUB presented the talk on behalf of Chris.

Quin Collier G3WRR gave a talk on contest adjudicating. It was interesting to see how much work goes into checking contests results, and tools available to help with that.

Microwave Meetings 2024

Next on the calendar – Scottish Microwave Round Table GMRT

Bookings are still open for the Twelfth Scottish Microwave Round Table (GMRT). It will be held on Saturday 9th November at the Museum of Communication, Burntisland in Fife. Admission includes lunch and there will be an optional dinner at a local hotel. To find out more and to book your place go to the GMRT Website https://gmroundtable.org.uk/. For further information email Colin GM4HWO at gm4hwo@gmail.com 73 Pete GM4BYF

Please note that bookings are now close to capacity.

Admission £15 includes a buffet lunch plus beverages during the day. Three course dinner costs £30. Both are to be paid on arrival at the Museum of Communication, cash only; there is an ATM across the street, but please bring correct change if possible. Please register early, because places are limited by capacity of the venue.

Please note that if you book for the daytime event and/or the Dinner, you are committing to pay. GMRT is non-profit making with no surplus funds to cover non-attendance.

GMRT can accept cancellations up to 7 days before the event – use *gm4hwo@gmail.com* email address for cancellation / de-registration.

Provisional programme:

09.30		Doors open	Doors open for registration
09.30	10.30	Opening	Coffee, tea and biscuits available
10.30	12.30		Morning Session: Chair Martin Hall GM8IEM
10.30	10.35	Welcome	Martin Hall GM8IEM (UK Microwave Group Scottish Representative)
10.35	11.20	Talk	Mark Hughes GM4ISM "Printed Circuit Boards for small projects"
11.20	11.35	Break	
11.35	12.20	Talk	Brian Flynn GM8BJF "Frequency Standards for Microwaves"
12.20	12.45	Break	Vacate lecture area to allow lunch preparation. In the museum: The GM4LBV Projects Trophy. The esteemed judges will be Ian White GM3SEK and David Stockton GM4ZNX.
12.45	13.45	LUNCH	
13.45	16.15		Afternoon session: Chair Andy Sinclair MM0FMF (President Lothians Radio Society)
13.45	14.30	Talk	Malcolm Hamilton GM3TAL "Getting started on 23cm"
14.30	15.00	Break	
15.00	15.45	Talk	David Anderson GM6BIG "Working towards EME and DSN reception"
15.45	15.55	Award	Construction Competition Conclusion and Award - Ian White and David Stockton
15.55	16.15	Break	Tea and Coffee. Social Time. Winding up of measurement facilities.
16.15	16.30		Event close. Votes of thanks: Andy Sinclair MM0FMF
17.00		EXIT	End of let
19.00			Dinner in the Kingswood Hotel

Measurement facilities are kindly provided by Brian Flynn GM8BJF in the museum during breaks.

Next after GMRT

Midlands Round Table

Now 23 / 24th November 2024

https://www.eatonmanor.co.uk/round-table-event-2024/

The event is being held at:

Eaton Manor

Eaton-under-Heywood

Church Stretton

Shropshire

SY6 7DH.

The event venue is wheelchair accessible and will be open from 9:00 am, proceedings will start at 10:00 am.

There is an admission charge of £22 per head to cover the venue hire, lighting and heating.

Admission also includes a two course sit down lunch (vegetarian option available on request at time of booking), all day teas and coffees etc.

This must be booked and paid for in advance

24/47/76GHz Contest July 2024

Conditions were very average for this event, but the weather was kinder, ranging from overcast to fine.
It was a close call on 24GHz between rover Pete G1DFL/P and Clive GW4MBS/P, with Clive winning out with the best DX of the contest with G4UVZ.
On 47GHz Dave G1EHF/P had a commanding lead with four QSOs, with John G8ACE/P as runner up. 76GHz saw just the two entries so it was honours even for Roger G8CUB/P and John G8ACE/P.
Several logging errors were noted – accuracy is as important in these contests as those on the lower bands!
John G3XDY

24GHz Contest July 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	G1DFL/P	IO91GN83	5	135	G8ACE/P	61	0.25	30cm PF Dish
2	GW4MBS/P	IO71XW37	1	128	G4UVZ	128	2	30cm dish
3	G1EHF/P	IO91GI44	6	113	G8ACE/P	40	0.25	60cm
4	G8CUB/P	IO91DH05	3	94	G8ACE/P	49	5	30cm offset dish
5	G8ACE/P	IO91JA47	2	82	G8CUB/P	41	3	60cm Dish
6	GW4JQP	IO71KR94	1	28	GW8GTZ/P	28	2	43cm offset
7	G0MDQ/P	IO82QJ	0	0		0	2	30cm Dish

47GHz Contest July 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	G1EHF/P	IO91GI44	4	86	G8ACE/P	40	0.08	2 x 35mm horn
2	G8ACE/P	IO91JA47	1	41	G8CUB/P	41	0.015	40cm Dish
3=	G1DFL/P	IO91GN83	1	23	G1EHF/P	23	0.004	25dB Horn
3=	G8CUB/P	IO91DH05	2	23	G1EHF/P	21	0.05	30cm offset dish

76GHz Contest July 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1=	G8ACE/P	IO91JA47	1	41	G8CUB/P	IO91GI25	0.012	30cm Dish
1=	G8CUB/P	IO91GI25	1	41	G8ACE/P	IO91JA47	0.05	30cm offset dish

24/47/76GHz Contest September 2024

Not many comments were received for this session. Conditions were very varied, with one report of “good” on 24GHz. At least the weather was fairly benign.
The top of the table on 24GHz was a close battle, with David M0GHZ/P coming out on top. Pete G1DFL/P takes the honours on 47GHz, and Roger G8CUB/P on 76GHz.
John G3XDY

24GHz Contest September 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	M0GHZ/P	IO81TK79	6	398	G7MHF/P	107	2	40cm Sky offset
2	G1DFL/P	IO91GI25	6	363	GW3TKH/P	120	0.25	30cm PF Dish
3	GW3TKH/P	IO81KR73	4	349	G8IKP/P	114	0.5	50cm pf dish
4	G8CUB/P	IO91GC68	6	204	M0GHZ/P	74	5	30cm offset dish
5	GW4HQX/P	IO81KR73	2	165	G1DFL/P	105	0.6	30cm pf dish
6	G4LDR/P	IO91EC02	4	150	M0GHZ/P	63	1	30cm dish
7	GW4MBS/P	IO71XW37	1	70	GW3TKH/P	70	2	30cm dish

47GHz Contest September 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	G1DFL/P	IO91GI25	2	54	G8CUB/P	27	0.004	25dB Horn
2	G8CUB/P	IO91GC68	2	41	G1DFL/P	27	0.05	30cm offset dish
3	G4LDR/P	IO91GC68	0	0		0	0.001	30cm dish

76GHz Contest September 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	G8CUB/P	IO91GC68	3	88	G8GTZ/P	37	0.05	30cm offset dish
2	G1DFL/P	IO91GI25	1	27	G8CUB/P	27	0.0025	2 x Flann Horns

24/47/76GHz Contest October 2024

Entrants were unanimous about the weather – windy, wet and cold. Not ideal for mm-wave operation. Nevertheless activity was as good as any other session on 24GHz this year, with several Wavelab based systems on the air.
Congratulations to David M0GHZ/P with a comprehensive win on 24GHz, to Dave G1EHF/P on 47GHz, and jointly to Dave G1EHF/P and Roger G8CUB/P on 76GHz.
Several commented on the coordination with the RSGB/IARU UHF contest, the feedback was pretty unanimous that this event should be on a different weekend.
John G3XDY

24GHz Contest October 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	M0GHZ/P	IO81TK79	7	378	G7MHF/P	107	2	45cm
2	G1EHF/P	IO91GI25	5	200	M0GHZ/P	62	0.25	60cm
3	G4LDR/P	IO81XG25	5	154	G1EHF/P	42	2	60cm dish
4	G8CUB/P	IO91GI25	5	153	M0GHZ/P	62	5	30cm offset dish
5	G1DFL/P	IO81WG22	5	151	G1EHF/P	48	0.25	30cm PF Dish
6=	G7MHF/P	IO82QJ85	1	107	M0GHZ/P	107	1.5	30cm Andrews PF
6=	M0JMO/P	IO82QJ85	1	107	M0GHZ/P	107	1.5	Andrews 30cm Dish
8	GW4HQX/P	IO81LS19	1	62	M0GHZ/P	62	0.5	40cm PF dish

47GHz Contest October 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1	G1EHF/P	IO91GI25	3	96	G4LDR/P	42	0.08	2 x 35mm horn
2	G8CUB/P	IO91GI25	3	70	G4LDR/P	42	0.05	30cm offset dish
3	G4LDR/P	IO81XG25	2	48	G1EHF/P	42	0.08	30cm dish
4	G1DFL/P	IO81WG22	1	6	G4LDR/P	6	0.004	25dB Horn

76GHz Contest October 2024

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms	Power	Ant
1=	G1EHF/P	IO91GI25	1	27	G8CUB/P	27	0.001	30mm
1=	G8CUB/P	IO91GC68	1	27	G1EHF/P	27	0.15	30cm offset dish
3=	G1DFL/P	IO81WG22	1	6	G4LDR/P	6	0.0025	2 x Flann Horns
3=	G4LDR/P	IO81XG25	1	6	G1DFL/P	6	0.015	30cm dish

mm-wave Championship

On 24GHz Pete G1DFL/P was active in all four sessions and won the July event, coming second in September, and taking the overall leadership on this band. Runner up was Roger G8CUB/P, who was also active on all four events and won the May session.

Dave G1EHF/P wins the 47GHz Championship this year with two session wins, with Roger G8CUB/P runner up with one session win and two second places.

Roger g8CUB/P dominated the 76GHz series, winning all four sessions. John G8ACE/P is runner up, sharing joint honours with Roger in the second session. Support from other entrants was rather patchy this year, with several appearing for just one session of the four.

Congratulations to all the winners and runners up. Pete G1DFL/P will receive the G0RRJ Memorial Trophy for 24GHz, and the 47GHz Trophy will go to Dave G1EHF/P.

John G3XDY

UKuG Contest Manager

24/47/76GHz Championship Tables 2024

24GHz

Pos	Callsign	5/5/2024	7/14/2024	9/15/2024	10/6/2024	TOTAL
1	G1DFL/P	371	1000	912	399	2311
2	G8CUB/P	1000	696	513	405	2209
3	M0GHZ/P	0	0	1000	1000	2000
4	G1EHF/P	528	837	0	529	1894
5	GW3TKH/P	459	0	877	0	1336
6	GW4MBS/P	0	948	176	0	1124
7	G4LDR(/P)	85	282	377	407	1066
8	G4FRE/P	947	0	0	0	947
9	GW4HQX/P	210	0	415	164	789
10	G8ACE/P	141	607	0	0	748
11	G7MHF/P	0	0	0	283	283
12	M0JMO/P	0	0	0	283	283
13	GW4JQP	0	207	0	0	207
14	G0MDQ/P	0	0	0	0	0

47GHz

Pos	Callsign	5/5/2024	7/14/2024	9/15/2024	10/6/2024	TOTAL
1	G1EHF/P	868	1000	0	1000	2868
2	G8CUB/P	1000	267	759	729	2488
3	G1DFL/P	465	267	1000	63	1732
4	G8ACE/P	556	477	0	0	1033
5	G4FRE/P	910	0	0	0	910
6	G4LDR(/P)	222	0	0	500	722
7	GW4HQX/P	549	0	0	0	549

76GHz

Pos	Callsign	5/5/2024	7/14/2024	9/15/2024	10/6/2024	TOTAL
1	G8CUB/P	1000	1000	1000	1000	3000
2	G8ACE/P	148	1000	0	0	1148
3	G1EHF/P	0	0	0	1000	1000
4	G1DFL/P	251	0	307	222	780
5	GW4HQX/P	514	0	0	0	514
6	G4FRE/P	284	0	0	0	284
7	G4LDR/P	0	0	0	222	222

UKuG MICROWAVE CONTEST CALENDAR 2024

Dates, 2024	Time UTC	Contest name
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

November 9	Scottish Roundtable	www.gmroundtable.org.uk
November 23/24	Midlands Roundtable SY6 7DH	**https://www.eatonmanor.co.uk/round-table-event-2024/**

EVENTS 2025

January 13	Heelweg, Westendorp, Netherlands	www.pamicrowaves.nl
February 1 (prov)	Ridgeway Roundtable, Chilton village	
February (tbc)	MicroMeet Madrid. Spain	
Tagung (tbc)	Dorsen, Germany	