An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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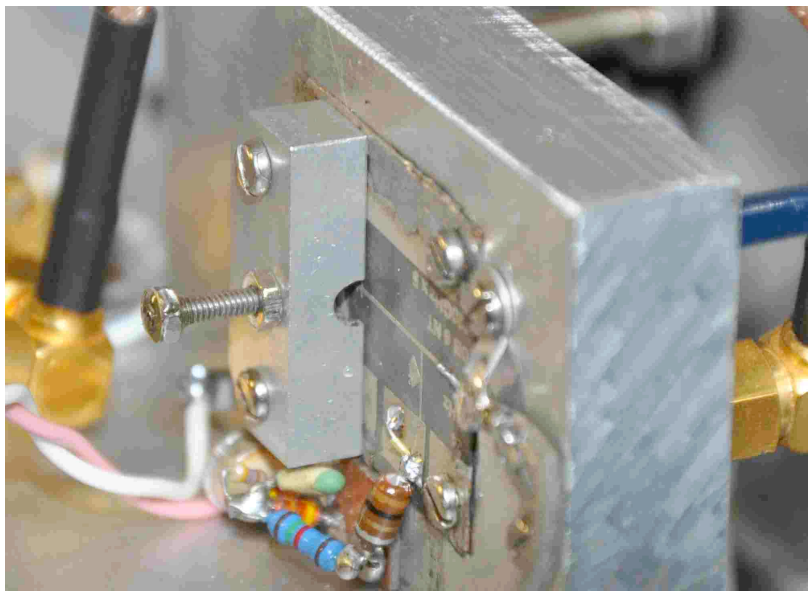
A ‘slab’ mixer for 122 GHz

By Chris Whitmarsh G0FDZ



In this Issue

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Loan Equipment

Don't forget, UKμG has loan kit in the form of portable transceivers available to members for use on the following bands:

5.7GHz 10GHz 76GHz

Contact John G4BAO for more information.

Subscription Information

The following subscription rates apply.

UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership**. For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via the Yahoo group and/or Dropbox. Also, free access to the Chip Bank.

Please make sure that you pay the stated amounts when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

You will have to make a quick check with the membership secretary if you have forgotten the renewal date. Please try to renew in good time so that continuity of newsletter issues is maintained.

Put a **renewal date reminder** somewhere prominent in your shack.

Please also note the payment methods and be meticulous with PayPal and cheque details.

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

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

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome.

Please send them to

editor@microwavers.org

The CLOSING date is the FIRST day of the month

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

Please submit your articles in any of the following formats:

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

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

I can extract text and pictures from pdf files but tables can be a bit of a problem so please send these as separate files in one of the above formats.

Thank you for you co-operation.

Martin G8BHC

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UKµG Chip Bank – A free service for members

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

Non members can join the UKuG 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 a component on the site will not be a guarantee of availability of that component. The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage.

Minimum quantity of small components supplied is 10. Some people have ordered a single smd resistor!

The service may be withdrawn at the discretion of the committee if abuse such as reselling of components is suspected.

There is an order form on the website with an address label which will slightly reduce what I have to do in dealing with orders so please could you use it. Also, as many of the components are from unknown sources, if you have the facility to check the value, particularly unmarked items such as capacitors, do so, and let me know if any items have been mislabelled. G4HUP's Inductance/ capacitance meter with SM probes is ideal for this (Unsolicited testimonial!)

Don't forget it is completely free, you don't even have to pay postage!

I have just updated the Inductor file and the ATC file in the chipbank catalogue on the website to reflect some acquisitions at Finningley, and to make a few corrections and clarifications.

Mike G3LYP

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 (eg 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 email john@g4bao.comThe current list is available at

www.microwavers.org/tech-support.htm

80m UK Microwavers net – Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV

Chairman's thoughts

I recently attended the Crawley Microwave Round Table. According to G0FDZ there were more attendees this year than in several years previous. Some of this was no doubt due to the sale of items from the Late G3GRO's estate. There were some very tempting items in the sale including a 10W Mikom 10GHz SSPA, a similar 5/6GHz SSPA and a 45W Toshiba 3.4GHz SSPA. I think I also spotted a 10GHz system, or at least a number of constituent parts?

Outside the car boot sale/flea market was in full swing with, again, many nice bits on sale, many of which were quickly snapped up. A complete G3WDG based 10GHz transverter system, on a tripod, was offered for £100. Although this was slow to sell, I understand it did eventually go. I'm sure a few attendees were kicking themselves for prevaricating for too long.

Also out in the car park area there were a good number of tripod-mounted microwave systems being demonstrated. There were some very nice examples of our 'art' on show.

A very varied talks programme and the annual construction contest judging rounded out the day.

This year the Crawley club (hosts for the Crawley Microwave Round Table) awarded a new trophy to the winner of the Crawley heat of the construction contest. The trophy is dedicated to Derek, G3GRO. Modesty forbids me saying who this year's winner was!

My thanks to the organisers of the Crawley round table and to the hard working 'catering staff' behind the counter.

The RSGB Convention is to be held on the 8th and 9th October and many of your committee will be manning the UKuG stand. If you are attending please drop by and say hello as well as enjoying the various talks on microwave subjects.

73 de Sam, G4DDK

Acting Chairman, UKuG

Heelweg 2017

http://www.pamicrowaves.nl/website/

Timelapse Part I 2016 made by PA3FXB

https://youtu.be/dEmRo0xHCko

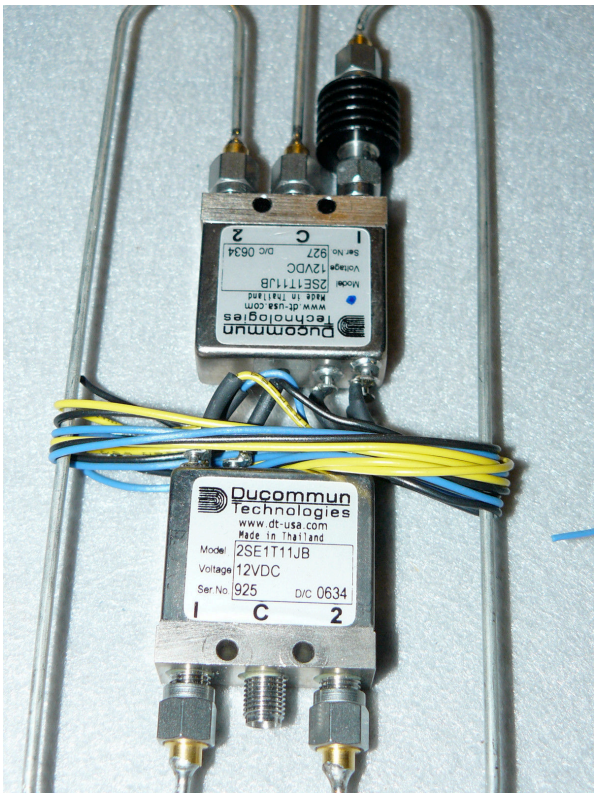
Some of the usual suspects from UKµG will be there!

G4BAO at Heelweg 2015

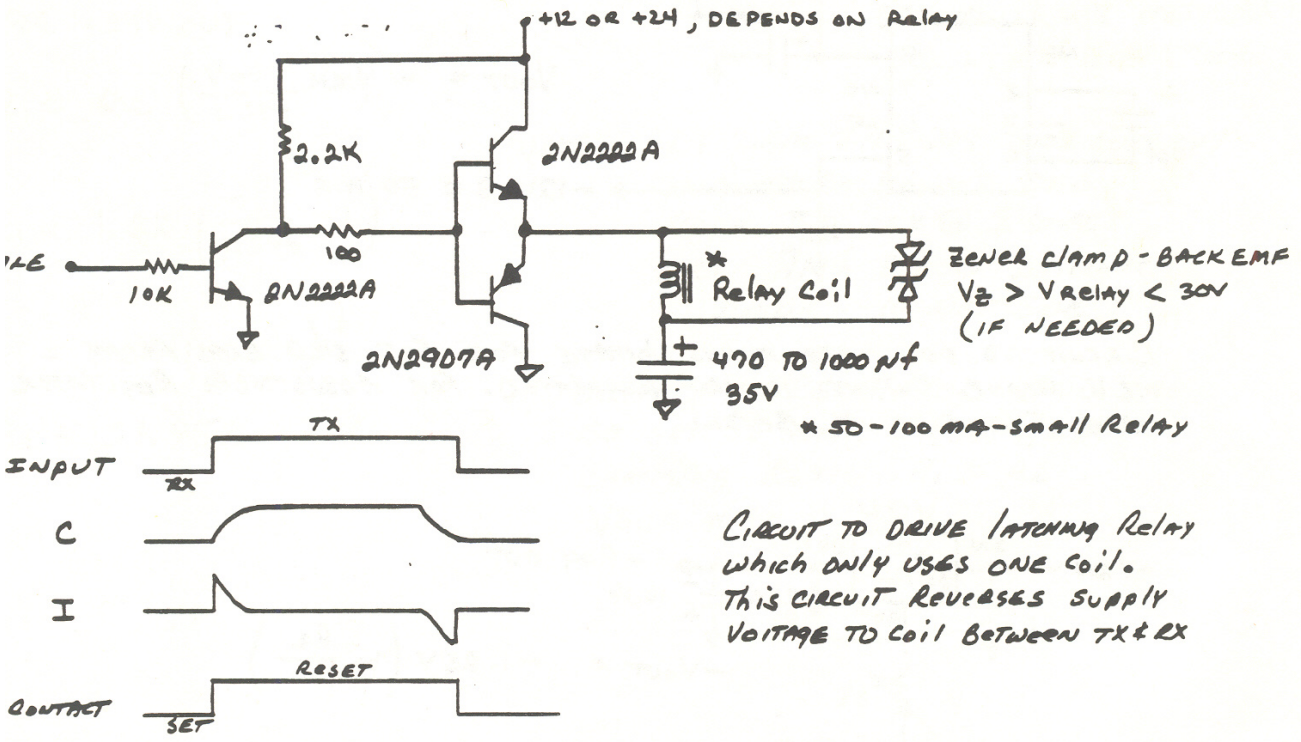
Drivers for latching relays.

By KØCQ, Dr. Gerald N. Johnson, P.E. retired.

I published a driver for the Ducommun relay, mentioned by M5POO last month (see details at the end of this article), and I have purchased from that seller as well as another that seems to have a large cache of the same relay selling individually. Its a polarity-sensitive, two coil latching relay. My driver was in CSVHF proceedings 2015. It's attached.



WA5TNY's totem pole driver originally in NTMS Feed Point in 1987, then in MUD 1991, and still in the ARRL Microwave/ UHF projects handbook takes three transistors and three resistors. Its good for 12 or 24 volts. He showed it driving a single coil latching relay where switching involves reversing the coil polarity. It can drive a two coil latching relay, like the Ducommun 2SE1T11JB that shows up on the auction sites regularly, with the addition of a couple diodes. The diodes do two jobs. They absorb the inductive kick from the relay coil on the fall of the drive current by providing a patch for the stored energy coil current, and they see that only one coil sees drive voltage at a time. This will work with coils that are polarity sensitive or insensitive. I would add a capacitor to the supply line similar or larger than the pulse making capacitor in series with the relay.



FEEDPOINT TECHNICAL COLLECTION, page 24.

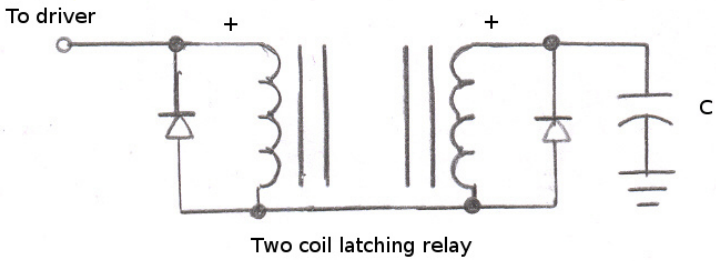
Proceedings of Microwave Update '91, page 334.

The ARRL UHF/Microwave Projects A manual, page 4-6.

W6PQL offers a kit that is more complex but does the same job.

http://www.w6pql.com/latching_relay_driver.htm

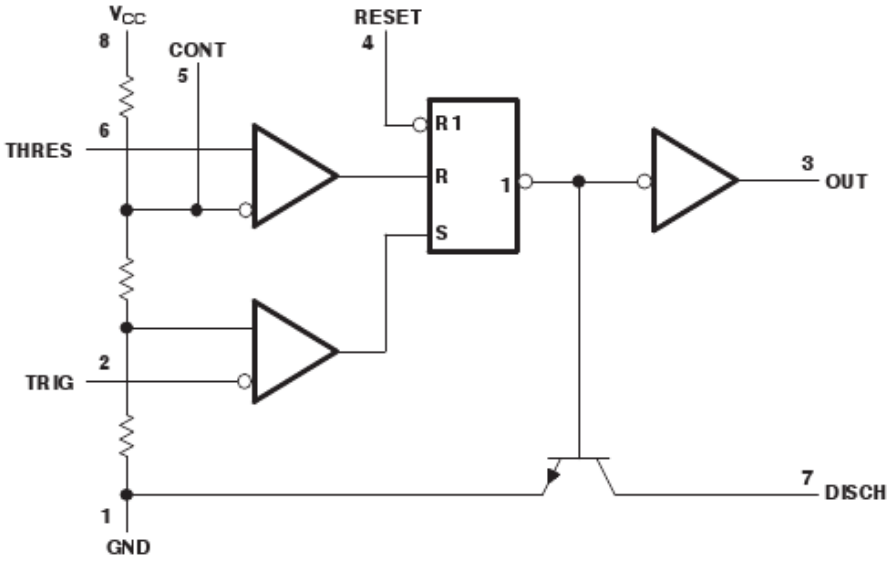
Circuit for a two coil latching relay.



Two coil latching relay

For relay coils rated less than 15 volts the classic NE555 bipolar timer has a sturdy output totem pole good to source or sink 200 ma. You can use two input options. Tie Reset to the positive supply, and trigger to threshold for the input. The input current will be very low. The output rise for rising input will happen when the input passes 2/3 the supply voltage and the .output fall for a falling input will happen at 1/3 the supply voltage. You can add resistors to supply or ground from the CONT pin to change those thresholds. The circuit uses fes components and little space. You can pull the trig input low and control the output with the reset but that will draw more current on the input. I used 350 mfd capacitors for supply and for relay pulsing because I had some from a hamfest last year.

FUNCTIONAL BLOCK DIAGRAM



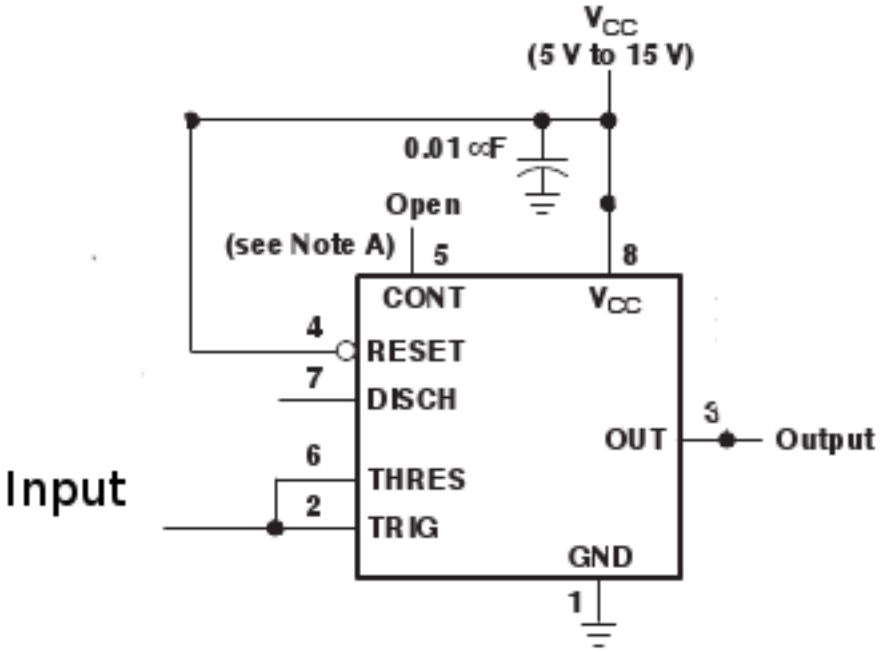
A. Pin numbers shown are for the D, JG, P, PS, and PW packages.

B. RESET can override TRIG, which can override THRES.

Table 1. FUNCTION TABLE

RESET	TRIGGER VOLTAGE(1)	THRESHOLD VOLTAGE(1)	OUTPUT	DISCHARGE SWITCH
Low	Irrelevant	Irrelevant	Low	On
High	<1/3 V_{CC}	Irrelevant	High	Off
High	>1/3 V_{CC}	>2/3 V_{CC}	Low	On
High	>1/3 V_{CC}	<2/3 V_{CC}	As previously established	

(1) Voltage levels shown are nominal.



Pin numbers shown are for the D, JG, P, PS, and PW packages.
NOTE A: Decoupling CONT voltage to ground with a capacitor can improve operation. This should be evaluated for individual applications.

For sale

SMA relays

I have found a source of SMA relays which may be of use to club members. They are from the USA and comprise two latching SPDT RF relays, either a 14dB or 20dB SMA attenuator (you can choose) and various hard lines with SMA connectors and a BMA socket; please see attached picture.

I paid around £50 for TWO sets of these including shipping to the UK; the parts appear to be new. The seller accepts PayPal and if any members are interested, please contact me at simon@m5poo.co.uk and I'll pass on the seller's details. I'm doing it this way to keep the seller's details out of the public domain as he also sells them for more on eBay.

Simon Robinson M5POO

simon@m5poo.co.uk

EME Dish available.(Free!)

If you have been thinking of trying EME and require a dish, I have a 2.4m 4 petal Andrews dish with mounting frame available for collection, the dish surface is good to at least 14GHz---ideal small dish to operate 23cms up EME. 13cms very easy with this dish and say 100w. Reason for availability is move to same size offset dish

Gordon Fiander G0EWN

This month I 'ave er mostly been

..... sorting out the UKuG 24GHz loan system

Turned out that there was a little more to do than I'd hoped on the recently purchased 24GHz loan transverter to make it fit for purpose. The problem stemmed from the 124.5MHz oscillator in the LO being, well, a little bit unstable!

An unlocked DB6NT, 1980 vintage, mark I 12GHz box, it drifted and warbled somewhat!

First plan was to lock it up to a reference. I found an unused G8ACE reflock kit in my junk box, put that together and programmed it to lock to a 10 MHz reference. After modifying the oscillator with a varicap to waggle the crystal it locked and didn't drift but it still warbled! After consultation with Sam G4DDK, we came to the conclusion that the previous owner must have replaced the crystal when converting it from the old 24192MHz band and had bought a "Poundland" cheap crystal. I will spare the manufacturer the embarrassment of naming him (something to do with Japanese poetry I think) but I think they've (deservedly) gone to the wall by now.

There was some academic discussion over such crystals at high multiplication factors a while back on the reflector and how the only solution was to bin them and get another one.

I've now done that and ordered a new one from DB6NT, at a reasonable price surprisingly. Once that arrives I'll pop it in and hopefully be good to go.

I got a couple of the little Morion 10MHz OCXOs from Ebay that G4JNT has been banging on about.

They are stunningly good, getting on frequency quickly and staying within a few hundred mHz (yes, milliHertz) once there.

In between preparing notes for my RSGB convention talk, playing with my new toy, an Arrow hand held VHF/UHF satellite antenna, and making plans for an Es Hail Sat system for next year I did manage a few QSOs on 23,9, 3cm and.... OMG! 24GHz! ....in the big October contest.

Where were YOU?

Dog eat your ~~homework~~ transverter?

73 G4BAO From The Fen Edge

A ‘slab’ mixer for 122 GHz

by Chris Whitmarsh G0FDZ

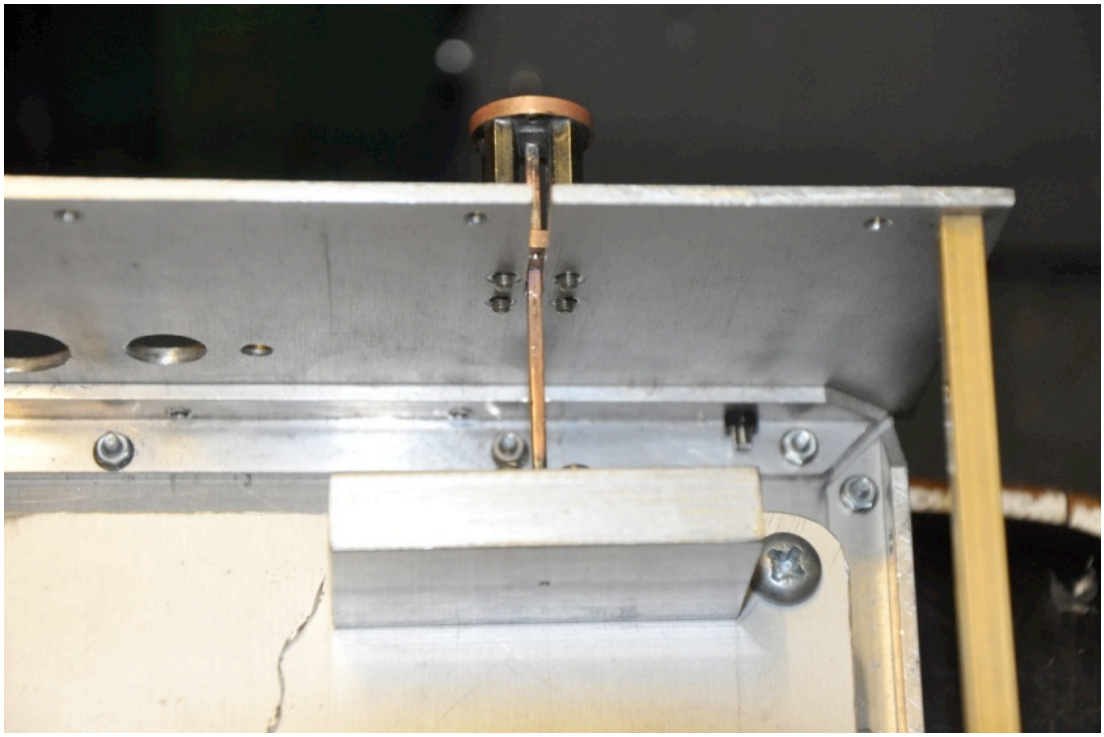
Until recently the usual way to build a mixer for the millimetre wave bands was to use one of the excellent PCB’s available from DB6NT and mount it into a custom made milled aluminium enclosure. These enclosures tended to be expensive and in some cases hard to find. This meant that a different enclosure would need to be obtained for every band and an idea was mooted that it would be a good idea to just use an aluminium slab that could easily be adapted to any band as required at the time of construction.

Recently I needed to make a mixer for the 122 GHz band and it was decided to use the 122 GHz mixer board number 32 from DB6NT. This uses 24 GHz for the LO drive and employs the 5th harmonic.

For a mounting plate, a piece of aluminium slab some 65 mm by 35 mm and with a thickness of 12 mm was obtained by band-sawing from a larger stock size. The use of thinner slab such as 6mm is also possible but be aware of the need to ensure enough threaded depth on the holes required to mount components on the slab without the holes running straight through the slab, and for the need to securely mount the slab vertically onto a base plate.

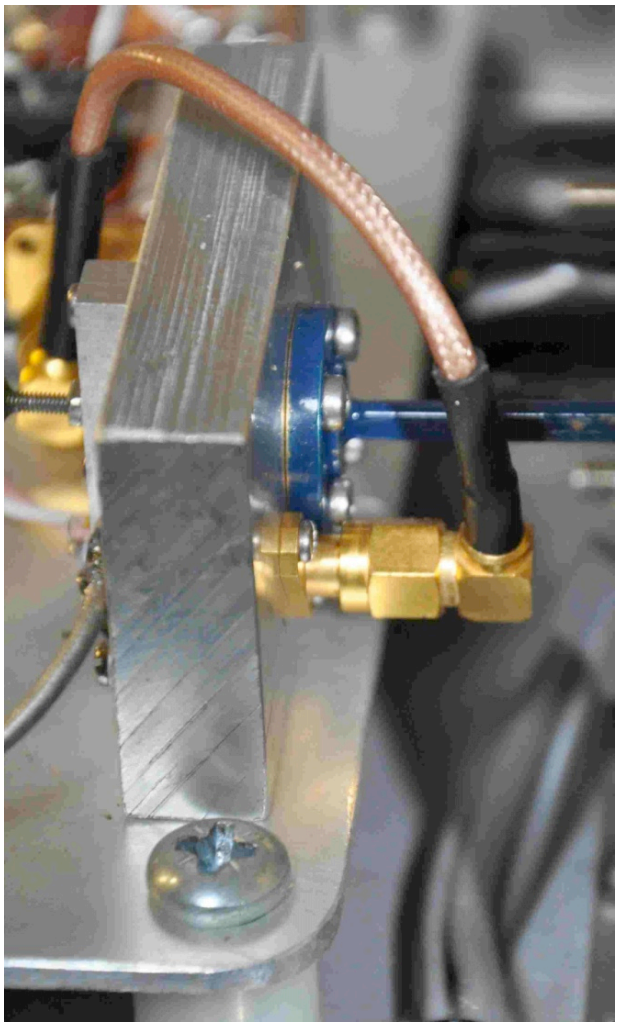
The most important item for the mixer is the round waveguide hole that takes RF to and from the mixer board diode to the antenna. The hole needs to be 1.7mm diameter for 122 GHz and this was very carefully drilled in the middle of the slab using a new drill and plenty of WD40 as a lubricant. It is very easy indeed to exert too much pressure on the very small drill, leading to disaster and the drill snapping off. By being patient and taking the drilling in easy stages and clearing the drill frequently of swarf, the job was completed OK. The best method is to use a drill stand and start with a smaller drill such as 1.4 or 1.5 mm and work up to the 1.7 mm size required.

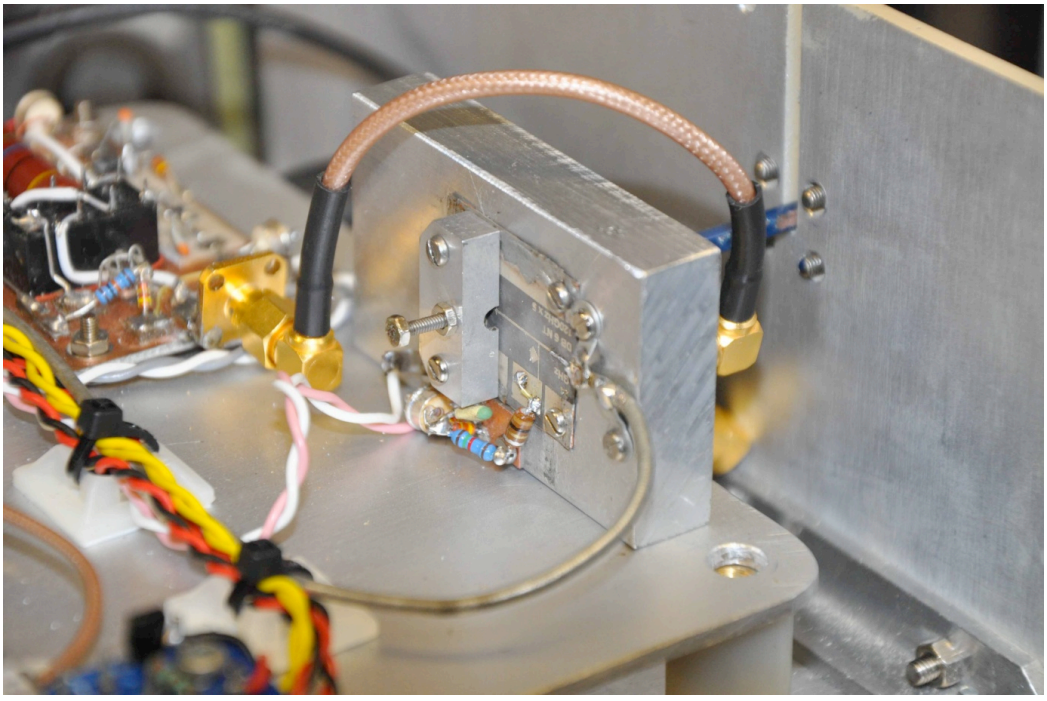
The mixer board needs to have the top and bottom ground plane areas connected together with copper foil which is soldered, and then the board can be carefully drilled to mount to the slab by means of M2 screws. The best method found to ensure accurate alignment of the waveguide hole with the board is to shine a bright light thorough the waveguide hole from the antenna side of the slab and move the mixer board on the other side of the slab until the waveguide aperture comes into view. The board can then be temporary fixed, the holes marked out and the slab can be blind drilled and tapped M2. Again, M2 taps can be very easily broken as they are tempered to make them very sharp but also brittle. The same advice as I mentioned with regard to drilling is advised and the use of both taper and plug taps is recommended. Don’t just use a taper tap!



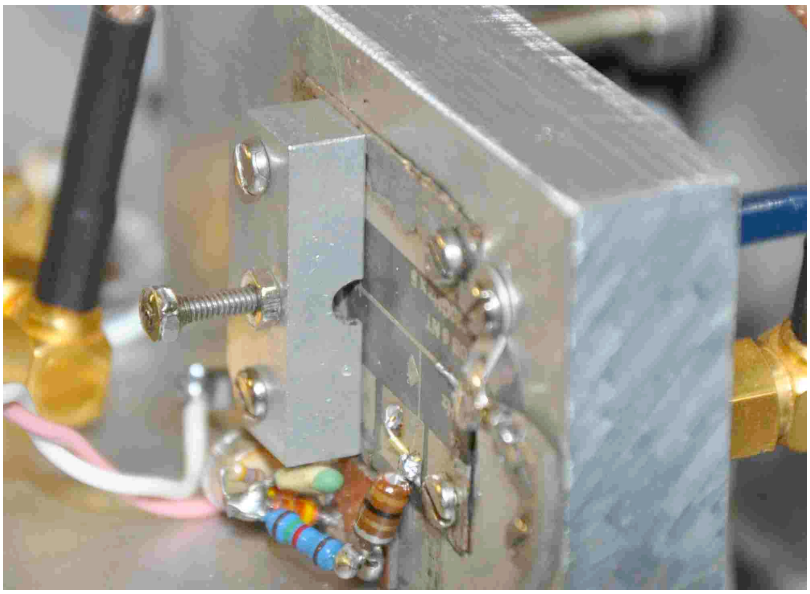
The mixer board has an IF pad and a hole was drilled through the aluminium slab to allow an SMA IF socket to be fitted to the antenna side of the slab where a wire can lead from the socket through the hole to the underside of the mixer IF pad and through a small hole in the pad to where it can be soldered. The waveguide hole also will need to have a flange fitted over it in its exact centre, and fastened using M2.5 screws in blind tapped holes. In this way conventional rectangular waveguide can be fitted to this crude round to rectangular transition and hence to feed the antenna.

The 24 GHz LO signal is brought straight to the board by means of a piece of 085 semi-rigid cable which is soldered to the mixer board LO port, and the outer of the semi-rigid is secured into position by soldering to two solder tags close to the board and fitted to the slab by M2 tapped holes. This method has been successfully used on both 241 and 122 GHz (using 34 and 24 GHz LO frequencies respectively). If a waveguide feed of the LO signal is required (such as when using a higher LO frequency such as 40 or 80 GHz) then an alternative method will need to be found. This will likely consist of a waveguide hole with a rectangular waveguide interface bolted over the hole in a similar way to that used for the output frequency, to enable the LO frequency to be fed to the mixer board.





A back screw arrangement is required to optimise the power output of the mixer and this is fabricated from a piece of aluminium block suitably shaped and drilled, tapped and then fitted over the mixer board over the output waveguide hole position on the board. For 122 GHz I used an M2.5 screw with the head filled down until only a simple disk remained. The screw was screwed into the tapped block and a locking nut provided.



The mixer board can now be finally secured onto the slab (once the diode is mounted), either by just using the M2 screws or additionally by silver epoxy gluing if desired. In my case I just used the M2 screws.

The slab normally will need to be fitted vertically to some kind of base plate, and to achieve that two M4 threaded holes were made in the side of the slab to enable fixture.

The slab mixer is now complete and the advantage is that by starting with a 'standard' size slab and drilling the appropriate waveguide hole (4mm for 47GHz to 0.9mm for 241 GHz) the slab can easily be adapted for any mixer board and frequency band.

Of course you still have to deal with an 'off-slab' IF amplifier, and transmit attenuator and switching if used as a transverter. Also some mixer boards have no provision for mixer diode current monitoring and bias and this can be easily accommodated by mounting a small piece of thin PCB material next to the IF pad of the mixer board again by using M2 screws. The appropriate component s can then be accommodated on this board and connection made to the IF pad via a small value RF choke.

It is hoped that the slab mixer will greatly help those who wish to venture onto the highest frequencies as the user can easily adapt the slab to suit the required band by suitable drilling and tapping etc without the need to obtain specific band metalwork.

Using the Elcom DFS-1301 synthesiser on 76GHz

Barry Chambers, G8AGN

The Elcom DFS-1301 synthesiser has a nominal tuning range of 12.65 – 13.35GHz and this should make it useful for 76GHz operation. In its unmodified state, however, the DFS-1301 frequency can only be specified in 5MHz steps and so the only useful frequency which can be programmed using a G4FRE programmer is 12.735GHz (x 6 = 76.410GHz). On receive, this gives a 434 – 430 MHz IF when tuning the 76GHz band from 75.976 to 75.980 GHz.

If the DFS-1301 is modified for direct PLL programming as discussed in a previous article, however, useful frequencies on both transmit and receive can be obtained as outlined below.

From the previous description of how the DFS synthesiser family operates, the basic frequency programming equation is

$$I.F.\,frequency = \left[\left(Prescalar\ division\ ratio \times N\right) + A\right] \times \frac{f_{ref}}{R \times f_{ref}\ division\ ratio} \qquad (1)$$

Where the IF frequency is the difference between the VCO frequency (one-quarter of the output frequency) and 27 times the 100MHz reference frequency (27 x 100 = 2700MHz). Normally the IF frequency is then divided by 8 in a prescalar before being input to the PLL.

The other PLL input is 10MHz ($\frac{f_{ref}}{f_{ref}\ division\ ratio} = \frac{100}{10}$).

The unknowns N, A and R are all integers.

Hence for a prescalar division ratio of 8, Eq 1 simplifies to

$$I.F.\,frequency = \left(8N + A\right)\frac{10}{R} \qquad (2)$$

And for a prescalar division ratio of 16, Eq 1 becomes

$$I.F.\,frequency = \left(16N + A\right)\frac{10}{R} \qquad (3)$$

The advantage of using Eq 3 and hence a prescalar division ratio of 16 rather than 8 is that the resulting values of N are reduced and this should result in lower phase noise.

As mentioned above, the standard DFS-1301 configuration seems to be with a prescalar division ratio of 8 but I have one which has been factory-modified to a ratio of 16. The modification to achieve this is very simple and involves cutting two PCB tracks on the synthesiser PLL board and adding two links.

The prescalar chip, labelled 026A (MC12026A) is located next to the PMB 2.2 2306T PLL chip, as shown in Photo 1. The chip connections to be modified are located within the yellow circle.

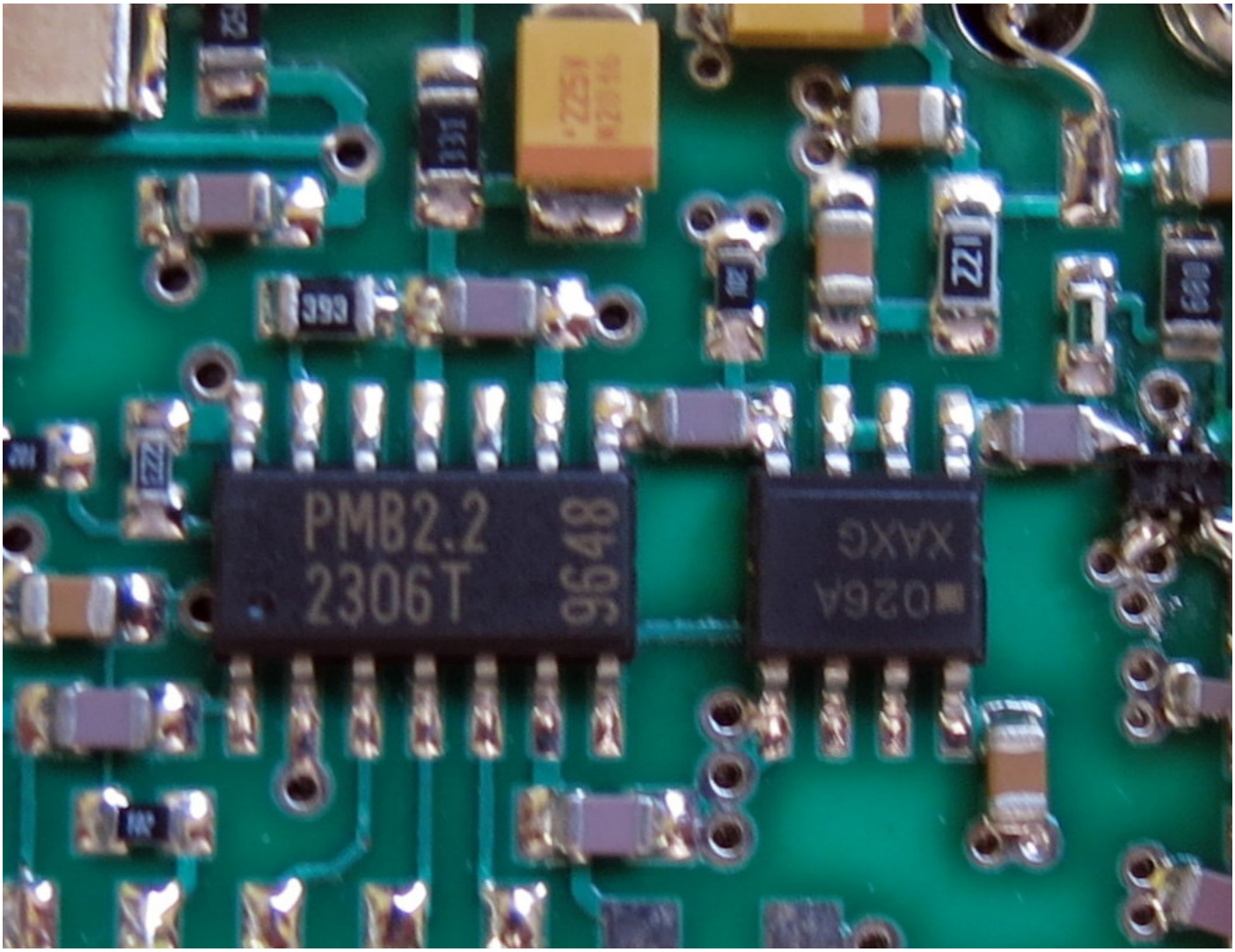


Photo 1 Location of MC12026A prescalar

Fig 1 shows the original and modified connections to pins 2 and 3 of the 026A chip. The result of the modification is to change the voltage on pin 3 from High to Low and this will change the division ratio from 8 to 16. Details of the modification are shown more clearly in Fig 1. The red dotted lines indicate the connections to be broken and the green solid lines indicate the new connections.

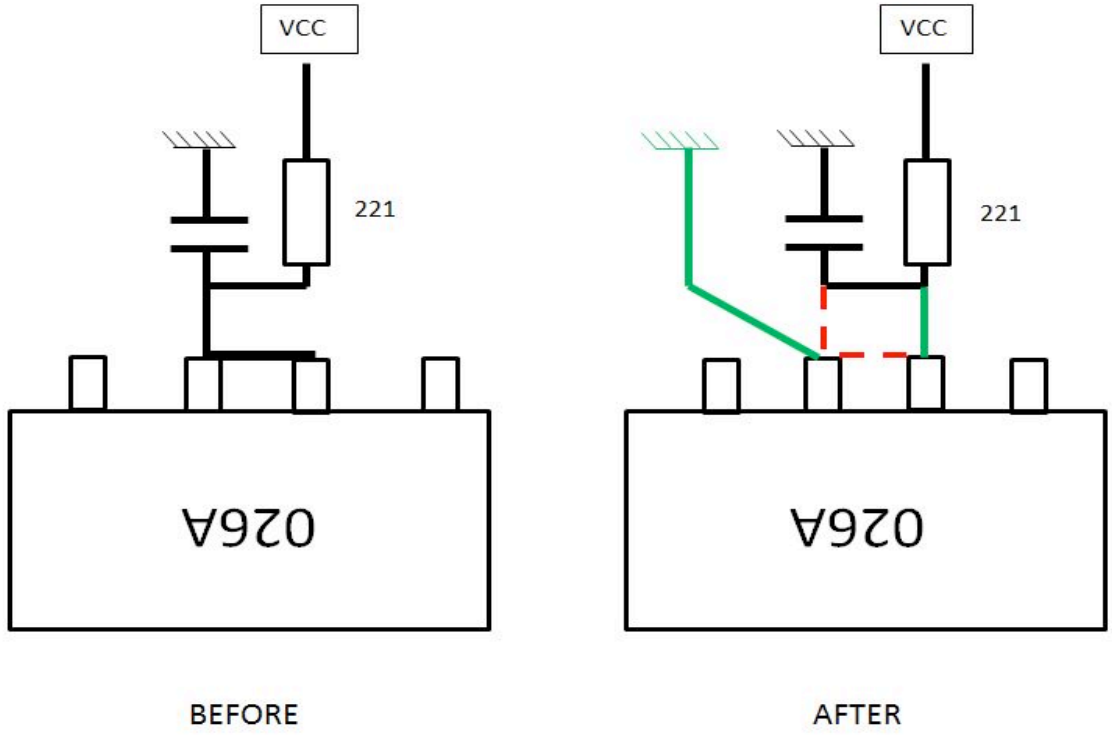


Fig 1 Prescalar wiring changes

Table 1 lists a number of useful transmit and receive frequencies for operation on 76GHz and the required values of N, A and R.

Freq GHz	Model	Pre-scalar	A	N	R
75.976 Tx	DFS-1301	16	5	87	30
75.978 Tx	DFS-1301	16	7	116	40
75.980 Tx	DFS-1301	16	15	34	12
76.410 Rx 434-430 high	DFS-1301	16	3	24	8
75.536 Rx 440-442 low	DFS1-301	16	15	41	15
75.544 Rx 432-434 low	DFS-1301	16	15	83	30

Table 1 DFS-1301 programming data for operation at 76GHz

Contest Results

John G3XDY, UKuG Contest Manager

July 24GHz Contest 2016

This was very different from last year when there were stations active in “Rover” mode and several more participants. Congratulations go to Neil G4LDR as the winner on this occasion. The entrants commented that it was very humid, which increases losses on 24GHz and limits ranges achievable.

The 24GHz Trophy goes to G4LDR for 2016.

24GHz Contest July 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G4LDR/P	IO81XG	2	58	G8CUB/P	29
2	G0FDZ/P	IO91CL	1	29	G4LDR	29
2	G8CUB/P	IO91CL	1	29	G4LDR/P	29

July 47GHz Contest 2016

I’m pleased to report an increased entry this year, with four stations rather than three as last year. Roger G8CUB/P and Chris G0FDZ/P share the honours as they both worked the same stations from the same site, just pipping Neil G4LDR/P for the 47GHz Trophy. Congratulations to both.

47GHz Contest July 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G0FDZ/P	IO91CL	2	122	GW3TKH/P	93
1	G8CUB/P	IO91CL	2	122	GW3TKH/P	93
3	G4LDR/P	IO81XG	2	118	GW3TKH/P	89
4	GW3TKH/P	IO81LS	1	93	G8CUB/P	93

July 76GHz Contest 2016

Congratulations go to Roger G8CUB/P who wins this event with two contacts, with G4LDR/P and GW3TKH/P. Runner up was Keith GW3TKH/P who made a contact over 93km with G8CUB/P.

76GHz Contest July 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G8CUB/P	IO91CL	2	122	GW3TKH/P	93
2	GW3TKH/P	IO81LS	1	93	G8CUB/P	93
3	G0FDZ/P	IO91CL	1	29	G4LDR	29
3	G4LDR/P	IO81XG	1	29	G8CUB/P	29

July 122-248GHz Contest 2016

Activity was rather low, with just two entries from G8CUB/P and G0FDZ/P, however they did pioneer the 122GHz band with a contact over 120m during the event, and also had a one way contact on 134GHz over 5.3km. Congratulations to both Roger and Chris on their achievements on the mm-waves.

122GHz Contest July 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G8CUB/P	IO91CL	1	1	G0FDZ/P	0.12
2	G0FDZ/P	IO91CL	1	1	G8CUB/P	0.12
134GHz Contest July 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G8CUB/P	IO91BL	1 way	3	G0FDZ/P	5.3
2	G0FDZ/P	IO91CL	1 way	3	G8CUB/P	5.3

August 5.7GHz Contest 2016

Entries were up for this session of the series and some good scores were made. Congratulations go to the Telford group G3ZME/P as winners of this session, with the Combe Gibberlets group M0HNA/P in runners up slot. It was good to see Ralph G4ALY appearing as best DX for most entrants from down in Cornwall.

5.7GHz Contest August 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G3ZME/P	IO82QL	11	1522	G3XDY	265
2	M0HNA/P	IO91GI	10	997	G4ALY	216
3=	GW3TKH/P	IO81KR	7	717	G4ALY	159
3=	GW4HQX/P	IO81KR	7	717	G4ALY	159
5	M0GHZ	IO81VK	7	681	G3XDY	246
6	G4BRK	IO91HP	6	586	G4ALY	237
7	G4LDR	IO91EC	6	528	G4ALY	195
8	2E0NEY	IO81VK	5	380	G3ZME/P	120
9	G3VKV	IO81XV	3	231	G3ZME/P	77

August 10GHz Contest 2016

A total of 11 entries were received for this session. Winners in the open section were the Telford group G3ZME/P from Brown Clee, with a clear lead over runner up Neil G4LDR. In the restricted section the Combe Gibberlets M0HNA/P were the leaders, with Pete GW4HQX/P in the runner up slot.

10GHz Contest August 2016						
Open Section						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G3ZME/P	IO82QL	17	2530	G3XDY	265
2	G4LDR	IO91EC	13	1874	G4KUX	395
3	GW3TKH/P	IO81KR	11	1195	G0OLX/P	238
4	G3VKV	IO81XV	5	241	G3ZME/P	77
Restricted Section						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	M0HNA/P	IO91GI	13	1601	G4KUX	368
2	GW4HQX/P	IO81KR	11	1195	G0OLX/P	238
3	G0LGS/P	IO81XW	12	993	G3XDY	223
4	2E0MDJ/P	IO81XW	10	713	G8GTZ/P	102
5	M0GHZ	IO81VK	7	486	G3ZME/P	120
6	2E0NEY	IO81VK	6	431	G3ZME/P	120
7	G1DFL/P	IO91OQ	4	392	G3ZME/P	154

5.7 & 10GHz Championship Tables

5.7/10GHz Championship Tables						
Positions after four events, the best three count to the overall total						
5.7GHz						
Pos	Callsign	29/05/16	26/06/16	31/07/16	28/08/16	**TOTAL**
1	G(P)3ZME/P	1000	1000	1000	1000	3000
2=	GW3TKH/P	827	0	455	471	1753
2=	GW4HQX/P	827	0	455	471	1753
4	M0HNA/P	0	408	671	655	1734
5	G4BRK	406	406	0	385	1197
6	G4LDR	0	333	424	347	1104
7	G3VKV	156	0	226	152	534
8	M0GHZ	471	0	0	0	471
9	2E0NEY	0	0	0	250	250

10GHz Open						
Pos	Callsign	29/05/16	26/06/16	31/07/16	28/08/16	TOTAL
1	G(P)3ZME/P	1000	1000	800	1000	3000
2	G4LDR	0	630	1000	741	1630
3	GW3TKH/P	530	0	373	472	1375
4	G4KUX	466	850	0	0	1316
5	G0EHV/P	0	0	692	0	692
6	G4BAO	271	202	0	0	473
7	G3VKV	99	0	277	95	471
8	M0DTS/P	424	0	0	0	424
9	G8GTZ/P	250	0	0	0	250
10	G4GSB/P	163	0	0	0	163
10GHz Restricted						
Pos	Callsign	29/05/16	26/06/16	31/07/16	28/08/16	TOTAL
1	G0LGS/P	1000	1000	1000	620	3000
2	2E0MDJ/P	1000	529	1000	445	2529
3	M0HNA/P	0	708	602	1000	2310
4	GW4HQX/P	549	0	283	746	1578
5	G0PEB/P	487	0	545	0	1032
6	M0GHZ	498	0	0	304	802
7	G1DFL/P	54	23	0	245	322
8	G3YJR	0	0	215	0	215

24/47/76GHz Contests August 2016

The level of support for the August event was poor, possibly due to holidays. However, Gordon G0EWN/P did submit a first entry for 76GHz, with a two way and a one way contact with G8AGN/P over 10km and 20km paths respectively.

On 24GHz G3ZME/P was the leading station from Brown Clee, with Roger G8CUB/P as runner up.

24GHz Contest August 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G3ZME/P	IO82QL	1	77	G3VKV	77
2	G8CUB/P	JO01FK	1	33	G0DEC/P	33

76GHz Contest August 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G0EWN/P	IO93FK	1.5	20	G8AGN/P	20

24/47/76GHz Contests September 2016

The weather was kind and lower humidity reduced path losses for the final session in 2016. Five stations submitted entries across the three bands.

Winner on 24GHz was Keith GW3TKH/P who made 5 contacts, with G3ZME/P as runner up with 3 QSO's.

On 47GHz Roger G8CUB/P was just ahead of joint runners up Keith GW3TKH/P and Pete GW4HQX/P Roger had 4 QSOs, and made good use of the rover rule.

76GHz entries were received from GW3TKH/P and GW4HQX/P, with Keith being the winner by dint of working G8CUB/P in two locations, whereas Pete only worked him in one.

24GHz Contest September 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	GW3TKH/P	IO81LS	5	393	G4EML/P	119
2	G3ZME/P	IO82QL	3	287	G4LDR/P	125
3	G4LDR/P	IO91CL	3	245	G3ZME/P	125
4	G8CUB/P	IO81WU	3	235	G3ZME/P	78

47GHz Contest September 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	G8CUB/P	IO81WU	4	256	GW3TKH/P	64
2=	GW3TKH/P	IO81LS	3	250	G4LDR/P	93
2=	GW4HQX/P	IO81LS	3	250	G4LDR/P	93
4	G4LDR/P	IO91CL	2	186	GW3TKH/P	93

76GHz Contest September 2016						
Pos	**Callsign**	**Locator**	**QSOs**	**Score**	**ODX Call**	**ODX km**
1	GW3TKH/P	IO81LS	2	157	G8CUB/P	93
2	GW4HQX/P	IO81LS	1	64	G8CUB/P	64

MM-Wave Contest Championship 2016

Congratulations go to Roger G8CUB/P as winner of the mm-wave Championship on all three bands. Roger made good use of the rover rule to maximise his score in each session. As winner of the series on 24GHz, Roger will receive the G0RRJ Memorial Trophy.

On 24GHz the runner up is Telford & District ARS G3ZME/P, who were on for three of the four sessions.

47GHz sees Keith GW3TKH/P in the runner up position by a small margin. No entries were received for the August session.

Keith GW3TKH/P is also runner up on 76GHz, where all the entrants submitted logs for 2 sessions out of the four.

The mm-wave contests have established themselves as an important part of the UK Microwave Group contest season. Feedback on the dates and rules is welcomed prior to next year's events.

24/47/76GHz Championship Tables 2016						
Final positions. The best three count to the overall total						
24GHz						
Pos	Callsign	19/06/16	17/07/16	14/08/16	11/09/16	**TOTAL**
1	G8CUB/P	786	1000	429	598	2384
2	G3ZME/P	316	0	1000	730	2046
3	GW3TKH/P	1000	0	0	1000	2000
4	G4LDR/P	244	1000	0	623	1867
47GHz						
Pos	Callsign	19/06/16	17/07/16	14/08/16	11/09/16	TOTAL
1	G8CUB/P	1000	437	0	1000	2437
2	GW3TKH/P	433	1000	0	977	2410
3	GW4HQX/P	433	0	0	977	1410
4	G4LDR/P	135	541	0	727	1403
76GHz						
Pos	Callsign	19/06/2016	17/07/2016	14/08/2016	11/09/2016	TOTAL
1	G8CUB/P	1000	1000	0	0	2000
2	GW3TKH/P	0	762	0	1000	1762
3	G4LDR/P	1000	475	0	0	1475
4	G0EWN/P	0	0	1000	0	1000
5	GW4HQX/P	0	0	0	408	408

Activity News : September 2016

By Neil Underwood G4LDR

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

September saw the last 5.7GHz, 10GHz and mm Wave UKuG contests of the year and together with the RSGB UKAC Tuesday evening events and the IARU 432MHz to 248GHz contest at the beginning of October makes for plenty of opportunity to get on the microwave bands. It would be nice if these contests coincided with good conditions, and for once the UKAC 2.3GHz to 10GHz contest on the 27th September did see enhanced conditions, (at least on north/south paths within the UK).

Activity on the cm bands

From John G3XDY JO02

Some DX around this month at times:

1.3GHz UKAC 20/9/16:

SK7MW JO65; DL0VV JO64; GU6EFB IN89; OZ1FF JO45; OZ9KY JO45; DJ5AR JN49; GW4HXO IO71; OZ9ZZ JO46; GM4JTJ IO86; GW8IZR IO73; GI6ATZ IO74; G8PNN IO95; G0EHV/P IO84; DF9IC JN48; G4VFL/P IO84.

10GHz UKuG Contest 25/9/16

Very short spell early Sunday: G4KUX IO94

2.3GHz SHF UKAC 27/9/16:

DJ1KP JO40; DF9IC JN48; SK7MW JO65; G8PNN IO95; OZ1FFJO45; PE2TV JO32; DL0VV JO64

28/9/16 Tropo to the south

1.3GHz: F1AFZ JN17; F5DQK JN18; F6KHM IN78 F1CPX IN97; F9OE IN78; EA2TZ IN93

2.3GHz: F1AFZ JN17; F5DQK JN18

10GHz: F6DKW JN18 59+++; F5DQK JN18

From Neil G4LDR, IO91

The UKAC SHF contest on the 27th Sept for once coincided with good conditions and I was kept busy for the full 2.5 Hrs. On 9cms I worked twice as many stations as I normally work. I finally worked G4JIG/P in IO83. On 3cms contacts included G8SFI/P and ON7FLY both at 320km.

Activity on the mm bands

From Keith GW3TKH IO81

For the 24GHz/47GHz/76GHz contest on 11th September, Pete G4HQX and I went to Cefn Y Galchen, IO81LS.

Roger, G8CUB/P was at Birdlip, a 64Km path. 59 SSB signals were exchanged on 24 & 47GHz.

On 76GHz we were copying Roger's SSB and keying the beacon TX for the contest exchange. Roger then changed his lens horn for a 60cm dish. The improved capability allowed 58/54 SSB reports to be exchanged, and Pete's best DX on the band.

Roger then set off for Hackpen. Neil, G4LDR/P was already there and we had easy exchanges on 24 & 47GHz but 76GHz wouldn't go. There was a band of low cloud moving across the horizon which appeared to be a good attenuator!

The usually difficult path across the top of the Blorenge to Brown Clee was working well this day, with an easy 24GHz exchange with G3ZME/P. An attempt on 24GHz with G4EML/P on Walbury resulted in a one way this time.

Roger arrived at Hackpen and we had contacts on all bands, 76GHz being a very difficult CW exchange.

An interesting day of testing, thanks to all and especially Roger for roving. And we didn't get wet this time!

Picture shows the equipment of GW3TKH and G4HQX, from left to right, 24GHz Tvtr; together on one tripod, 76G Tvtr, 76GHz Bcn, 47GHz Tvtr; 76GHz Tvtr; 47GHz Tvtr.

From Neil G4LDR IO91

For the Sept mm wave contest I operated from Hackpen Hill between Swindon and Marlborough in Wiltshire (IO91CL). This guaranteed a line of sight path to GW3TKH/P and G4HQX/P at Cefn Y Galchen, (IO81LS). Contacts with both stations on 24 and 47 GHz over the 94km path were straight forward. An attempt at 76GHz where simple transverters (bare diode mixers) were used at both ends did not go. I was however able to copy the relatively high power (mWs) 76GHz beacon that GW3TKH/P was running using a FunCube dongle with laptop running HDSDR as the IF receiver for the 76GHz transverter. This set up enabled me to view and record the spectrum of the received 76GHz signal.

Conditions must have been enhanced on 24GHz because I worked G3ZME/P on Brown Clee over a 124km obstructed path. However attempts with closer stations G4NNS (IO91) and G1JRU (IO90) over much more obstructed paths failed. A near line of sight path to Walbury Hill (IO91GI) enabled an easy contact with G6ZAC/P but not with G4EML/P who had a transmit problem.

From Gordon G0EWN

With the return to longer hours of darkness and cooler temperatures, tests have been under way on a number of bands 'up north'. These include tests on 76GHz between G8AGN and G0EWN and tests at optical frequencies / nanowaves between the above and G0RPH out in Lincolnshire.

The most recent test on 76GHz was just to check modifications made to both sets of equipment...G8AGN tweaked his system to squeeze a little more out of his transverter, whilst the G0EWN system, originally built by G3PYB, has now been completely rebuilt. This has included the use of a directly programmed Elcom 1201 synthesiser, where the frequency is set directly via an Arduino. The IF is now 432MHz with normal tuning, low side injection of LO.

At least one other operator has started construction of a 134GHz system and we are keen for others to join in on all frequencies above 24GHz, including nanowaves. Please get in touch if interested.

Regarding the high bands, i.e. above 24GHz, we are aware a number of people have equipment gathering dust, or parts / diodes/ pcb's / dishes et.c which have been unused for years. If this is the case please consider recycling them by making them available. Again we would like to hear from you.

Activity at nm wavelengths

From Gordon G0EWN

On Nanowaves, equipment has been dusted off and a test over a 65km path made to check operation. The path was very easy, despite so conditions and G0RPH was able to turn down the current supplying his red LED to just a few hundred milliamps but his signal still remained '59'. Other tests are planned shortly on Infra-Red and Ultra Violet (850nm and 400nm); on UV PMT's are the most sensitive RX's as PIN photo diodes have poor efficiency at this end of the spectrum.

From Barry G8AGN

After an almost 3 year enforced absence from nanowaves due to family health issues, the "old firm" of G8AGN, G0EWN and G0RPH are now back in business.

On the evening of the 16th of September we had an easy red light QSO over the 65km path between High Bradfield, near Sheffield (G8AGN/P and G0EWN/P), and Manton on the Lincs Wolds (G0RPH/P). All stations were using Phlattlight LEDS and A4 Fresnel lenses on transmit and PIN diode detectors with A4 lenses on receive.

The red lights were very easy to see with the naked eye, even though visibility was not optimum due to street lights at the Sheffield end and some haze/mist. Signals both ways were 5/9+ on speech.

We plan to do more tests over the coming winter months on both red light and UV/IR.

We hope that others will dust off their gear and become active again.

From Richard GØRPH (Source: UKNanowaves)

I am pleased to note that Frank Doerenberg (F/N4SPP) has included a mention of our optical test in Hellscreiber communication in the "amateur radio" section of his excellent web pages about that mode: https://www.nonstopsystems.com/radio/hellschreiber-function-operation.htm#top-of-page

… and finally

The deadline for activity news for the next edition of Scatterpoint is Tuesday 1st November.

RSGB Convention News

Congratulations to UKµG members:

- **Dave Powis G4HUP**, winner of the Innovation category of the Convention Construction Competition, sponsored by @HamRadioUK.
- **Sam Jewell G4DDK**, overall winner of the Convention Construction Competition, sponsored by @HamRadioUK

Pictures from the RSGB Convention (organised by Graham Murchie G4FSG) follow.

Bryan G8DKK (right) explaining path profiles

The UK Microwave Group stand

Photos by Murray Niman G6JYB

UKµG Microwave Contest Calendar 2016

Dates	Time UTC	Contest name	Certificates
13 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz	F, P,L

Key:		
	F	Fixed / home station
	P	Portable
	L	Low-power (<10W on 1.3-3.4GHz, <1W on 5.7/10GHz)

Contest results are also published online – please follow the link from the UKuG Contests page at:

www.microwavers.org/?contesting.htm

73
John Quarmby G3XDY

Microwave activity days in France. Journeés d'Activité

October WE 29 & 30

73 Jean Paul F5AYE

Events calendar

2016

Sept 30–Oct 1	National Hamfest	www.nationalhamfest.org.uk/
Oct 3 – 7	European Microwave Week, London	www.eumweek.com/
Oct 7 – 9	RSGB Convention	rsgb.org/convention/
Oct 13–15	Microwave Update, Saint Louis, Missouri	www.microwaveupdate.org/
Nov 12	Scottish Round Table	www.gmroundtable.org.uk/

2017

Jan 14	Heelweg, Westendorp NL	www.pamicrowaves.nl/
Feb 11	Tagung Dorsten	www.ghz-tagung.de/
Apr 8	CJ-2017, Seigy	cj.ref-union.org/
Apr 8–9	**Martlesham Microwave Round Table & UK*µ*G AGM**	http://mmrt.homedns.org
Apr 22	RSGB AGM	http://rsgb.org/agm
May 19–21	Hamvention, Dayton	www.hamvention.org/
July 14 – 16	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Sept 8 – 10	62.UKW Tagung Weinheim	http://www.ukw-tagung.de/
Oct 6 – 8	RSGB Convention	rsgb.org/convention/
Oct 8 – 13	European Microwave Week, Nurembourg	www.eumweek.com/

2018

June 22–24	Ham Radio, Friedrichshafen	http://www.hamradio-friedrichshafen.de/
August 16–19	EME2018, NL	
Sept 23–28	European Microwave Week, Madrid	http://www.eumweek.com/

NB Some of the 2017/18 event links may not be working yet.