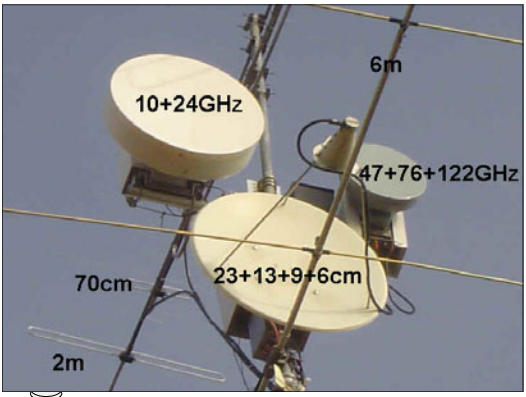
An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

Published by the UK Microwave Group

2011 FEBRUARY/MARCH



NEW 24GHz TROPO WORLD RECORD 579km

A new world record has been set by DL7QY and F6DKW on 7th February, 2011. The CW signals were 529 both ways during this historic contact. Our congratulations to Claus and Maurice.

Full details in the Activity News - see p.20

The picture shows the DL7QY antennas.

In this issue ...

Latest News ...

- **New world 24GHz record France-Germany**
- **VK-ZL 13cm first across the Tasman Sea**
- **W1GHZ to attend Martlesham RT in April**

MANY THANKS TO ALL OUR CONTRIBUTORS THIS MONTH ... WITHOUT YOU THERE WOULD BE NO SCATTERPOINT !

UK Microwave Group Contact Information

Chairman: **G4BAO** **Dr. John C. Worsnop** **Email:** chairman@microwavers.org **Located:** Cambridgeshire (JO02CG) **Address:** 20 Lode Avenue, Waterbeach, Cambs, CB25 9PX **Home Tel:** ++44 (0)1223 862480	**General Secretary:** **G8BHC** **Martin Richmond-Hardy** **Email:** secretary@microwavers.org **Located:** Suffolk (JO02PA) **Address:** 45 Burnt House Lane Kirton, IPSWICH, Suffolk, IP10 0PZ **Home Tel:** ++44 (0)1394 448213	**Membership Secretary: G8DKK** **Bryan Harber** **Email:** membership@microwavers.org **Located:** Hertfordshire (IO91VX) **Address:** 45 Brandles Road Letchworth Hertfordshire, SG6 2JA **Home Tel: n/a**	**Treasurer:** **G4FSG** **Graham Murchie** **Email:** treasurer@microwavers.org **Located:** Suffolk (JO02) **Address**: 42 Catherine Road, Woodbridge, Suffolk, IP12 4JP **Home Tel:** ++44 (0)7860 356775
Scatterpoint General Editor: G3PHO, **Peter Day** **Email:** editor@microwavers.org **Located:** S.Yorkshire (IO93GJ) **Address:** 146 Springvale Road, Sheffield, South Yorkshire, S6 3NU, **Home Tel:** (after 6pm) ++44 (0)114 2816701	**Scatterpoint Activity News Editor: G8APZ** **Robin Lucas** **Email:** scatterpoint @microwavers.org **Located:** Essex (JO01DO) **Address:** 84 Woodman Road Brentwood Essex, CM14 5AZ **Home Tel:** ++44 (0)1277 211126	**Contest & Awards Manager: G3XDY** **John Quarmby** **Email:** g3xdy@btinternet.com **Located:** Suffolk (JO02OB) **Address:** 12 Chestnut Close, Rushmere St. Andrew, Ipswich, Suffolk, IP5 1ED **Home Tel:** ++44 (0)1473 717 830	**RSGB Microwave Manager: G6JYB** **Murray Niman** **Email:** g6jyb@microwavers.org **Located:** Essex (JO01) **Address:** 55 Harrow Way Great Baddow Chelmsford Essex, CM2 7AU **Home Tel:** ++44 (0)1245 474969

From the Editor's Desk

Hello again everyone ....

Some remarkable contacts have taken place in the West European region in recent weeks, including a superb new 24GHz world record. You can read all about it in Robin's columns at the back end of this edition of Scatterpoint. This is real "scoop" for our newsletter!

You will only be reading this edition now because either you are still receiving the paper edition of Scatterpoint (which ceases with the May 2011 issue) or because you have joined the Yahoo Scatterpoint download Group or you're on the short and restricted list of folk who are having problems with Yahoo and are getting an emailed newsletter for the time being. If you know of other members who are not receiving Scatterpoint it's because they have not read the past few month's of pleading by this editor to transfer to Yahoo! You tell 'em!

Don't forget also that the Martlesham Round Table is now to held in April... details can be found elsewhere in this issue.

Your scribe is now busy making the final arrangements for his DXpedition to the British Virgin Islands which takes place from March 7-21. I'll be looking our for any microwavers, who also do HF, on all bands 80-10m, especially during the weekend of the 12-13 March when I will be operating CW as VP2V/G3PHO in the RSGB's Commonwealth Contest. I'd appreciate your points! A good time to work me would be around 2300-0300 on 80 and maybe 40m cw and around midday on 20, 15 and hopefully 10 metres. Look around .020 on each band. **73 from Peter G3PHO**

News, views and articles for this newsletter are always welcome. Please send them to:-

editor@microwavers.org

preferably by email, or to the editor's address shown above. **The CLOSING date is the FIRST day of the month** if you want your material to be published in the next issue.

UK MICROWAVE GROUP EXTRAORDINARY GENERAL MEETING SUNDAY 17th APRIL 2011

Notice is hereby given that an Extraordinary General Meeting of the UK Microwave Group will be held at 9:45am on Sunday, 17 April 2011 as part of the Martlesham Microwave Round Table event which takes place over that weekend.

The motion is:
"That the Annual General Meeting be deferred to the April 2012 meeting of the Martlesham Microwave Round Table and occur annually thereafter."

Reason:
MMRT has moved from its November slot to April. Although this year's MMRT is only a 1-day event, being close to the recent November 2010 MMRT, it will return to its 2-day format in 2012 incorporating the AGM.

73 from Martin Richmond-Hardy, G8BHC, Secretary, UK Microwave Group

CAN YOU .....

put pen to paper (or finger to keyboard) and write an article or other item for Scatterpoint? The success of this newsletter to date is entirely due to that solid core of experimenters and operators who regularly send items for publication. However, the supply is not endless and we feel sure there are many others out there who could share some project with us or write of their microwave experiences!

Articles do not have to be technical! There's even room for a cartoonist to poke fun at his or her fellow microwaves in a light hearted series of sketches, so is there a budding artist out there? Please send any items to :

editor@microwavers.org

Articles should be in plain text, Word.doc or PDF. Diagrams/photos should be sent as separate files as well as being embedded in the article. Even paper submissions are acceptable in emergencies!

UK MICROWAVE GROUP SUBSCRIPTION INFORMATION

The following subscription rates now apply. **Please make sure that you pay the correct amount** 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!

Until May 2011, your personal renewal date will be shown at the foot of your address label if you receive Scatterpoint in paper format.

Scatterpoint distribution by email ceased with the January 2011 mailing, and is now distributed electronically as a .pdf download by means of Yahoo! Groups.

If you are a former email only subscriber, and you have forgotten your renewal date, please ask the membership secretary for a reminder. From now 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 (the editor suggests having it tattooed on your forearm!).

Whichever payment method you use, please remember to include your **name** and **callsign** with your Paypal or cheque details.

Payment can be made from the UKuG website membership page

www.microwavers.org
(Paypal, or any credit card)
or
a cheque (drawn in £ on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary
or
(as a last resort, by cash to the treasurer!)

The UKuG membership rate for 2011 is:

UK	**£6.00**
US	**$12.00**
Europe	**€10.00**

For this you receive Scatterpoint as a .pdf file.

Low cost 14.4 MHz TCXOs from Pyrojoseph (and their transmit use at 10GHz)

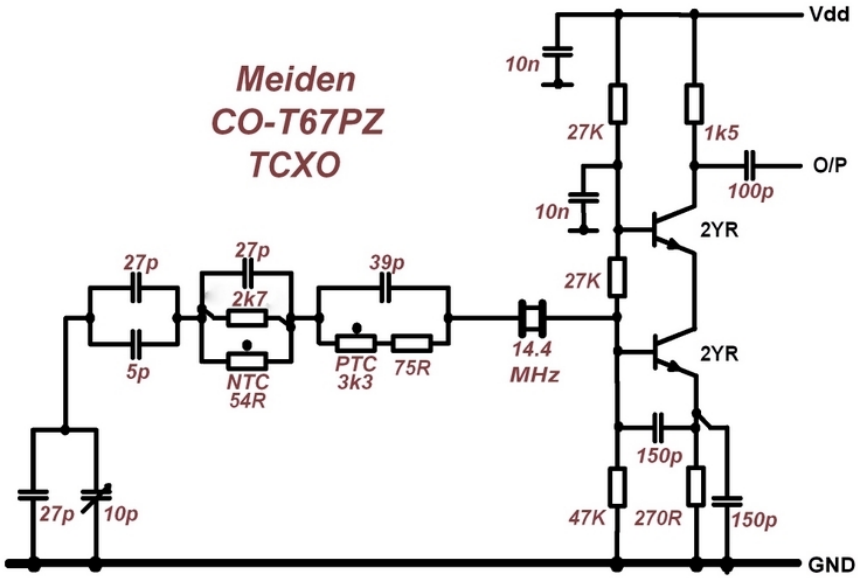
… by Bernie Wright, G4HJW

For a couple of years now Pyrojoseph has been selling 14.4 MHz TCXOs on eBay at a very modest price. He must have quite a few because he is also selling them in lots of 400 as well as in 10 and 50 off batches.

I had used an early buy of these Meiden units to multiply up to 10GHz and was amazed at the signal purity and temperature stability and thought others might be interested in a few notes on the follow-up work.

The initial performance encouraged me to investigate further and I bought a couple of 50 off batches. Not all of these were free from random frequency jumps – in fact, as a rough guess, about 75% suffered from this effect but, at half a dollar each, this still represents excellent value for money. Interestingly, the good units tended to be grouped together, having been supplied in the manufacturers original packing. To test these 100 leaded TCXOs, sockets were fitted to the test multiplier pcb and it was found that when multiplied up to 10 GHz, there was no obvious frequency shift caused by the sockets. Even adding a second direct ground connection to the TCXO can only made a few Hz difference.

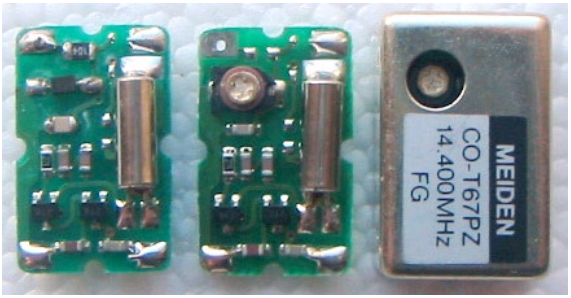
The TCXO circuit was pencilled out and one unit disassembled so that unmarked components could be measured. The thermistor resistance values shown were measured at a single temperature of about 20 C. Vdd for these TCXOs is nominally 5v.

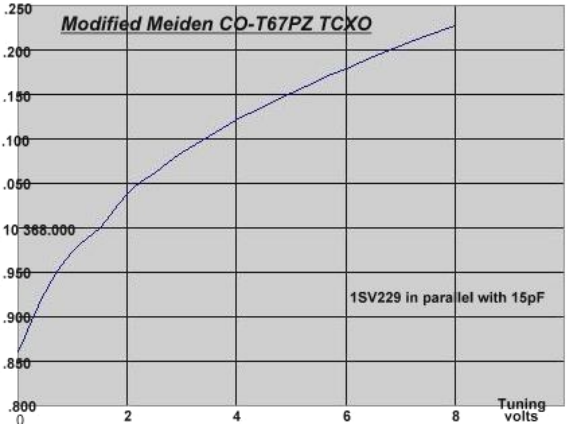


Unfortunately, although the pcb is tracked to take an electrical tuning input, the relevant components are not fitted on this particular model.

A single solder fillet is used to keep the pcb fixed to the can, so removal of the tcxo board is easy.

So, having separated out the units that were free from random frequency jumps, the trimmer and its companion shunt C were removed. In their place, a 1SV229 varicap was fitted, with a 100K series resistor connected to the previously unfitted tuning voltage pin. Finally, a shunt capacitor across the varicap was used to centralise the tuning range.





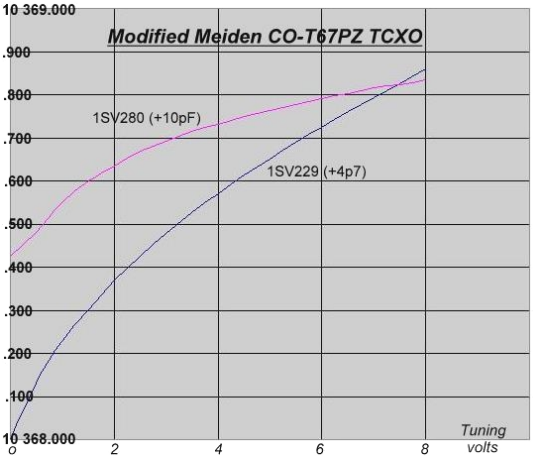
Multiplying by 720 produces 10 368.000 MHz, so increasing this to cover the calling channel at .100 requires a nominal 1.4 KHz HF shift at 14.4 MHz – the graph opposite shows the pulling range obtained when the 1SV229 varicap was shunted with a 15pF capacitor.

My interest being mainly beacon band operation, the next question was 'would it pull to 10 368.750 MHz ' and, if so, would it remain stable there?. Well it certainly was on the first unit to be modified, so some time was spent modifying other TCXOs to see what the repeatability would be like.

To centralise the tuning range around the beacon band of interest, a 4p7 capacitor was added in shunt with the varicap diode and this resulted in the response shown on the right.

Given the reduced shunt capacitance, the coverage is somewhat greater than in the first example, perhaps too much so, so another run was made using the lower capacitance swing 1SV280 varicap, which required 10pF shunt capacitance to again centralise the coverage and this is also shown on the graph.

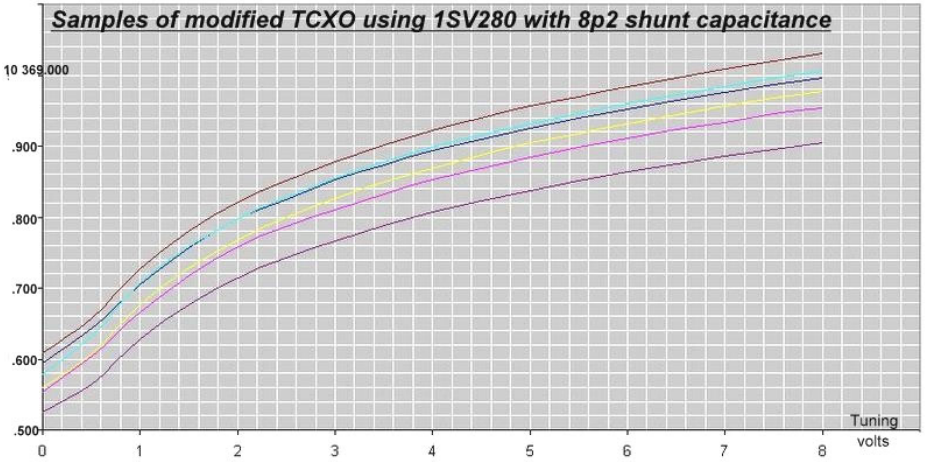
Both varicaps are available from a UK eBay seller.



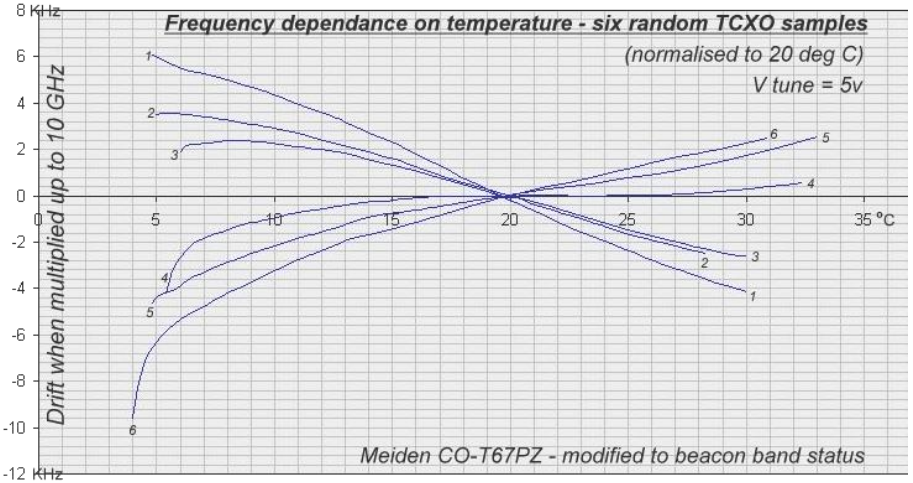
Following an intermittent fault in the G0GHK/B 10GHz transmitter up at Sandtoft, a temporary replacement was quickly put together using one of the original modified 14.4 MHz Meiden TCXOs. It runs unlocked, and has remained within a couple of

kHz or so of the beacon's nominal frequency. Incidentally, this transmitter runs about 6dB lower power than the original, which explains most of the recent reports of poor reception at distance.

For general beacon band use the frequency span is best moved up a little, so decreasing the 10pF shunt capacitor to 8p2 was done on all remaining units. Six more units were modified to see what the repeatability would be like:



So far so good but how about frequency stability over a reasonable degree temperature change? – is the temporary G0GHK/B beacon performance just a one off? A further six TCXOs were modified and measured over the temperature range 4 – 30 degrees C.



It is interesting to note that, although one sample was quite temperature insensitive over a wide range, centred at about 22 deg C, the rest had quite constant rates of change, though the rate-change figure between samples was quite wide, with some being ntc and some ptc. Quick assessments of other modified units revealed that generally the response is ntc.

The ageing characteristic has been interesting. In all cases there has been an initial HF drift, occurring over the first few days of continuous operation, usually of the order of 5 – 6 kHz at 10GHz, after which the units settle down to a shift of perhaps a kHz or so over the first year of operation for the few that have been left running that long.

So summarising, the modified TCXOs look quite promising, and quite repeatable results can be expected even when moving the frequency up into the beacon band at 10GHz. Ovening the tcxo offers an alternative to phase locking or frequency conditioning, and it should be interesting to obtain more ageing information.

73 from Bernie Wright, G4HJW

The North Eastern Lights

The two photos here show the portable red lightwave station being assembled by well known microwaver Rob, M0DTS. The whole thing looks very rugged and stable being mounted inside a van. It looks very reminiscent of GW3PPF's 10GHz wideband station in the 1970s when Phil had a 1.2 metre diameter dish mounted in A VW Kombi (campervan) door aperture! Rotating the antenna meant driving the van around in a circle!

M0DTS is part of a group of keen and active lightwavers in the Newcastle to County Durham region. They have already achieved some good distances over 60km using both straight transmitters (3 watt Luxeons) and also an interesting transverter system which downconverts from 80 metres! The large, plastic, fresnel lenses are available for around £1 at stationary shops around the UK.

A technical article by G8CYW on all this is is due to appear in RSGB Radcom very soon, while a talk by Barry, G8AGN, is on the April Martlesham programme.

The Bodger's Guide to ...
A 40 Watt power amplifier for 2320MHz using the MRF19085 in a G4BAO 1296MHz board

By John G4BAO

Introduction

This article describes how I made a useful 13cm Power Amplifier using internally matched 1900MHz devices and a G4BAO 1296MHz PA PCB (as described in June 2009 RadCom). (Ref. 1)

With the need to improve efficiency of Cellular Phone base stations, there has recently been a quantity of PCS1900 Amplifiers around the surplus market. A number of articles such as that by WA2AUU (Reference 2) have been published on modifying these amplifiers.

The amplifiers often contain the MRF19XXX series of 1900MHz internally matched devices, normally a non- starter for other frequency ranges due to the internal matching. That said, I love a challenge and was encouraged by WA2AUU's results with the MRF19125 and my own 'bodging' of some MRF19100 modules from a Lucent PKLAM amplifier. We both got reasonable gains and output power albeit at lower efficiency.

Let the Bodging begin!:

I was therefore encouraged to "do something" with the eight, ex-equipment MRF19085 devices I'd been given a while back and, having more 1296 boards than 1296 devices, I decided to try and re-engineer a few boards for 13cm.

With a bit of Smith charting and creative swiping from the Freescale application notes for 1900MHz, I managed to get a reasonable idea of the matching networks required. A read of reference 3 will give you some idea what is involved in this. As a rule, most of these SHF LDMOS designs use a "Fat line" (4-6 ohms) of slightly longer than a quarter wavelength on the input and a shorter one on the output to transform the very low impedances of the device closer to 50 ohms. Trimming can then be done by adjusting the length and a small capacitor to ground at the 50 ohm end.

The G4BAO 1296MHz board has a 0.29 wavelength line (at 2320MHz) on the input and a similar length on the output. After much tweaking of the amplifier I surprisingly ended up with a good match with the input line unaltered and maximum output by widening and shortening the output line.

Preparing the blank PCB:

Track modifications

The PCB requires a larger cut-out for the device, some removal of copper, (best carried out with a VERY sharp scalpel) and the addition of tuning tabs. In **Figure 1,** on the opposite page, track removal is shown in black, added copper tape in orange and the cut out is shown in white.

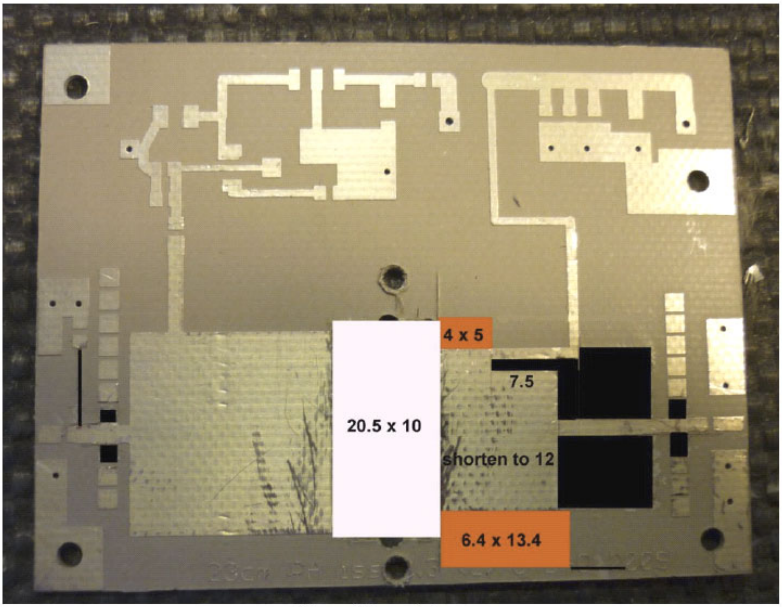


Figure 1 board changes

Attaching the device

As the MRF19085 is a flanged device without bolt holes, it needs to be clamped to the heatsink and the flange electrically connected to the PCB ground plane. This is achieved by soldering a piece of thin copper tape to the ground plane, under the device as in Figure 2. This also acts as a heat transfer mechanism between the device and the heatsink, so no heatsink compound is needed.

If you use adhesive copper tape, make sure that you remove all of the adhesive from under the device with a suitable solvent.

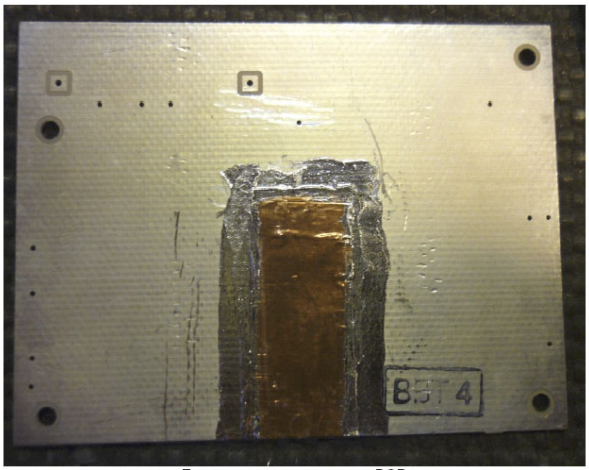


Figure 2 copper tape under PCB

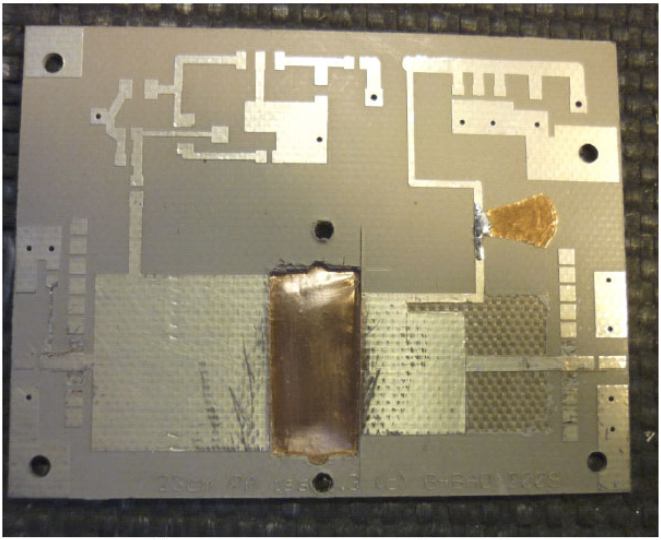


Figure 3 copper tape and added "capacitor"

Circuit changes

The final amplifier circuit differs from the 1296MHz board only in that all the tuning tabs are removed, the output capacitor is changed to a 10pF ATC700, the input capacitor to a 47pF ATC600 and a 0.9pg Gigatrim is placed on the input just after the input capacitor. A higher value of gate resistor (1.8K) was used.

Device clamping

Figure 4 shows the assembled amplifier with the home made device clamp manufactured from thick walled fibreglass tube. This construction has the advantage that it is “springy” when tightened down, but take care not the over-tighten as you will crush the tube. Due to the temperature over the device, the clamp must be a either fibreglass or (ideally) a thermosetting plastic such as PTFE.

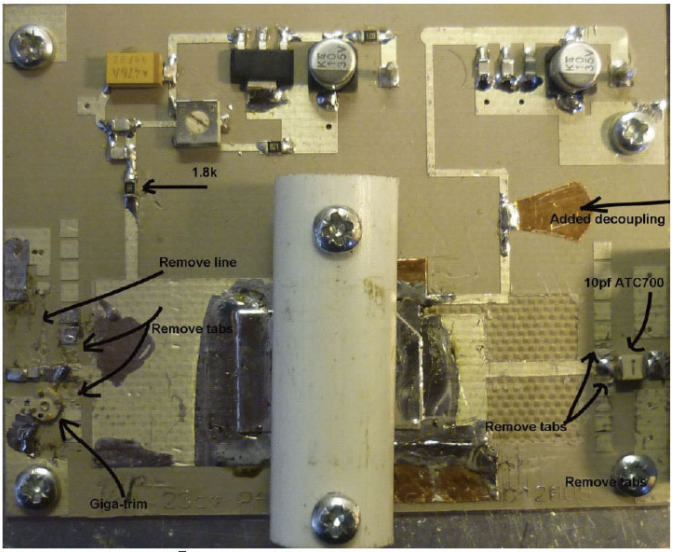


Figure 4 component changes and device clamp

Representative test results

These figures are measured on Amateur test equipment which does not have a current calibration certificate. They should be treated as a guideline only and no performance guarantees are given or implied. Quiescent drain current Idq was set to 1 ampere for all the tests.

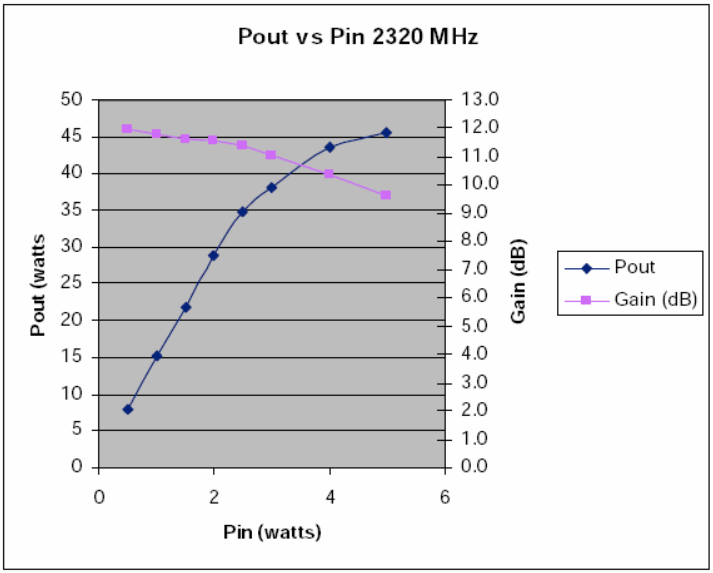


Figure 5 Power out vs Power in and gain

Gain varies between boards but you can expect between 10 and 12dB depending on how carefully you build it.

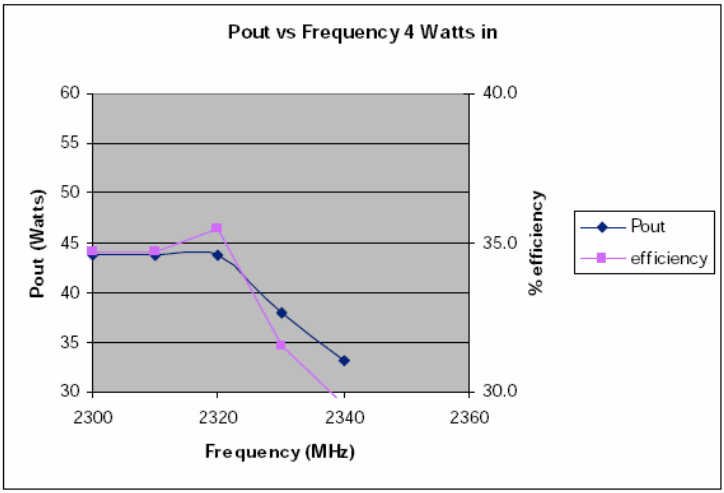


Figure 6 Power out vs frequency and efficiency

Efficiency is quite poor but acceptable for Amateur use, the device drawing up to 5 Amps at 28 volts at full power.

Input tuning is quite sharp and, when tuned to 2320MHz, power drops off quickly above this frequency. I have not tried to optimise the design for 2400MHz

Heat sinking requirements

As the efficiency is only around 35- 45% (see test results) significant heat sinking and a fan is required to keep the device cool. I tested the amplifier on a 100x 200x 40(fins) mm heatsink and it needed forced air cooling with a 120mm fan underneath the fins.

References

1. Dr J. C. Worsnop G4BAO - "A 45 watt Amplifier for 23cms" - Radcom June 2009

http://homepage.ntlworld.com/john.g4bao/Files/a45w_amplifier_for_23cm.pdf

2. R. L. Frey – WA2AAU "70 Watts Cheap on 2304 MHz Modifying a 1900 MHz PCS Amplifier for 2304 MHz" - Eastern VHF/UHF Conference April 22, 2006
http://www.mgef.org/amps/presentation/AMLpa6_C.pdf

3. Dr J. C. Worsnop G4BAO – "The Bodger's guide to LDMOS Power Amplifiers"- UK Microwave Group RAL round Table 2009
http://homepage.ntlworld.com/john.g4bao/Files/G4BAORAL09.pdf

Online Microwave Portal with Contest Log Entry

Thanks to some excellent work by Pete, G4CLA, of the RSGBCC, we now have a near to finished version of the **UKuG Contest Portal.**

The link below should take you to the contest calendar and you can navigate from there. Please try out the functionality, e.g upload a test log or create a log online and let me know of any quirks or problems.

http://microwave.rsgbcc.org/cgi-bin/readcal.pl

The link to the UKuG Home Page needs some more work, as its not very obvious how to get back into the contest portal again.

Please forward any comments to me and I will collate any bug reports.

73 John G3XDY UKuG Contest manager **<g3xdy@btinternet.com>**

Editor's note...

A screen grab of the first page of the new portal is shown opposite. When you get to this, just click on your favourite contest and you'll be taken to a page showing the dates and rules in detail plus navigation bars that include an online log entry facility. Anyone who has entered recent RSGB Contests such as NFD, SSB Field Day or the RSGB 80M Club Contests will feel at home here as the system is almost identical. Eventually John hopes to have contest checking software that will enable rapid log checking and your results being posted on line within a few days of the deadline! No need to wait for your Scatterpoint! Contesters will certainly applaud John for this excellent facility.

MICROWAVE CONTESTS

Home | Claimed Scores | Logs Received | Calendar | Upload Log | Create Log

Microwave Contest Calendar 2011

This calendar is available as an Icalendar file which can be imported into Outlook ICAL

Also as a Google Calendar Google Calendar

* provisional - initial version

Date (2011)	Time UTC	Contest Name	Sections	Notes/Special Rules
6 Mar.	1000-1600	Low Band 1.3GHz 2.3GHz 3.4GHz	F P	Low Band Contests (S1)
10 Apr.	1000-1600	Low Band 1.3GHz 2.3GHz 3.4GHz	F P	Low Band Contests (S1)
29 May.	1000-1600	5.7GHz Cumulatives #1	F P	5.7GHz Cumulatives (S2)
29 May.	1000-1600	24GHz Cumulatives #1	F P	24GHz Cumulatives (S4)
29 May.	1000-1600	10GHz Cumulatives #1	F P	10GHz Cumulatives (S3)
5 Jun.	1000-1600	Low Band 1.3GHz 2.3GHz 3.4GHz	F P	Low Band Contests (S1)
26 Jun.	1000-1600	5.7GHz Cumulatives #2	F P	5.7GHz Cumulatives (S2)
26 Jun.	1000-1600	24GHz Cumulatives #2	F P	24GHz Cumulatives (S4)
26 Jun.	1000-1600	10GHz Cumulatives #2	F P	10GHz Cumulatives (S3)
17 Jul.	0900-1700	76GHz	All	Trophy Contest (S6)
17 Jul.	0900-1700	24GHz Trophy	All	Trophy Contest (S6)
17 Jul.	0900-1700	47GHz	All	Trophy Contest (S6)
31 Jul.	1000-1600	5.7GHz Cumulatives #3	F P	5.7GHz Cumulatives (S2)
31 Jul.	1000-1600	24GHz Cumulatives #3	F P	24GHz Cumulatives (S4)
31 Jul.	1000-1600	10GHz Cumulatives #3	F P	10GHz Cumulatives (S3)
7 Aug.	0900-1700	Microwave Field Day	Open Restricted	Microwave Field Day (S5)
21 Aug.	1000-1600	5.7GHz Cumulatives #4	F P	5.7GHz Cumulatives (S2)
21 Aug.	1000-1600	24GHz Cumulatives #4	F P	24GHz Cumulatives (S4)
21 Aug.	1000-1600	10GHz Cumulatives #4	F P	10GHz Cumulatives (S3)
25 Sep.	1000-1600	5.7GHz Cumulatives #5	F P	5.7GHz Cumulatives (S2)
25 Sep.	1000-1600	24GHz Cumulatives #5	F P	24GHz Cumulatives (S4)
25 Sep.	1000-1600	10GHz Cumulatives #5	F P	10GHz Cumulatives (S3)
27 Nov.	1000-1600	Low Band 1.3GHz 2.3GHz 3.4GHz	F P	Low Band Contests (S1)

Key to Special Rules	
S1	Low Band Contests
S2	5.7GHz Cumulatives
S3	10GHz Cumulatives
S4	24GHz Cumulatives
S5	Microwave Field Day
S6	Trophy Contest

Key to Sections	
All	All
F	Fixed Home Station
L	Low Power
Open	Open
P	Portable
R	Amateur radio only talkback
Restricted	Restricted

Key to multipliers

MICROWAVE DISTANCE RECORDS

Until very recently, the main source of information for these was at G3PHO's website. Due to other commitments, Peter has not been able to maintain his website for the past 3 years and the list is now out of date. The page has been transferred to the UKuG website and has been updated with the latest records. Thanks to Murray, G6JYB, the transfer is now complete. Peter will be revising his own website later this year but it will be stripped of all news items and records data, etc, with just the technical pages remaining. To see the latest records list please visit:

http://www.microwavers.org/records.htm

The new records@microwavers.org email address is currently set to forward to the Scatterpoint editors, John G3XDY and G6JYB. It is one of a number of entries on the Operating pages (under Awards, trophies, firsts, squares, etc).

UKuG MICROWAVE FIELD DAY

7 AUGUST 2011

23cm and 10GHz

The correct times for this new event are **0900—1700GMT** and not as published in last month's contest information. This contest is aimed at portable groups but fixed stations are strongly urged to come on the microwave bands to work the groups. Who knows, there maybe some rare squares activated!

A USEFUL DOWNLOAD
(Information from Kent Britain WA5VJB)
Here's a very good field strength program and you can use it to back into Antenna Factors.

Subject: Application Notes (Rohde & Schwarz International - Service & Support - Downloads)

http://www2.rohde-schwarz.com/en/service_and_support/Downloads/

PATHLOSS SPREADSHEET

The spreadsheet available at **http://www.g4jnt.com/ReflectedPathLoss.xls** allows two stations to get an estimate of signal strengths and S/N ratio when reflecting off a common structure that is Line Of Sight to both such as aircraft scatter or large structures on adjacent hills. It implements standard radar equations to determine the received signal intercepted by a structure of known area, then assumes this to be re-scattered uniformly.

Input the values shown in blue specifying Tx power, distances, cross sectional of the scatterer and receiver data - all the other spreadsheet cells are protected - to see how reflected signals can be made to work for you. Andy is not sure of the cross sectional area of aircraft for their scatter calculations but when used for signals from GB3SCX reflected off a cylindrical tank and an ISO cabin on Cheesefoot head 16km away, it gives remarkably accurate results compared with actual observation.

LIGHTWAVE ACTIVITY INCREASES ....

Phil G8MLA, with Jake G1YFF in attendance, and G4HJW had their first optical QSO on a Saturday evening in mid January over a very modest 5.5km path. This was preparation for a 20km version between Fulbourn and Haddenham which will be attempted at some point soon. Although the signal from Phil was pretty much blinding at times, the group gained a fair amount from the experience. It was quite windy, and keeping the link in alignment at either end was certainly an issue. Also, a good solid talkback path, with audio where you want it (!), ie next to the tripod when positioning, is an obvious 'must'.

The 99p A4 size fresnel lenses from 'The Store' are remarkably good considering the price (though Phil was using a credit card size item via ebay). It's estimated the team had at least 20dB in hand, so the 20km path should be easy enough. Bernie comments, "If we were ambitious enough, we could try a 87 km path to equal Gordon and Barry's UK record success of the previous weekend, though we would need higher hills than we have in Cambrideshire. BTW, I make that requirement about 25dB up on last night's levels. Given that the 1W Tx red led has a wide 120 degree coverage, only about a tenth of the light makes it to the lens, so there's plenty of room for improvement.

(Our thanks to G4HJW for the notes ... editor)

G4JNT TRANSVERTER INTERFACE DOCUMENTATION

After a request for information, I've now placed details of the JNT001 transverter interface on my website:
http://www.g4jnt.com/JNT001.pdf
There's no PCB layout .... this got lost in the annals of time/obsolete graphics software, etc, so, any potential constructors, you're on your own !

The module interfaces an IC202 or FT290 transceiver to transverter modules with low level drive requirements, handles Tx/Rx switching with controlled 12V supplies and provides a 21V supply for coax relays

It's a bit 'long in the tooth' now since it originally appeared in 1992, but modules are turning up second hand and, having just cleared out the loft recently, I think I still have some of the PIN diodes that were used in it.

Andy G4JNT / G8IMR

Video and Pictures HEELWEG 2011

From: "Eene de Weerd" <pa3ceg@hetnet.nl>
Date: Wed, 19 Jan

Hello Folks,

Again, the 2011 HEELWEG MEETING was a great success. More than 200 visitors, mostly from PA, ON and DL but also from the UK, F, SP and SM came by. A wide range measuring equipment was available and the operators had a lot work to do during the whole day.

A new video impression is available at **www.pamicrowaves.nl**

Interested in microwave? ... then take look at our forum **http://www.pamicrowaves.nl/website/forum/index.php**

Sorry, most of the topics are in Dutch but Google translation will work in most cases.

73 from PA0BAT, PA3CEG, PA7JB and PE1FOT

MARTLESHAM MICROWAVE ROUND TABLE Sunday 17 April 2011

This is the UK's premier amateur microwave radio event of the year. The date has now been moved to April for the foreseeable future. Since there will most likely not be another edition of Scatterpoint out before the event, please go to the special website site set up at:

http://mmrt.homedns.org/

At the time of writing this column the website is open for you to register and it is important you do so as no one can get past the security gate unless they are on the list held by the gate staff.

The event this year a one day affair but there will be a dinner on the Saturday night for those who wish to make a weekend of it. You can book the dinner and overnight accommodation using the information on the website.

The full programme, including six talks, is also shown on the website.

This event will also offer a chance to meet **Paul Wade, W1GHZ** who is coming along to give one of his excellent lectures. In addition, we will also have lectures by other overseas amateurs ... namely DL1MEA and WW2R.

By Robin Lucas, G8APZ

CONTEST and ACTIVITY REMINDER

February

22-Feb 2000 - 2200 2.3GHz+ Activity Contest
Arranged by VHFCC (RSGB Contest)

March

6-Mar 1000 - 1600 Low band 1.3/2.3/3.4GHz
First 4 hours coincide with IARU event
12/13-Mar 10GHz EME
(Arranged by DUBUS)
15-Mar 2000 - 2230 1.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
22-Mar 2000 - 2200 2.3GHz+ Activity Contest
Arranged by VHFCC (RSGB Contest)

April

9/10-Apr 5.7GHz EME
(Arranged by DUBUS)
10-Apr 1000 - 1600 Low band 1.3/2.3/3.4GHz
19-Apr 1900 - 2130 1.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
26-Apr 1900 - 2100 2.3GHz+ Activity Contest
Arranged by VHFCC (RSGB Contest)

May

30-Apr/1-May 3.4GHz EME
(Arranged by DUBUS)
7-May 1400 - 2200 10GHz Trophy
Arranged by VHFCC (RSGB Contest)
7/8-May 1400 -1400 432MHz & up
Arranged by VHFCC (RSGB Contest)

FRENCH JOURNEES d'ACTIVITE (JA)

The dates for the French activity contests are not yet available, but we will have them next time.

23CM DXPEDITION TO JO34

Thorsten, **DG7TG**, recently asked if JO34 is wanted on tropo on the **23cm** band. I told him that I'm very sure it is. There will be plenty of UK stations looking to make contact with the only land in this "watery" square, the island of Heligoland (it is spelt "Helgoland" in German).

Heligoland is located 46km off the coast of Germany. It consists of two islands, the main one being Hauptinsel with a land area of just one square km.

Thorsten will be with the **DR3M** group during the May IARU contest on 7th and 8th May, 2011 and the group will be using 400w on **23cm** into a pair of 48ele antennas.

With an excellent clear sea take off to the UK, many stations should be able to get this one in the log. Older readers may remember Heligoland as a sea area in the BBC shipping forecast which later became "German Bight".

21st SEIGY MEETING - 2011

The 21st annual microwave meeting at Seigy, in the Loire valley (CJ2011) takes place over the weekend of Saturday 9th April.

There is normally a dinner on the Friday evening and again after the main events on the Saturday but places are limited.

For further information, contact **F6ETI**. Philippe's email is f6eti@wanadoo.fr

JANUARY 23cm UKAC

The 18th Jan UKAC was "absolutely bristling with activity despite conditions being indifferent" according to Ray, **GM4CXM**.

Ray says that the new M5 multiplier ** [see next column] appears to have been very well received and, although some stations in the South East were not active this time, they were more than made up for by stations coming on from elsewhere.

Whilst aircraft scatter came in very useful to get IO91, IO92, JO22 and JO45 during the first hour, as flight numbers reduced, so did his long haul possibilities.

Activity from Scotland was the highest

he has seen so far, with at least twelve **GM** stations active from four locator squares. From IO78 square, Martin, **GM8IEM** was QRV for the whole duration, but Ray thinks he was unable to make any contacts, despite a number of QSO attempts.

Of Ray's 30 contacts, 10 were in **GM**, and as is fairly usual, seven of the stations were over 500km, with **P0EHG** (JO22) at 729km and **OZ1FF** (JO45) at 782km.

*** The new M5 Rule*
UK QTH Locator Multipliers. The multiplier is the sum of the number of different large locator squares (e.g. JO01,IO91 etc.) worked on that band. Only contacts with UK stations (G, GW, GM, GI, GD, GU, GJ) count for multipliers. Contest exchange is RST plus serial number and QTH Locator

Ray mentioned **GM8IEM** above. On 25th Jan, Martin, **GM8IEM** (IO78hf) worked **GM3SEK** (IO74sr) on **23cm** using aircraft scatter. It is believed to be Martin's first QSO on **23cm** from what is no doubt a very challenging location so far north.

Bob, **G8DTF** (Manchester, IO83sm) planned to be active on **13cm** and **3cm** in the UKAC. After fitting his new dish for **3cm** to the mast, he found it wouldn't point at the horizon, so there is still some work to be done before he gets **3cm** working.

Plans to get the **23cm** transverter at the masthead, to reduce the cable losses by 4dB also hit snags, when Bob discovered that the mechanical arrangements were inadequate for the weight of the transverter, and there were also "waterproofing issues", so he ended up with the transverter in the shack with 20m of FSJ4-50 feeding his 62 element homebrew yagi.

The first attempt set up via '**KST** was with David, **M0GHZ**, but this failed, and the problem was later traced to a rotator calibration error. A few relatively local contacts followed with **G4CBW** (IO83), **G8OHM** (IO92), **GW8ASD** (IO83), **G4MVU** (IO83) and **MW1FGQ** (IO83).

Then tuning around near the calling channel a number of other stations were heard, **G3VKV** (IO81), **G0MJW** (IO91) and then **G3DVV** (IO91). Ray **GM4CXM** was about S4-5 and a QSO attempt set up on '**KST**. After starting the QSO conditions appeared to decline rapidly and Ray's signal was gone, before the contact was complete.

Bob then heard David, **M0GHZ** working Tony, **G4CBW** so he tail ended and this time he made it. If Bob can get the **23cm** transverter up at the masthead, he'll probably make it with Ray next time.

ACTIVITY and BEACON REPORTS

From: **Dave, G4FRE, Malvern,**

Whilst over in Malvern for Christmas, I took the opportunity to put a 2' dish in the loft. It can have dual band feeds for **5GHz/10GHz** or **10GHz/24GHz**. [*Dave's dishes are aimed through a window, or roof window*].

Having managed to get to Malvern just in time to beat the arrival of the snow, and the subsequent closing of Heathrow, I was rewarded by the reception of some **24GHz** beacons on snow scatter.

On Dec 20th, I heard **GB3CAM** (again...but JT4 doesn't decode in Snow Scatter, then **GB3FNM** and later **GB3ZME** (QTF 060). **GB3MHX** was detectable on **10GHz** on the newly finished DEMI GPS locked transverter (using the SDRIQ as the K3 panadaptor). It is nice to put the rig on a known frequency.

On the UKAC worked **G8OHM** (**23cm**/**13cm**) and **G0MJW** (**23cm**). For the first time I heard **GM4CXM** on **23cm** but got no response to my calls

Continuing the **24GHz** beacon quest on Dec 30th, I went up the Malvern Hills (actually the car park of the "Kettle Sings" restaurant on the west side) and heard **GB3AMU** on a 20db horn. That makes it four **24GHz** beacons heard!

On Jan 2nd, I took a look for the "LF" signals The usual ones were there; **GB3ZME** and **GB3OHM** on **9cm**, **GB3ZME** and **GB3OHM** on **6cm**, **GB3LES** on **13cm**, **GB3CCX** (sounding very nice nowadays) and **GB3LEX** on **10GHz**.

This activity highlighted a problem with the DXC feed to www.beaconspot.eu which has since been identified and fixed.

I heard more **24GHz** beacons than worked stations on the UKAC, which says something!

I'm now back in Dallas (**WW2R**), where I am re-housing the **47GHz**/**122GHz** gear.

73, Dave, G4FRE

FIRST ZL TO VK ON 2.3GHz

On 27th January, Stephen, **ZL1TPH/p** worked Adrian, **VK4OX** (QG63kp) in Queensland on **13cm** tropo using SSB. The signals were a good 58 over an incredible distance of 2317km.

This QSO is thought to be a first on **2.4GHz** between **VK** and **ZL**. The path across the Tasman Sea had been open on 144MHz and **23cm** the previous day too. Stephen wrote:

" I had no logger internet access up at Moirs Hill (RF73hm) about 20km to the north of Auckland, but from home before I left to go portable, I placed my intention on the logger to attract the attention of the **VK4**s.

Moirs Hill is just north of my home QTH and is around 350m ASL. In the past I have worked Ross **VK2DVZ** and Mark **VK2AMS**, and heard **VK2ZT** on **23cm**.

I was slightly unsure of the path direction to **VK4** at the time of the **13cm** QSO since my station operation was out of the tailgate of my work station wagon. My station was modest on **2.4GHz**. A **VK5EME** transverter, with preamp, and a two watt PA driving an eight watt PA, into a pair of 75 Watt Spectrian power modules combined with couplers from **W6PQL**. Rather than take up my FT817 to use as an IF, I just used the Icom IC-202 which is permanently attached to this transverter. The antenna was a 1.2 m dish, attached to the tow ball mount, on the same mast as the 2m 8 element Yagi.

With Adrian first hearing me on **2.4GHz** it was rather weak. I marked the dish point with a marker pen, just in case I lost this reference bearing. My real concern - was my dish pointing in the correct direction.

Adrian put his keyer on **2.4GHz**, I could not hear it at first with RIT adjustment, but then I found it on a QSB peak, quickly grabbed the rim of the dish, which was next to me and gave it a swing. Towards the north the dish went and **VK4OX's** keyer was very LOUD. Moments like these are never forgotten.

Next was the wait, which seemed like a very long time, with his keyer finally off - I called on SSB. I never touched my original TX frequency, just used the RIT on the IC-202 as it happened so fast.

The weather that afternoon was extremely hot with no winds whatsoever. Looking back on the day, I really was not in the mood for loading gear in the work wagon to go up the hill. Two things spurred me along. I could see VK stations sitting on the logger with little if any **ZL**s active. Also I worked Brian, **ZL1AVZ** locally on 2m and he mentioned that the band was still in good shape. So loaded up the gear, forced myself and headed up to Moirs Hill once again. I'm glad I did." **Stephen, ZL1TPH**

The following day, Adrian, **VK4OX,** got into the shack at 19:00utc (5am local) and was surprised to hear the **ZL1VHF** beacon on 2m about 529. He then received an email from Brian, **ZL1AVZ**, saying he would be on from Muriwai, RF73fd, in about one hour. Over to Adrian:

"At 21:00utc, I worked **ZL1AVZ** on 2m at S6, and we were joined by John, **VK4JMC**. Brian set up his dish for **2403MHz** and between 2130utc to 2140utc we had quite a good 2 way SSB QSO on **2403.100**. The signals peaked at 53 but disappeared in the QSB troughs at times.

VK4JMC also worked **ZL1AVZ** on **2403.100** at approx 21:47utc. When we went back to 144MHz **ZL1AVZ** was only 55.

After these contacts were made, **ZL1AVZ** changed the feed on his dish to **1296MHz** and we made a weak but successful 2 way SSB QSO there at 22:14utc. Signals were better on **2.4GHz** than they were on **1.3GHz** but there was a gap of about 35 minutes between QSOs. The contact with **ZL1TPH/p is** 2317km and the contact with **ZL1AVZ** comes out at 2319km, so it is very close.

Having only 6 character grid squares for both **ZL1AVZ** and **ZL1TPH/p** QTHs, the distance calculations are not accurate enough. I need more accurate data to establish the correct distances and therefore who is the current **VK/ZL** record holder." **73, Adrian. VK4OX**

Congratulations to all involved in these superDX contacts on 13cm - next 6cm and 3cm???

24GHZ BEACON BACK ON AIR

During mid January, David Wrigley, **G6GXK** returned the **GB3MAN** beacon to service. It is on **24048.850MHz** from IO83wo and is GPS locked.

Please report via www.beaconspot.eu or DXC spots. All reception reports are very welcome.

24GHz BEACON RECEPTION

During the morning of 23rd January, 2011 Morgan, **SM6ESG** in Varberg (65 km south of Gotenburg) discovered an sea inversion over the Kattegat, which was apparent the previous day also. Morgan reported reception of the Säby beacon **OZ1EHF** (*Sæby, Denmark*) at 59+25dB over a 104km path. The temperature was -2 in Sweden at the time.

END OF JANUARY TROPO DX

During the morning of 31st January, conditions appeared to be up somewhat on **23cm**, which enabled Pete, **2E0NEY** (IO81) to work **F1RJ** (JN18) at 55 over a 420km path. A few hours later, Eckhard **DK7QX** (JO42KH) was receiving beacons **GB3USK** at 559, and **GB3MHL** at 539, and then a QSO with **2E0NEY** at 766km.

Things appeared to be getting better during the afternoon, when Pete worked **DC7QH** in JO62qn (52 both ways) at a QRB of 1071km. To add to his tally, a few hours later, Pete went on to work **DC8UG** (JO30uh) 706km at 53.

Shortly after 17:00utc **DK7QX** was receiving **GB3USK** even more strongly at 599 and Neil, **G4BRK** (IO91hp) worked Eckhard over the 707km path (Neil runs 400W and a 35ele yagi and Eckhard runs 180w to a similar yagi). Neil went on to work Matthias, **DL6ABC** (JO62om) at 1002km and gained a new square.

Tony, **G4CBW** (IO83ub) was also receiving some of the **DL** beacons, and worked **DC8UG** (JO30uh) at 755km, but conditions for Tony didn't appear to be as favourable as for those further south until a few hours later. In the evening, Tony worked **DK1VC** (JO31) at 59 both ways, but his best DX on receive appeared to be the **DB0YI** beacons (JO42xc) on both **23cm** and **13cm** at 833km.

The higher bands also showed some enhanced propagation later in the evening. John, **G3XDY** (JO02ob) worked **DL5DWF** (JO71) on **23cm** for a new square, and his best DX for the day on three bands was 1014km with **OE5VRL/5** (JN78dk) on **23cm** (59/59), **13cm**, and **6cm** (53/55). Several tests on **3cm** unfortunately produced no results.

Rudi, **OE5VRL/5** received **23cm** UK beacons **GB3MHL** at 599 with QSB at 1006km, and **GB3USK** 569 at 1253km. On **13cm**, **GB3MHS** was up to 579 with QSB.

The opening continued on the 1st February, but the paths seemed to have moved east.

During the afternoon, **OE5VRL/5** heard the **F6DWG** beacons from JN19fk, on **13cm** at 599 with QSB and on **6cm** at 559 with QSB. Rudi then had a contact with Maurice, **F6DKW** (JN18cs) on **23cm** with very strong signals.

A QSY to **3cm** produced reports of 419/539 at 891km, and in a later test signals were up to 59 with QSB. On **3cm** **OE5VRL/5** runs 25W with a 3m dish, and **F6DKW** runs 10W and a 90cm dish.

Maurice went on to work **OK2POI** on **23cm**, and Rudi worked **F6DWG/p** (JN19aj) on **6cm** at a distance of 903km, but **3cm** produced nil.

F1PYR FIRST EME QSO ON 10GHz

On 5th February, André, **F1PYR** (JN19) received his own echoes off the moon for the first time. The strength of the echoes in tropo terms was 419.

André had a sked at 11:30 with **G4NNS** (IO91), but it was raining and although Brian had told André that he could make the sked at 11:30, it was in fact 11:40 before the moon cleared the very wet tree line, and Brian could hear his own echoes to find the moon for sure. Once Brian heard André, the QSO went through in under 10 minutes.

The moon was at near apogee so there was about 1.8db of extra path loss. There was a lot of libration - spectral spreading ... or was that rain scatter ??

For tracking, André uses **F1EHN** software and hardware to steer his 3.5m dish (pictured above). **F1PYR** uses a **DB6NT** preamp and 30W PA (designed by **F6BVA**), and **G4NNS** has a 3.7m dish with a 20W **DL2AM** PA.

Brian says he was delighted and honoured to give André his #1 on **10GHz** EME and adds that bottles were opened to celebrate at both ends of the QSO!

24GHz WORLD TROPO RECORD

On 7th February, at 09:56utc Claus, **DL7QY** (JN59BD) and Maurice, **F6DKW** (JN18CS) made a **24GHz** tropo contact in which they exchanged CW signal reports of 529/529, to establish what is almost certainly a new world record distance for the band of 579km.

Humidity on at least part of the path was much lower than normal, at around 26% with a ground temperature of 5 degrees. Claus says he was surprised at the **24GHz** distance, and never believed it would be possible because of the high attenuation on **24GHz** (10 times more than on **10GHz**!!).

The duration of the opening was only one or two hours, with extremely strong signals on **10GHz** - in fact Maurice reported **DL7QY** on **3cm** as "end-stop".

Claus says " It was a very nice SHF day (I guess it was the best in my life)".

F6DKW has a 2W PA, with a 50cm dish, and **DL7QY** has 1W RF into a 70cm dish - his QTH is 533m asl and the antenna is 20m above ground level.

The previous world tropo record is believed to be the one set in September, 2002, when **WW2R/5** and **W5LUA** made a record contact on **24,192MHz** over a distance of 542km.

Over an hour before the contact took place, **OE5VRL**(JN78dk) reported reception of the **F6DWG** beacons on **6cm**/**3cm** (JN19aj), and this was quickly followed by several QSOs with Marc **F6DWG/p** on **13cm**, **6cm**, and **3cm** over the 900km path.

Marc noted that all his tropo indicators were "in the red", and so he did not hesitate to go out portable, despite the extremely cold WX!

He points out that he was QRV and did some **24GHz** tests just before Maurice, but it was **F6DKW** who hit the jackpot! Marc was there at the right time, which of course is important. Here's to the next time!

24GHz FROM SPAIN TO FRANCE

On Saturday February 5th, Guy **F2CT/p** worked Tomas **EA2BCJ/p** on **24GHz** with his 0.2mW for what is thought to be the first international QSO with an "official " **EA** station on this band. Well done Tomas, and we hope you will be able to become QRO soon!

MORE EXCEPTIONAL TROPO

The 6th of February saw the return of some more fantastic conditions, and long DX paths. Guy **F2CT/p** worked Ralph **G4ALY** on **10GHz** with 59+ reports over 830km!

Guy was up above the clouds which were over the sea (as seen in the photo) but unfortunately Ralph is not back on **24GHz** (yet!!!).

Ralph, **G4ALY** (IO70vl) reported the following **23cm** contacts from Cornwall, all on SSB. **F1JRD** (JN03) 55/55, **F6CBC** (IN94) 59/59 **F6FHP** (IN94) 59/59, **F6CIS** (IN94) 59/59 **F6AJW/p** (IN93EK) 807km 57/59.

On **13cm** he worked **F6DRO** (JN03) 579/579 F6CBC (IN94) 559/539 and on SSB, **F4CWN** (JN03) 57/57, **F6CIS** (IN94) 59/58 and **F6FHP** (IN94) 59/59.

The real "icing on the cake" or "cerise sur le gateau" was a **3cm** contact with **F6DRO** on CW 529/529 at 903km and with **F6CBC** (IN94) at 519 both ways.

...AND FINALLY

The opening of 6th/7th February produced some exceptional DX. I made notes of who worked what, but unfortunately, there is no more room in the column, and my deadline looms! Please send in your own accounts of what you worked. The next issue will be the April one. **73, Robin, G8APZ**

Please send your activity news for this column to:

scatterpoint@microwavers.org