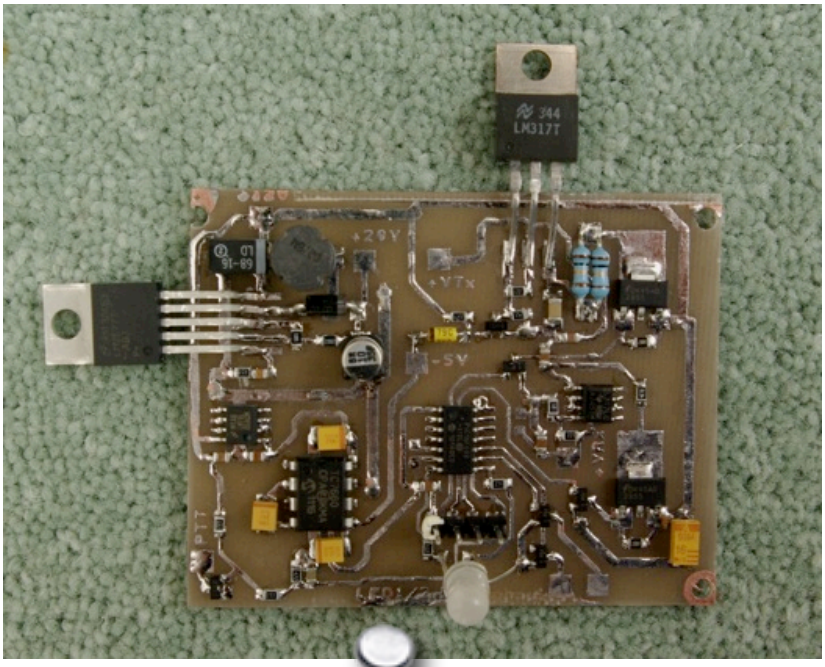
An Amateur Radio publication for the Microwave Enthusiast

# scatterpoint

August/Sept 2012

Published by the UK Microwave Group



## Transverter Head Unit Control & Switching Module

**Andy Talbot G4JNT**

## NEW UK 10GHZ RECORD!

In this Issue



**Many thanks to all our contributors this month, without whom there would be no Scatterpoint!**

# UK Microwave Group Contact Information

| | | | |
|---|---|---|---|
| Chairman: G4BAO<br>Dr. John C. Worsnop<br>Email: chairman @microwavers.org<br>Located: Cambridgeshire JO02CG<br>Address:<br>20 Lode Avenue<br>Waterbeach<br>Cambs CB25 9PX<br>Home Tel:<br>+44 (0)1223 862480 | General Secretary: G8BHC<br>Martin Richmond-Hardy<br>Email: secretary @microwavers.org<br>Located: Suffolk JO02PA<br>Address:<br>45 Burnt House Lane<br>Kirton<br>Ipswich<br>Suffolk IP10 0PZ<br>Home Tel:<br>+44 (0)1394 448213 | Membership Secretary:<br>G8DKK Bryan Harber<br>Email: membership @microwavers.org<br>Located: Hertfordshire IO91VX<br>Address:<br>45 Brandles Road<br>Letchworth<br>Hertfordshire SG6 2JA<br>Home Tel: n/a | Treasurer: G4FSG<br>Graham Murchie<br>Email: treasurer @microwavers.org<br>Located: Suffolk JO02PC<br>Address:<br>42 Catherine Road<br>Woodbridge<br>Suffolk IP12 4JP<br>Home Tel:<br>+44 (0)7860 356775 |
| Scatterpoint<br>Editor: G8BHC<br>Martin Richmond-Hardy<br>Email: editor @microwavers.org<br><br>See above for other contact details<br><br>NB editor & scatterpoint email addresses go to both John and myself | Scatterpoint<br>Activity News: G4BAO<br>John Worsnop<br>Email: scatterpoint @microwavers.org<br><br>See above for other contact details | Contest & Awards Manager: G3XDY<br>John Quarmby<br>Email: g3xdy @btinternet.com<br>Located: Suffolk (JO02OB)<br>Address:<br>12 Chestnut Close<br>Rushmere St. Andrew<br>Ipswich<br>Suffolk IP5 1ED<br>Home Tel:<br>+44 (0)1473 717 830 | RSGB Microwave Manager: G6JYB<br>Murray Niman<br>Email: g6jyb @microwavers.org<br>Located: Essex (JO01)<br>Address:<br>55 Harrow Way<br>Great Baddow<br>Chelmsford<br>Essex CM2 7AU<br>Home Tel:<br>+44 (0)1245 474969 |

**UK Regional Reps**

| | | | | |
|---|---|---|---|---|
| Ray James | Scotland | GM4CXM | gm4cxm@yahoo.co.uk | gm4cxm |
| Gordon Curry | NI | GI6ATZ | gi6atz@qsl.net | gi6atz |
| Tony Pugh | Wales | GW8ASD | gw8asd@gw8asd.co.uk | willcroft |

**Assistants**

| | | | | |
|---|---|---|---|---|
| Kent Britain | USA | WA5VJB/G8EMY | wa5vjb@flash.net | kent.britain |
| Dave Powis | Trophies | G4HUP | g4hup@btinternet.com | daveg4hup |

## Editor's corner

August & September have been a busy month for the UKµG committee. Have I mentioned EME2012? Your truly has had his hands full managing the EME2012 web site and, with Doug G4DZU and Dave G4HUP, the EME2012 bookings – so Scatterpoint has had to take a back seat for a while but I hope you find it worth the wait as we have *records!* 10GHz and Nanowave distance records and record attendance at EME2012.

**73 de Martin G8BHC**

## 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**

## UK MICROWAVE GROUP SUBSCRIPTION INFORMATION

The following subscription rates now 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.

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.

**QUOTE YOUR CALLSIGN PLEASE!**

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!)

## Colour codes

**Editorial & Events**

**Activity & Contests**

**Technical**

**Nanowaves (optical)**

**Commentary**

## Reproducing articles from Scatterpoint

If you plan to reproduce an article exactly as per Scatterpoint then please contact the Editor – otherwise you need to seek permission from the original source/author.

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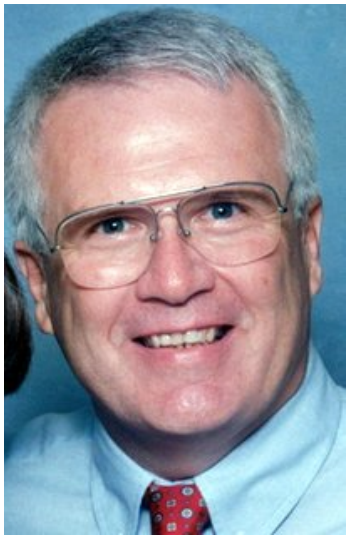
# Silent Key

## Packrat Ed White, WA3BZT, SK



Edward Joseph White, age 65, of Bear, DE, passed away on Thursday, July 5, 2012, at the Delaware Hospice Center. Born on April 16, 1947 in Nuneaton in the county of Warwickshire, England, Mr. White was the son of the late William White and Julia Cartain White. He proudly served in the US Air Force as a young man and would continue in the service of his country as a member of the US Air Force Reserve for 41 years before his retirement from military duty. In civilian life, Mr. White was an incredibly gifted engineer. He was instrumental in developing electronic guidance systems for NASA in the 1960s and 70s. He was last employed as a satellite engineer. He was a licensed amateur radio operator (WA3BZT) and was part of Navy MARS, a national emergency communication system. As an amateur radio operator, he included the use of “Earth- Moon-Earth” technology--essentially bouncing signals off the moon. Mr. White was a member of American Legion Post # 25 in Middletown. He is survived by his beloved wife, Joan Taber White; his daughter, Angelique M. White and her husband, Jason Rogers, of Douglasville, PA; and his two grandsons, Justin David Rogers and Dalton Eric Rogers. In lieu of flowers, contributions in memory of Mr. White may be made to the Delaware Hospice Center, 100 Patriots Way, Milford, DE 19963.

Source: Packrats

# FUNcube Dongle PRO-PLUS

You can view the FUNcube Dongle PRO-PLUS presentation given to the AMSAT-UK International Space Colloquium 2012 on Saturday September 15 by following these steps:

- Go to www.batc.tv/
- Click on "Film Archive"
- Select "AMSAT 2012" in Category box and click on Select Category
- Select "02 - FUNcube PRO-PLUS" in Stream box and click on Select Stream

Or download the whole video of the presentation from
www.batc.tv/vod/AMSAT%20session2.flv

# Crawley Microwave Round Table Program

## Sunday 23rd September 2012

As usual we will be running the UK Microwave Group annual construction contest for the G3VVB trophy. Please do bring along your constructed equipment and enter the contest. Entries do not necessarily need to have been constructed during the last year. Last years winner was Jeff G4HIZ – this year it might be you that carries away the trophy! The program this year offers the micro-waver something different – come along and support the construction contest and hear the talks.

### Provisional timetable:

| | |
|---|---|
| 10:00 | Venue opens |
| 12:00 | Construction contest judging commences |
| 13:00 | Lunch (rolls, sandwiches etc and tea/coffee available) |
| 14:00 | Opening address by Derek G3GRO and the results of the construction contest |
| 14:15 | Millimetric Microwave Adventures - Chris Whitmarsh G0FDZ |
| 15:00 | The updated Bodger's guide to back garden EME - John Worsnop G4BAO |
| 15:45 | Break ( tea and coffee available) |
| 16:00 | Latest progress on the simple microwave power meter – Derek Atter G3GRO |
| Plus – a surprise presentation by Derek to round off the day | |
| 16:30 | End of meeting |

The venue is the Crawley Amateur Radio Club's hut and directions can be found at:

www.carc.org.uk/find_us/directions.shtml

# Scottish Microwave Round Table Program

## Saturday 3rd November 2012

This years Scottish Microwave RT will take place on Saturday 3rd of November with doors open at 10am for a 10.30am start. The venue is the Museum of Communication at Burntisland in Fife, just across the Firth of Forth from Edinburgh.

The registration page is now available at http://www.rayjames.biz/microwavert/index.html

This will be updated with additional information like the programme and dinner menu when available.

Due to health, safety and "comfort", there is a maximum of 50 attendees the venue can accommodate so please register early to avoid disappointment.

Measurement facilities will be available. Please see the relevant page for advice.

Ian GM3SEK is currently receiving offers for interesting RT talks and would be more than happy to include additional papers. Please see the contacts page.

The GMRT2012 evening dinner will again take place in the Burntisland Sands Hotel.

**Ray GM4CXM**

**obo Ian GM3SEK, Colin GM4HWO, Brian GM8BJF, David GM4ZNX**

# British Astronomical Association
## Radio Astronomy Group

### 2012 GENERAL MEETING

**Saturday 27th October** 10:30 – 17:30 National Space Centre, Leicester, LE4 5NS

| | | |
|---|---|---|
| | **Prof Andrew Lyne** | **Jodrell Bank Centre for Astrophysics Pulsar Team**<br>*Using pulsars as cosmic clocks in the study of gravitational theories* |
| | **Dr Chris North** | **Cardiff University School of Physics and Astronomy & co-presenter for The Sky at Night**<br>*Astronomy at Mega Megahertz* |
| *plus:* | **Tony Abbey G3OVH** | *Using the FUNcube Dongle and budget variants for Hydrogen Line reception* |
| | **Peter Blair G3LTF** | *Optimising the performance of parabolic reflector antennas* |
| | **Brian Coleman G4NNS** | *Outreach via Hydrogen Line astronomy* |
| | **John Cook G8EDG** | *SIDs, SFEs and CMEs in 2012* |
| | **Matt Earnshaw & Noah Hardwicke** | *Next generation radio astronomy* |
| | **Paul Hyde G4CSD** | *Practical considerations in observing meteor scatter* |
| | **Jeff Lashley 2E0ODF** | *Data processing and control* |
| | **Dr David Morgan** | *Interferometric detection of an extra-galactic radio source* |

RF Design UK and UKRAA will also have stands at this event. Tickets are £15 (£12 for BAA members) including buffet lunch, free admission to the National Space Centre and free parking. See **www.britastro.org/radio** for more information or contact **radiogroup@britastro.org**

# Annual Meeting of the BAA's Radio Astronomy Group

## National Space Centre, Leicester on Saturday 27th October

The Radio Astronomy Group of the British Astronomical Association is holding its Annual Meeting at the National Space Centre at Leicester on Saturday 27th October. This follows a very successful event last year which was sold out some weeks beforehand and had a strong amateur radio contingent in the audience.

The format for this year's meeting will be similar with two keynote speakers and a number of supporting presentations, displays of hardware and posters on various aspects of amateur radio astronomy.

**Dr Chris North** of the Cardiff University School of Physics and Astronomy and co-presenter on The Sky at Night will talk about "Astronomy at Mega Megahertz" and the technologies used for observing at far-infrared frequencies as used in the Herschel Space Observatory, the Planck satellite, the JCMT and the ALMA telescope array.

**Prof Andrew Lyne** from the Jodrell Bank Centre for Astrophysics Pulsar Team will discuss how these massive cosmic flywheels make superb clocks for exploring some of the fundamental laws of physics that determined how the Universe evolved.

**Peter Blair (G3LTF)** will describe the performance criteria for parabolic dishes and the choices that are available for their performance optimisation, together with some dish construction issues such as surface accuracy and materials. Feed types suitable for use on a range of frequencies from 400-10,000 MHz will be discussed together with the setting up process for moderate size dishes and some simple measurements that can give an estimate of performance.

**Brian Coleman (G4NNS)** will describe observations made live with over 50 visitors at a series of events during National Science and Engineering Week 2012. These events are organised under the auspices of the British Science Association and this year's theme was "Our World in Motion" so it was thought rather appropriate to use hydrogen line observations to measure the velocity of planet Earth relative to the hydrogen within our galaxy, thus demonstrating that our galaxy has a spiral structure.

**Dr David Morgan** will introduce the theory and practice of constructing a radio interferometer at 408 MHz which can then be used to detect the elliptical radio galaxy in the constellation of Virgo. The benefits of using an interferometer for observing small diameter sources against the background of the Milky Way will be discussed and the role of interferometry in the latest professional radio telescopes will be addressed.

**Tony Abbey (G3OVH)** will be comparing the performance of budget USB-based DTV receivers with that of the FUNCube Dongle to establish whether these devices could form the basis of a low cost instrument for radio astronomy applications.

There will be several additional papers on various aspects of amateur radio astronomy and our two main speakers will be participating in a lunchtime Q&A session. RF Design UK will be showing their noise measurement products and UKRAA will have a selection of products and books. More information can be found at www.britastro.org/radio/ and tickets can be obtained via the BAA Office or from Paul Hyde at radiogroup@britastro.org

Tickets are £15 (£12 for BAA members) and include a buffet lunch, afternoon tea, admission to the NSC attractions (apart from the Planetarium) and free parking.


# EME 2012 News

## Cambridge 16–18 August 2012

During August the UK Microwave Group hosted the 15th International EME Conference at Churchill College Cambridge. This included two days of lectures and multi-media presentations, a pre conference guided tour to Bletchley Park WWII code breaking centre and a visit to the National Radio Centre, two formal dinners and a program for delegates' partners.

Nearly two hundred delegates and 75 partners from 26 countries attended, making this the most successful EME conference on record.

The two formal dinners were held in the Churchill College dining hall. At the first, Howard Long, creator of the “Fun Cube Dongle” entertained us with the story of its genesis and gave us a preview of the MkII version. At the second, “Gala Dinner” the speaker was the eminent Radio Astronomer Professor Antony Hewish who described his involvement with that subject which lead to his being awarded the Nobel Prize for Physics in 1974.

It was especially appropriate that **Joe Taylor K1JT** an EME enthusiast, delegate to the conference, fellow Nobel Laureate and old friend of **Professor Hewish** sat next to him at the top table. With two such eminent Radio Astronomers present and by the inclusion in the lecture program, of a talk on using a “back yard” interferometer to detect radio emissions from the Virgo cluster as a distance of about 50 million light years, the connection between Earth-Moon-Earth communications and Radio Astronomy was clearly demonstrated. The presentations can be viewed on line by visiting the BATC web site.

GB2EME was operated remotely by G4SWX for the two main days of the conference and over 120 JT65 contacts were made on 2m despite the close proximity of the sun to the moon. There was also a comprehensive Noise Figure test set up run by G3XDY and HB9BBD. Details of the contacts and NF results can be seen on the web site at eme2012.com

Thanks in particular to **Waters and Stanton** as the Principal Sponsor, **CambHams** for providing the reception team and **BATC** for the excellent recordings of all the presentations which can be seen at batc.tv/channel.php?ch=1 – select category EME2012 Conference then choose the presentation.

# Some of the many messages of thanks for EME 2012

Nice job guy's, great down loads and video, thanks. Good Stuff!

73 Tommy WD5AGO

Hi just arrived home after a nice meeting. Thanks to all

73 de Lars SM4IVE

Back from Cambridge!

It was a great time to spend 3 days in a nice place , it was also a real pleasure to put a face on a lot of call from a lot of countries. Organisation was perfect. We do not imagine the mass of works behind this events!

Amitiés André F1PYR

… just to say a big THANK YOU! to the organizers and to the participants of EME 2012 for a nice meeting and an enjoyable time. CU all in France in 2014.

M & M – team (DL1YMK)

EME 2012 was a wonderful experience! I enjoyed every moment of it and would like to thank the organizers for their excellent work

73 Eric ON5TA

I agree, Best congratulations and thanks to the whole organization

I1NDP, Nando

Thank you to the whole EME 2012 team for two wonderful days, perfectly organized! Not to forget Dominique HB9BBD, who was very busy in the lab for two days, measuring our preamps and noise sources!

73s Juergen DJ8FR

Dear Moonbouncers,

In one word: GREAT! A few more words: Thanks to ALL of the organizers for a fabulous work making it all run so smoothly, elegant and professional. Thanks to ALL of the attending delegates that all together made it such a complete and rewarding experience.

I do hope to see you all in Lannion in 2014. Until then bounce-a-lot, will you!

73 / Ingolf, SM6FHZ

For those of the organization I did not shake hands to thank you. Now via internet THANK YOU for the perfect weekend. It was nice to meet many amateurs who i worked from the moon.

73 John PA7JB

Susan and I returned back home today after having made a stop-over in Reims (F).

We both say a big thank-you to the management team of this marvelous event!

Not only did we meet many old and new friends, we both enjoyed the company of the EME community in many aspects.

73 HB9BBD Dominique

EME Friends, I watched EME 2012 via the on line, delayed feeds... Really really nice show, and speakers / topics Thanks to all who made it happen so well.

Best, 73, Pat Barthelow, AA6EG

Morning Graham,

… Many thanks for a great evening and once again congratulations to you, your committee and everyone involved for an excellent job.

Best regards Dave

Thanks to all, just had one of my best hamradio events last weekend. Got in contact with a lot of new friends and got many informations about moonbounce. My wife Silvia was also happy about the partners program. We had really nice days there. Thank you to all of you and especially to the organization team. It must have been a heavy work and lot of to do. Hope to meet you on moon on 23cm until end of year.

73, Slawek DL6SH

Thanks for the perfect organisation of the 2012 EME conference

73 Walter ON4BCB & ON0EME team

Graham I was very proud to work with you and your team, THANK you !!!

Zdenek – OK1DFC

Hi Graham,

Thank you for nice words. It was the best Conference ever from our stand point and organised as only the Brits can do it. (a very common VK acknowledgement of your TV Olympics etc). The attention to detail and the coordinated duties all seemed to have worked a treat. You have to be very proud of you and your teams accomplishment…

…Again it was just fantastic. Thank you again. Hopefully we will meet again in France in 2014.

73 88 Bev and Doug

We had a safe trip back to home. I would like to say you one time again a warm thanks for this really nice moment spent together. We really appreciate how everything was well organized. It was for us a great

honor to be included in this circle and I learned a lot of things, a bundle of idea are now germinating in my head. I hope to see you again soon for such nice time.

Best 73's Patricia and Philippe F5JWF

A HUGE THANK YOU to the organizers of this Six-Star-Event! Not to forget the able and friendly staff of Churchill Hall. It was wonderful to meet old and new friends in a throughout relaxed atmosphere. Simply unforgettable. I said good-bye to the city of Cambridge on Sunday morning during a 5 hour walk thru this jewel.

73 Jan DL9KR

A big THANK YOU from me and Asta to all who helped make the EME2012 conference such a smoothly running, memorable and thoroughly enjoyable event!

We have both been involved with organising professional conferences in the past, so can appreciate the huge amount of work that has gone into this one. The organisers have earned every bit of kudos they have got from the community so far, and more… GOOD JOB !

73 Gudmund SM2BYA / SM3BYA Asta SM2UHV

Hello All

I have attended dozens of conferences over the last 50 years and I have to say this one was better than all the others combined. I have NEVER seen one so well organised. Everyone was made to feel that he or she was VERY special. Please send thanks to the guys and their wives for doing an UNFORGETTABLE job!! Thank You All!!!!!!!

Steve N4PZ

Hello to all

Just arrived in south west France with Corine after visiting Hampshire and some nice Ham's houses. I think Cambridge 2012 EME Conference will stay in all Memories. It was a great event with high level technical talks in always a kindness and helpful environment. Many Thanks to all organisers for their huge work. **Thanks to all your votes, next 2014 EME conference will take place in Pleumeur-Bodou near Lannion in "French Brittany".** In order to satisfy all EME community and keep us into Ham friendship. Waiting for, see you asap off the Moon. Kindly regards Cordialement

73 Guy F2CT

Hi Graham,

Thanks for everything. It was a thoroughly enjoyable event. The venue was perfect for the job, and the trip to Bletchley was well worth fitting an extra day in for. The Bretons have a hard act to follow.

On the noise figure front, it seems the ordure has met the air-moving apparatus and ripples are spreading! Great fun

David GM4ZNX

Hi Graham,

Many thanks for the wonderful time we spent in Cambridge! It was an excellent conference – and a pleasure for Marietta and me to be once again in Churchill College and to spend a little time with Tony Hewish.

73, Joe, K1JT

Many many many thanks to eme2012 team. Fantastic meeting and organization.

best 73 and see you in Lannion.

Dario IW2FZR

We have to admit to one (verbal) complaint and that was that there was insufficient bar staff on duty at one stage!
We had been advised that 2 (or possibly 3) Firkins (72 pints) of Real Ale would be sufficient for the conference. By the end, we had used 6 Firkins which could go some way to explaining why everyone enjoyed themselves!!

**PS from Ingolf SM6FHZ**

In answer to Paul's, W1GHZ, question at the end of my presentation regarding the radiating performance in the diagonal cuts for the feed simulated with mounting legs present; the graph IS included in the long version of the paper present at the CD that came with the proceedings.

I have also updated the presentation with this graph and with a Far Field Phase Error graph in three cuts where one of them is in a diagonal plane. Also are a few extra bonus slides (not shown at the talk from the stage) included at the end.

You can find the 3.4 MB large PDF-file on my Web-page 2ingandlin.se/SM6FHZ.htm under the "Engineering" headline. Look for "432 MHz Feed analysis...". Click to view or right-click to down-load as usual.

Enjoy.

The CambHams Reception Team


Al Katz K2UYH was presented with this silver salver to commemorate 40 years of editing the 432 and Above EME Newsletter

**More pictures at eme2012.com**

# ANDORRA : SHF Activity June 15th – 25th 2012

## C37SHF Pic MAIA JN02UN Pic Blanc JN02UM

**F1FIH Michel F2CT Guy F6HTJ Michel**

**Miguel EA3TJ, Pau EA3BB Guy F2CT Michel F1FIH**


**Michel F6HTJ Guy F2CT Pau EA3BB Michel F1FIH**

This expedition was initiated to promote the activity of the SHF from the Principality of Andorra, including using the propagation mode via Rain Scatter.

The project was approved by the Office of the REF and then subject to approval by URA (Union Radio-amateur Andorrans).

The license C37SHF has been granted exclusively to radio club of the URA and not as individuals.

Customs procedures have been simplified.

On Tuesday evening we were invited to the URA headquarters located in Andorra la Vella, by Joan C31US Chairman of the URA, by the officers and the association.

We were able to attend a twenty amateur radio traffic through the possibilities Rain Scatter on the tapes "hyper".

The recording of qso made on 24 GHz in the afternoon under the deluge with Christian F1VL has raised many questions including the manufacturing cost and the development of efficient equipment.

A dinner "Tapas" closed late this evening sympathetic initiation.

Despite the very high altitude, the multiple attempts with the Paris region on the strips 23, 13, 6 and 3 cm have failed because of poor tropo, the absence of RS, but mostly because of the Pyrenean summits culminating with more than 2800 m between 20 ° and 355 QTF! A full day was devoted to a fruitless search of high points that can provide better clearance to the North, however, in this research paths little vehicular access with our vehicles have been removed!

We extend our sincere thanks to Joan C31US Chairman of the URA and the amateur radio Andorrans for their warm welcome, the President of the REF F6BYJ, secretary F1TE F5HX well as for their administrative assistance.

Operationally special mention for Christian F1VL who did not hesitate to brave the elements in mobile connections to achieve 24 GHz as well as Benjamin EA3XU which has continued to relay information from MOs EA to boost activity SHF. To our friends and Pau EA3BB Miguel EA3TJ who have not hesitated to take the course to greet us and bring us some drinks bubble énergisentes

Thank you to Maurice F6DKW, Marco and André F6DWG F1PYR for the many attempts of 6 and 3 cm.

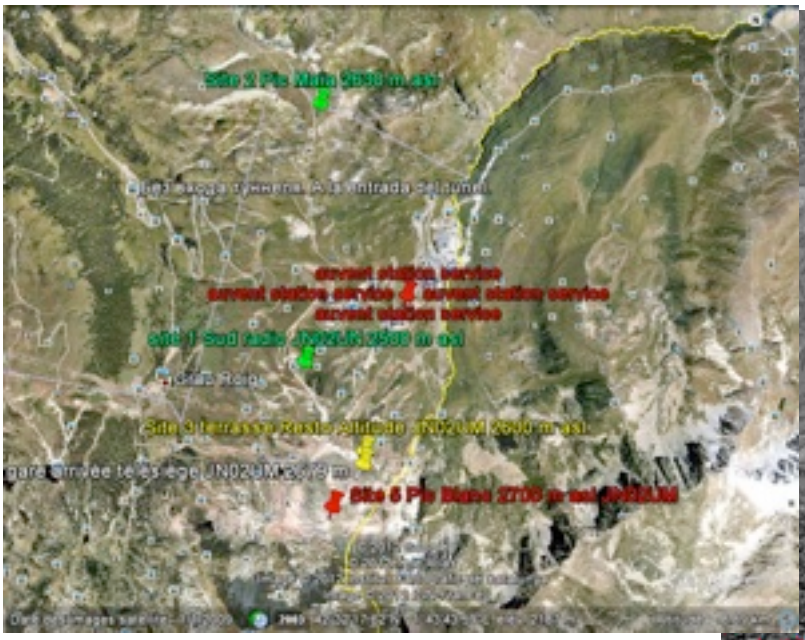
Few "bursts" were heard by reflection on the aircraft but could not materialize!

Thank you all who have been present.

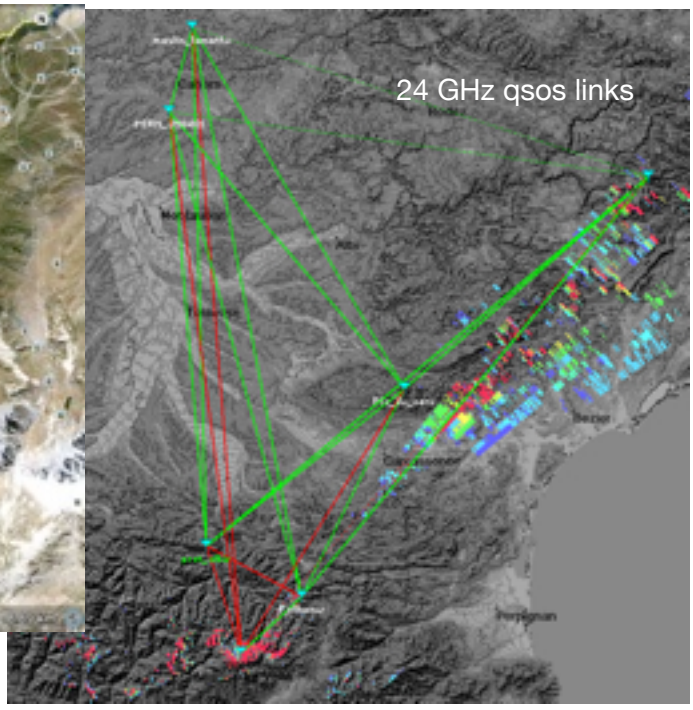
The experience will certainly be renewed on a site accessible with Michel's (F6HTJ) 4x4 and providing better clearance to the north.

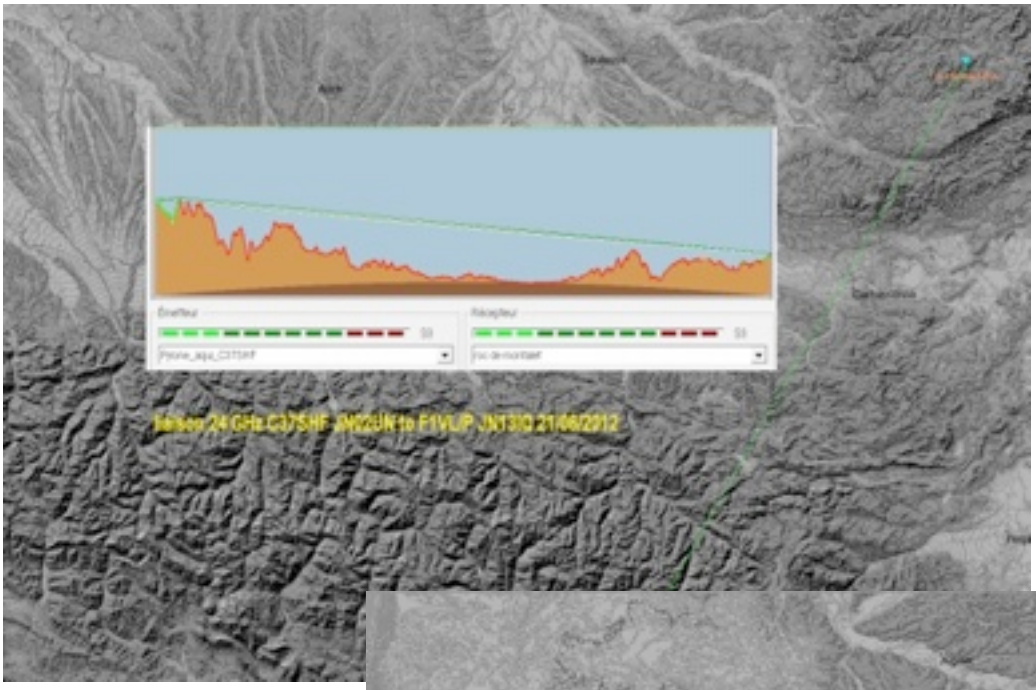
The QSL should be sent directly to the URA.

**73s C37SHF TEAM F1FIH F2CT F6HTJ**

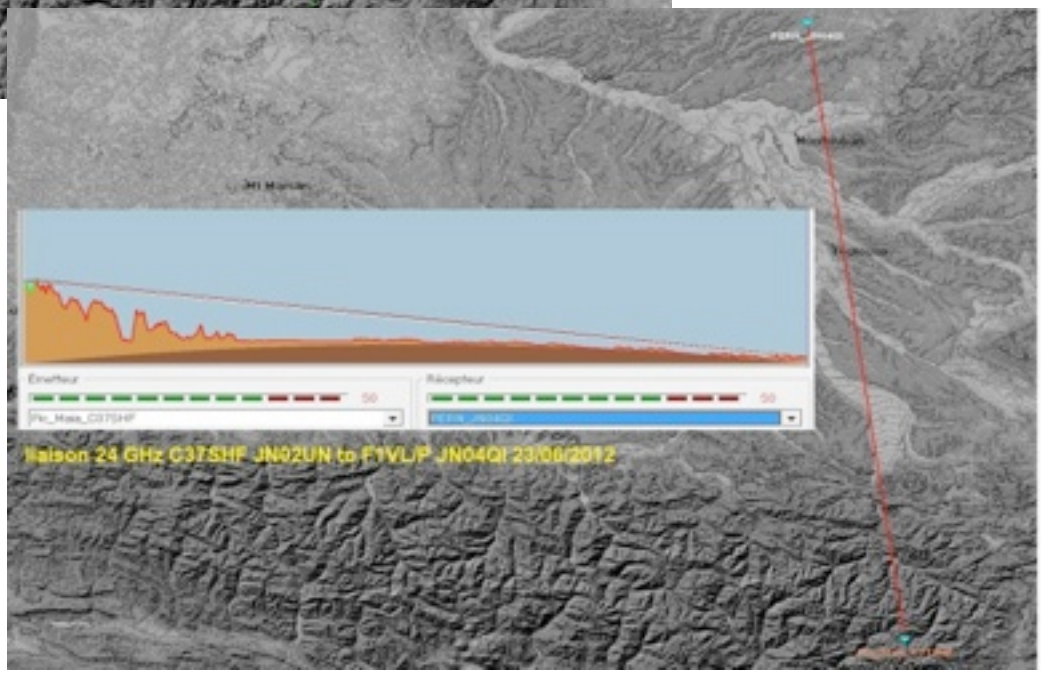


Locations activated



24 GHz qso
C37SHF/JN02UN
F1VL/P/JN13IQ
150 km



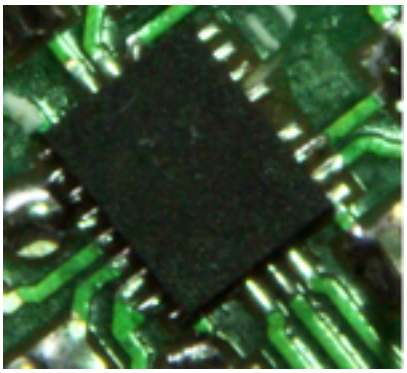
24 GHz qso
C37SHF JN02UN
F1VL/P/JN04QI
202 km

# Solving the Pin-Zero problem

## Or a few notes on homebrewing with small microwave chips

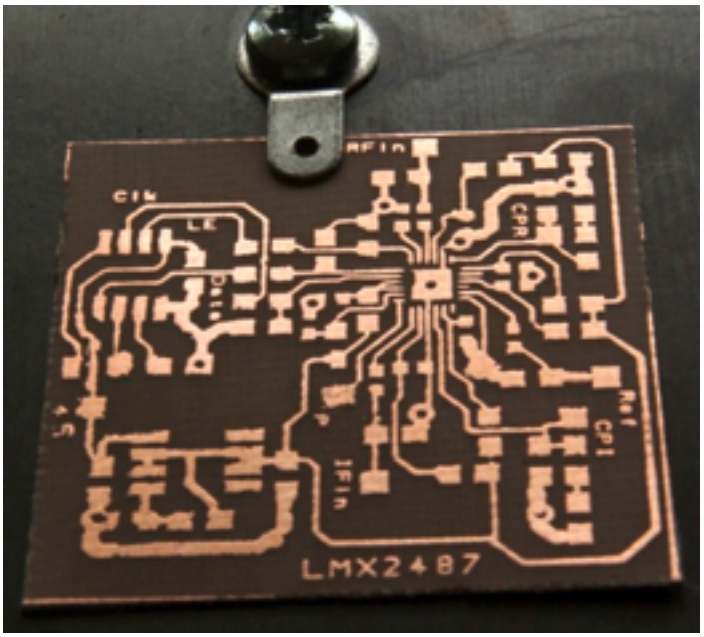
**By Andy Talbot G4JNT**

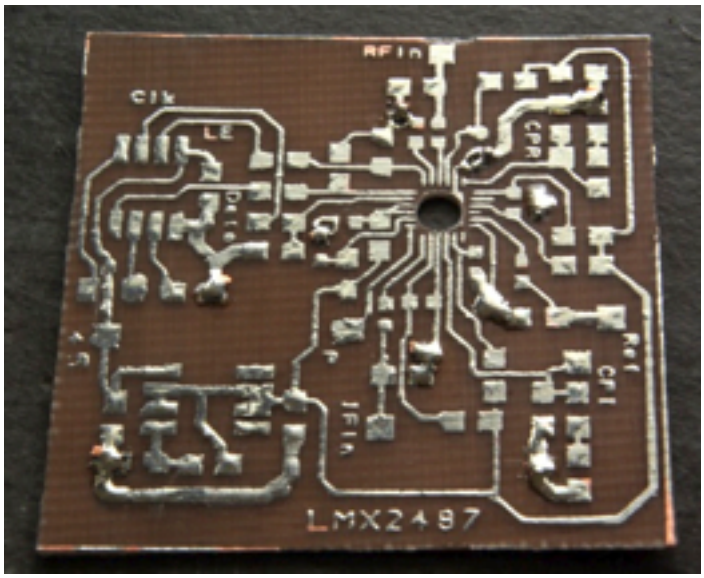
Many of the nice microwave ICs nowadays come in tabbed or leadless quad packages with a metallised pad on the underside that serves the dual purpose of allowing a direct low impedance connection to a ground plane and also behaving as a heat conductor. Data sheets usually refer to this as Pin 0 [1]. The exposed pad is soldered to a copper area on the top side that is connected though to the underside via several plated though holes. The pad is usually soldered using reflow techniques where the whole PCB is raised to just above solder melting point and pre-applied solder paste is allowed to melt and fill the gaps. For homebrew construction of such boards, a large soldering iron applied to the underside with flux and plenty of solder usually does the job – it is easy to see when the solder has flowed as it wicks up the plated though holes. When good flux is used [2], solder shows the very satisfying property of flowing well and going just where it wanted



On the leadless (or tabless) TQFP and similar packages, soldering the pads on the topside is really easy using this flux. First very carefully align the IC on its pads, press down with a small screwdriver or scriber so it cannot move and drench the assembly in flux so it is clearly sitting in a pool of liquid. Load a clean soldering iron bit with flux and wipe it along one side of the IC, pushing solder into the gaps. Repeat on each side of the IC. If the flux evaporates before you get all the way round, apply more. Use a strong magnifier to check solder has flowed into the gap on every pad. Repeat the flux and solder-wipe as often as necessary. Don't be afraid of overheating the chip – it can survive this. For an electrical test method see [3]

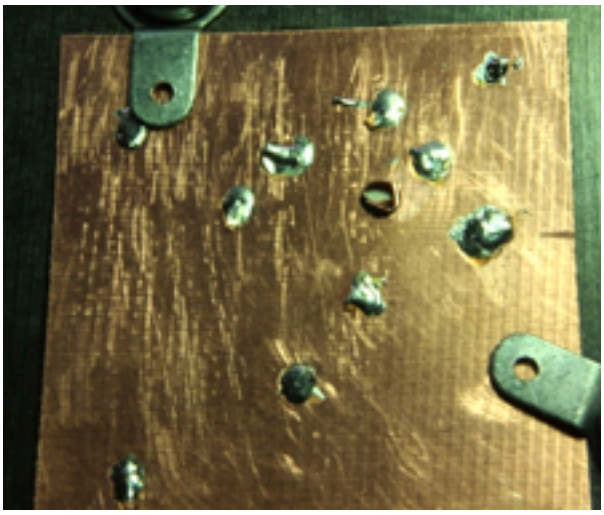
With homebrew PCBs life isn't so simple when it comes to soldering Pin-Zero. Plated though holes do not exist. Originally, on the first version of those DDS boards, Dave Wrigley drilled one large hole and filled it with solder – it worked. But the AD9852 is a large IC with a big pad on the underside and 80 tabs around its periphery. These are enough to securely hold the chip when applying the heat.



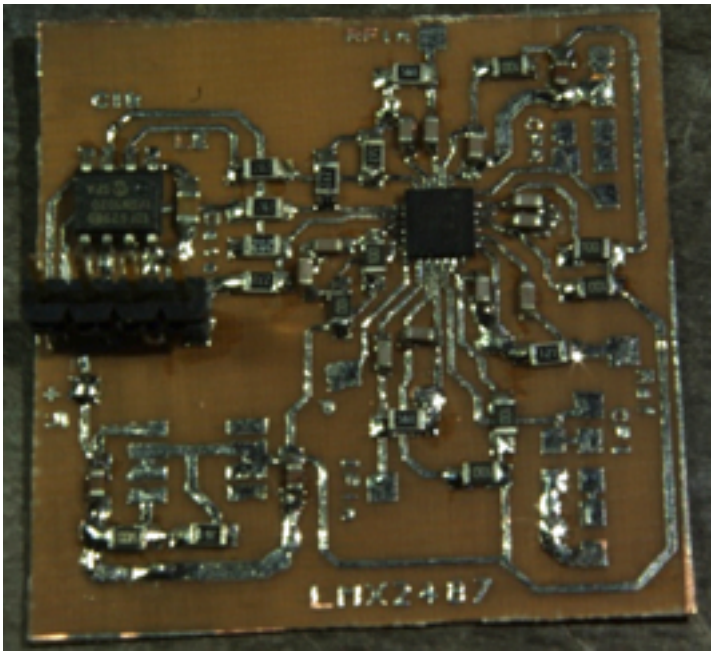




On the tiny 4mm square leadless packages many of the half-decent microwave synthesizers come in, the pad on the underside is only 2.5mm square. For the first one of these for which I tried to make a homebrew PCB, I drilled a 2.3mm hole (which was a bit too large, see photo) on the underside, smoothed off all edges,

pretinned all copper surfaces top and bottom , applied plenty of flux and initially soldered the 24 pads – they looked good and I felt very satisfied at having done so.



I turned the board over, placed a small circle of copper foil into the hole to simulate a plated though hole, then applied heat and solder. It flowed well, it all looked good. Until I turned the PCB over and looked at the top again. The action of soldering the underside had raised the whole IC to solder melting point, which had melted the tabs and the IC had moved and was badly misaligned on its tracks. The whole chip had to be removed the same way, by heating from the bottom and removing the tabs were all covered in solder making it even more difficult to align and redo. Eventually I did get the device properly soldered on , and in spite of the repeated overheating and severe abuse, the synthesizer module did work properly.



Hardly a satisfactory procedure though, so the next time I used a chip with a pad on the underside, I was determined to do it better, and applied a bit of forethought. The really important thing is to make sure the chip cannot possibly move when the bottom is heated with whole thing above the solder melting point. The way this was done was to make a clamping arrangement so when mounted upside-down for soldering the underside, the PCB was forced down onto a flat surface and the chip pushed hard against its pads. A thick metal plate with several M4 tapped holes was pressed into service. A couple of M4 solder tags made good clamps as shown in the photographs. (This arrangement was also a convenient way to hold the PCB for the conventional top side soldering operation). The first time I tried soldering the large pad using this arrangement it appeared to need an awful lot of heat. Realisation struck. The top of the IC pressing onto the metal surface was conducting heat away too rapidly. For the next time I placed three thicknesses of paper between the top of the IC package and the metal to act as a heat insulator. Soldering the pad was now much easier.

Rather than bothering to make up a thin circle of copper foil to drop into the hole, I just made up a U-shaped piece with a width about the same as the hole diameter and dropped this in. So long as the bottom of the U drops though the hole and touches the pad itself, the sides are pressed onto the ground plane and after ensuring everything is drenched in good flux [1] solder will reliably flow onto and around everything it needs to.

Incidentally, both ADF4510 Fractional-N synthesizer PCBs – worked straightaway, immediately, from switch on. Very satisfying.

[1] Most data sheets call this Pin-0 for ground. Analog Devices, just to be different, call it Pin 25 on a 24 pin chip. So I suppose, in that case, it should be called the Pin-N+1 problem

[2] Kevin G3AAF sells small bottles of liquid flux at most µWave Roundtables. This is excellent stuff. Low viscosity, low residue and is absolutely superb at making solder flow just where it is wanted. It seems to have an almost magical ability to prevent annoying solder bridges. If these do form, usually though not having enough flux in the first place, or a dirty soldering iron bit, apply more flux and a quick wipe with a (clean) soldering iron bit is usually enough to remove the bridge.

[3] RadCom May 2012, Design Notes, page 29, Testing Complex ICs

# 10GHz Transverter Modules: an overview

**Christopher Bartram RF Design**

## Introduction

These transverter modules have been designed using 21st century technology to allow the construction of a high performance transverter for the 10GHz amateur band. They form part of a new range of PCB–based assembled kit modules which will make the amateur microwave bands accessible to radio amateurs who lack the ability, facilities, or spare time to build modern microwave equipment from scratch. This note provides background information on some of the initial units which are either in, or close to, production. Performance figures quoted here are based on measurements of prototypes; they should be representative of what will be achieved in production, but please contact CBRFD for current information before buying.

## The Basics

The units are designed as PCB–based modules of standardised sizes, using modern surface–mount components and multi–layer PCB technology. They represent a fresh approach to the design of microwave equipment for radio amateurs, allowing a progression from a basic, low power transverter, all the way to a highly capable system.

Integral screening is provided by the multi–layer PCB design and chemically milled 5–sided boxes. This provides adequate screening without the need to use the traditional 'German silver boxes'!

RF and microwave interconnections are made using SMA connectors, while the DC and control interfaces are via 2.54mm pitch Molex connectors.

## Initial Products

### *UDC10368C – image–reject up/down converter*

The first product to become available is a synthesised low–power up/downconverter from and to 144 and 10368MHz. This uses an image–reject topology to reduce spurious outputs on transmit to acceptable levels when operating without external amplifiers. One reason for choosing the image–reject approach has been that two UDC s operating standalone, in conjunction with 60cm dishes, should be capable of communicating over any line–of–sight path within the UK. (1)

The UDC10368C employs a high–performance single–chip microwave frequency synthesiser operating at 5112.0MHz as its local oscillator. The mixers used operate with the local oscillator at half the usual frequency. This has a number of advantages regarding spurious generation, and also results in some circuit simplification. The mixers are combined at microwave frequencies via printed microstripline networks and at 144MHz by an L/C hybrid combiner. On receive, each mixer has its own 144MHz preamplifier, using a SiGe transistor: this has been designed for excellent amplitude and phase stability as well as a low noise figure. A noise figure of approximately 11dB and an output power at −1dB gain compression of −10dBm can be expected from the standalone board.

The UDC10368 can also be supplied to special order for 10368 – 432MHz, or 10450MHz −145MHz operation, and for use as a DATV up/downconverter from 70MHz.

The UDC10368C will be available from early September 2012.

### *SRF040R0U – 40MHz frequency reference*

The microwave frequency synthesiser employed by the UDC10368C requires a clean, stable frequency reference at 40, 80, or 96MHz. The SRF040R0 is based around a 40MHz temperature compensated crystal oscillator (TCXO), and has adequate stability for normal SSB/CW operation.

The SRF04R0 will be available from early September 2012.

### *FBP10368W40 – 10368MHz 40MHz bandpass filter*

To use amplifiers in the transmit path of a transverter based on the UDC10368, it's necessary to add bandpass filtering in order to reduce the transmitted spurious to an acceptable level. A bandpass filter will also reduce the susceptibility of the receive path to out–of–band interference.

The FBP10368W60 is a a two–pole bandpass filter using a dual–mode topology in circular waveguide. The insertion loss is <1.5dB at 10368MHz, with a 1dB bandwidth of ~30MHz, a –3dB bandwidth of ~40MHz and a –40dB bandwidth of ~600MHz.

The FBP10368W40 will be available from early August 2012.

### *SAT144P371 – switched attenuator*

As the UDC10368C requires only 20mW drive on transmit, some form of attenuator is required between typical transceivers and the unit. The SAT144P5 is a variable attenuator which can be driven with between 0.5 and 5W, and set to an output level of 20mW. The attenuator is switched–in on transmit under control of the sequencer in the UDC10368C. On receive, the signal will pass through with less than 1dB loss. Although designed for general purpose use, the SAT144P371 also has a dedicated FT817 interface.

The SAT144P371 will be available from early September 2012.

### *ADF10368F0R7 – dish feed*

To efficiently feed an offset dish, such as those used for satellite TV, requires a feed horn which is matched to the focal length/diameter ratio of the dish. While older designs, such as those of the late Dick Turrin, W2IMU, are available, they are often difficult to build, while some amateur realisations, due to attempts to use available materials, fail to work properly.

The ADF10368F0R7 is a compact feedhorn with an inbuilt coax to waveguide transition. It uses the principles outlined by Skobelev, using a step in the circular waveguide to launch two waveguide modes. At the mouth of the horn, the two modes combine out of phase at the edge, resulting in cancellation of any currents flowing around the horn. It is these currents, which if allowed to exist, cause the generation of unwanted sidelobes. The result, when the horn is used with a suitable dish, is an antenna which has excellent aperture efficiency.

The ADF10368F0R7 will be available from early August 2012.

### *ART10368P15*

In order to increase the output power of the transverter and it's sensitivity to levels where obstructed paths with greater losses can be be worked, the ART10368P17 contains a 30mW power amplifier, and a 3dB noise figure, 11dB gain receive path amplifier, along with a solid–state antenna switch. The transmit power level should be adequate to drive a variety of high power amplifiers, including a projected design from CBRFD, while the receiver sensitivity achieved by the receive path amplifier will be more than adequate as a second–stage for a high performance LNA.

The ART10368P15 is scheduled for production by November 2012.

## Interested?

For further information, and to get on the mailing list, please email Chris Bartram, GW4DGU
cbartram@theiet.org

## Notes:

(1) The longest line–of sight path in the UK is claimed to be Yr Wyddfa (Snowdon) to Merrick in Galloway: approximately 232km. That equates to a path loss of ~160dB between isotropic antennas. A –10dBm transmitter into a 33dBi antenna, with a similar antenna at the receive end should deliver about –104dBm to the receiver over that path. A 12dB noise figure receiver with 100Hz bandwidth will have a noise floor of about –143dBm. Thus the signal–to–noise ratio in 100Hz will be ~39dB, which in amateur microwave terms is very loud! A SSB signal will be solidly readable at that s/n.

# Transverter Head Unit Control & Switching Module

**Andy Talbot G4JNT**

This module combines most of the functions needed for control and voltage regulation in a microwave transverter and is aimed at mast head mounted systems that consist of either the full transverter, or just a Power Amp / LNA combination. It comprises of a negative voltage converter delivering -5V for Rx and Tx amplifier biassing; a 28V switch mode generator for coax relays with drive for latching or normal types; and switchable regulated supplies for transmitter and receiver RF hardware. A PIC controls the correct sequencing of Tx / Rx changeover in response to PTT demand. If all sections are not needed, various parts can be pic-N-mixed or bypassed as needed.

## Operational Details

**Figure 1** (page 20) shows the circuit diagram of the complete unit. A higher resolution version can be found in [1]. The 28V supply comes from an LM2577 ***Simple Switcher*** step-up regulator. This will easily deliver 100mA plus. Other voltages can be generated by changing the feedback network. The 28V generator runs continuously.

A fixed +5V supply from the 78L05 powers the PIC sequencer and the ICL7660 negative voltage converter. The +5V supply is available for any other use – such as a local oscillator. The negative voltage is around -5V, but is not inherently stabilised. Maximum current draw is about 10 to 20mA.

Two P-Channel MOSFETS FETs switch the input supply to Rx and Tx regulators. These consist respectively of an LM317L regulator rated at 100mA maximum for the receive side, and an LM317T for transmit, rated at 1.5A maximum. The output voltages can be set as required; for my 10GHz mast head unit with the resistor values shown, they deliver 5V and 10V respectively. The Tx supply is interlocked so that if the negative rail fails, the supply is removed to protect expensive exotic PA transistors. The interlock is not provided on the Rx rail as most receiver circuitry should survive this.

A PIC microcontroller monitors the PTT input line – an open circuit / high level is taken as Rx; grounding this goes to Tx. On a Rx >> Tx transition, the Green LED is first extinguished, Rx power is removed, then after a delay the relay is pulsed or placed in the Rx position. After another delay the Tx power is enabled with the Red LED. The opposite sequence occurs when a Tx >> Rx demand is detected. Although not used at the moment, the 16F688 PIC contains an A/D converter that could be used to monitor output power via a diode detector, or various voltage levels and send these back to the ground. Two pads on spare I/O lines are available for this purpose. Two or three more I/O lines can be found on the in-circuit programming interface. Future versions could, for example, transmit the output power as serial data to the ground. Alternatively, sense contacts on the RF relay could feed back into the PIC to ensure correct changeover before power is applied. Its only software !

## Construction

**Photo 1** shows the unit made up on a 70 x 55mm PCB. The PCB layout is available [1] in .PDF format for home constructors using UV acetate or press-N-peel techniques. There is a ground plane on the rear not shown, with ten through connections. Gerber or Easy-PC Pro-X files can be provided on request. PIC code in Assembler and compiled.HEX format can also be found in [1] The 16F688 PIC is not as well known as other devices but was chosen for several reasons. It has a calibrated internal oscillator, meaning no crystal or CR components, and maximising the number of I/O pins available. It comes in a smaller 14 pin package

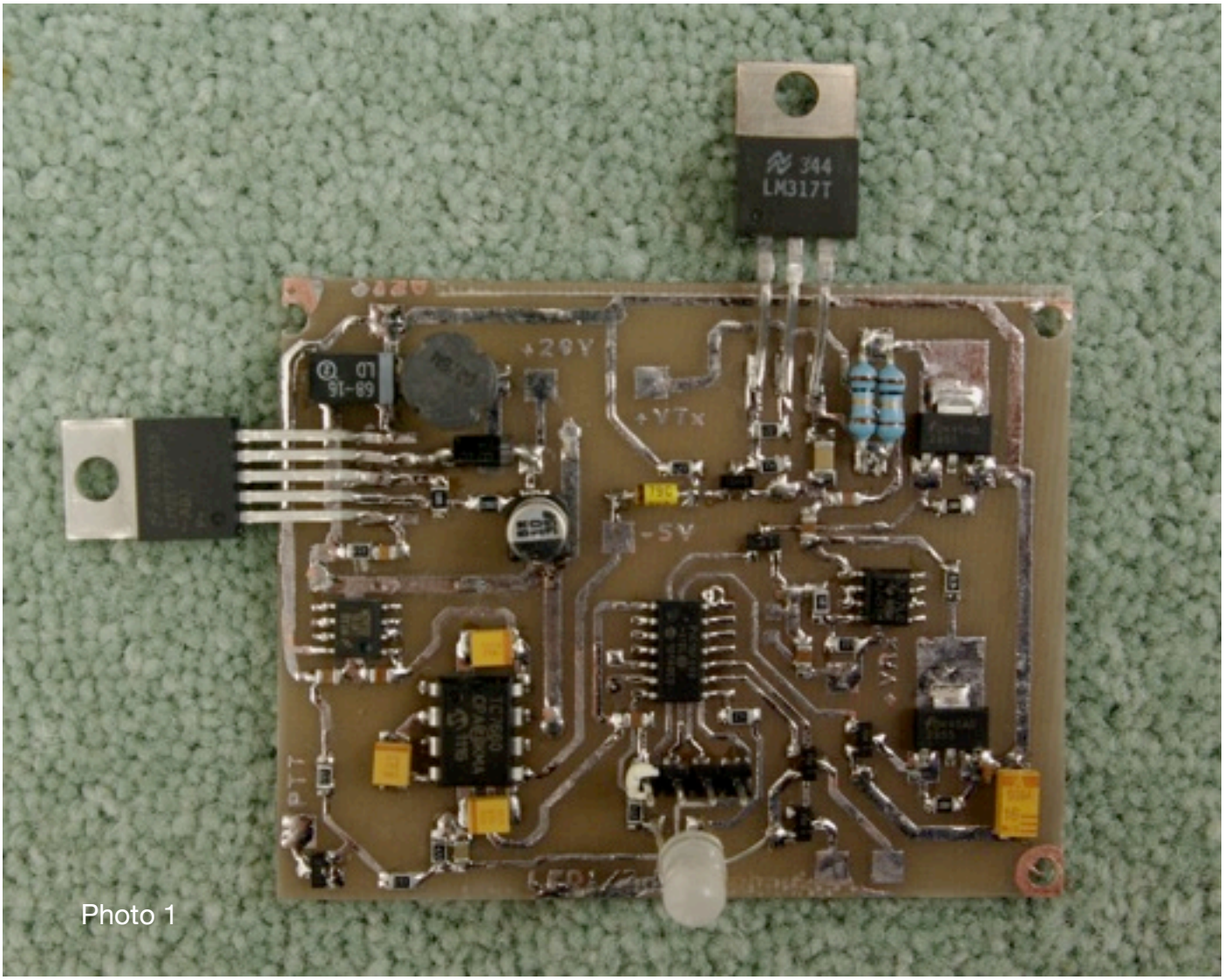


Photo 1

than the more popular devices for a more compact PCB layout and importantly, though not used here, has the A/D converter. It is also cheaper.

Most components can be substituted with similar types – nothing is important. Unless the 28V supply is to be asked to deliver a lot of current, the value of the inductor is not critical. Any SMPSU inductor value in the 50 – 200µH region and rated at 100mA will work. The diode should be a Schottky type such as the IN5819 (rated 1A 40V). If a large pulsed relay such as a waveguide type is used, an additional larger value capacitor should be added externally on the 28V rail to deliver the high current pulse demand.

## PIC firmware mods.

The PIC firmware allows for a few changes in functionality. The delay between each switching event can be set in milli-second intervals by changing the ***DELCONST*** constant (default 80ms). The switch de-bounce time is set by the ***DEBOUNCE*** value (default 10ms) and the latching relay pulse in ***RELAYPULSE*** (default 40ms). Setting this latter value to zero causes the RLa and RLb outputs to be alternately pulled continuously for non-latching relays.

## Reference

www.g4jnt.com/TvtrCtl.zip

*I've added a page to my website with a few hints for SMT construction. At the moment it just has a few notes on installing SMT ICs.*

*The page will be added to later.*

See www.g4jnt.com/ConstructionNotes.htm

**Andy G4JNT**

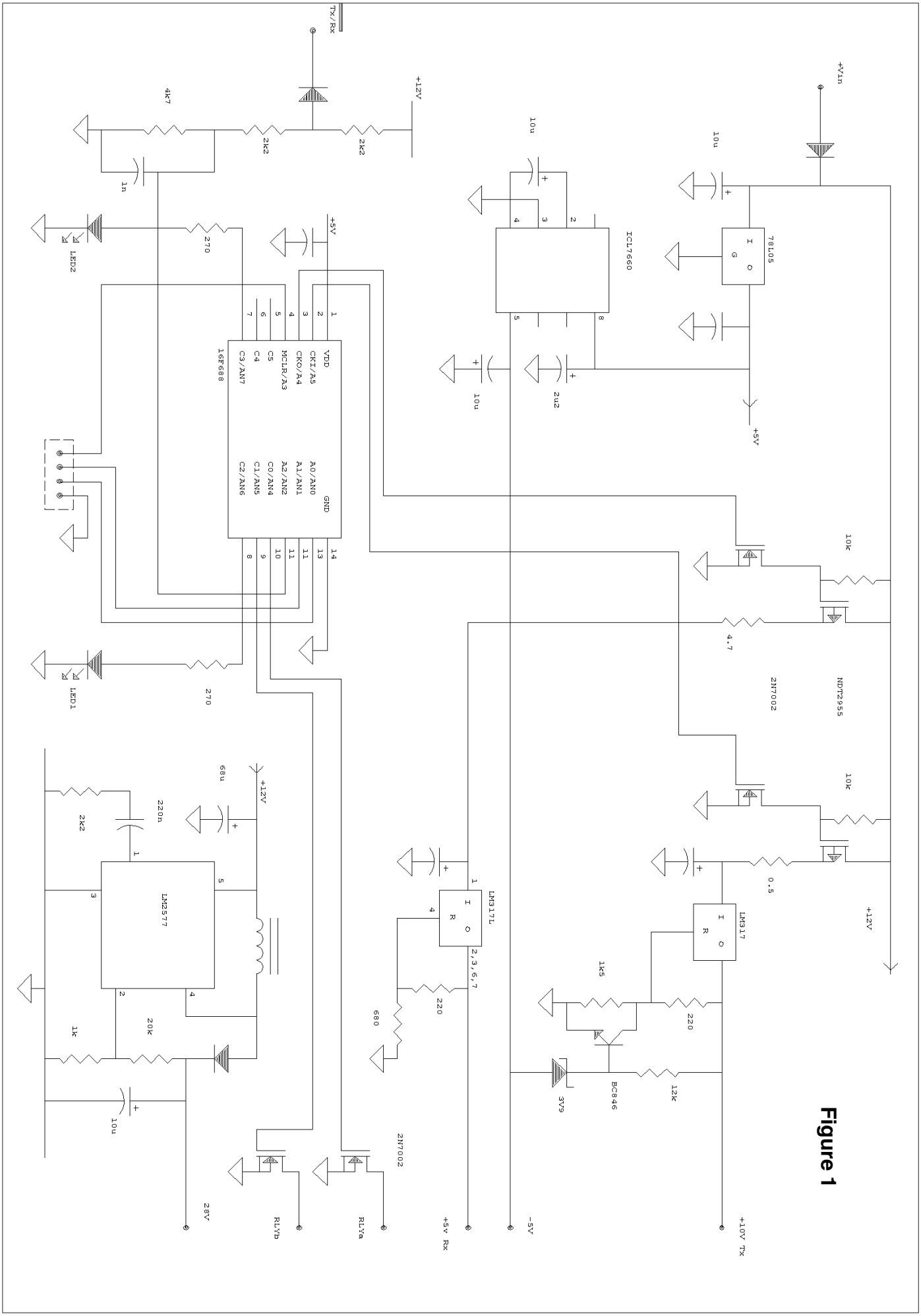

Tx/Rx
+12V
4k7
2k2
2k2
1n
LED2
270
+5V
10u
10u
ICL7660
78L05
+Vin
10u
2u2
+5V
16F688
VDD
CKI/A5
CKO/A4
MCLR/A3
C3/AN7
C4
C5
C6
C7
GND
A0/AN0
A1/AN1
A2/AN2
C0/AN4
C1/AN5
C2/AN6
LED1
270
10k
4.7
2N7002
NDT2955
10k
0.5
+12V
LM317
LM317L
2,3,6,7
220
680
1k5
220
BC846
12k
3V9
2N7002
+10V Tx
-5V
+5V Rx
RLYa
RLYb
28V
68u
+12V
2k2
220n
LM2577
1k
20k
10u

Figure 1

# Nanowaves

With the earlier times for darkness as we move into autumn, nanowave activity has picked up. Barry G8AGN and I have done some testing on UV-nominal 400nm wavelength with two way contacts over 4km, 10km and a one way over 22km. We hope to try to extend our daylight DX – 54km-when we have some more time.

Building on all the work so far, we decided it was time to push the red light dx some more. So on the 8th September, despite less than ideal conditions-–-very hazy atmosphere, low visibility-–-we decided to try a path of 129.1km from the North York Moors to Totley Moor SW of Sheffield. Pleased to report the test was successful--Barry gave me 52 and I gave Barry 53. Peter G3PHO accompanied Barry at the Sheffield end to monitor fair play/confirm correct qso.

I have included a photo of my portable red light equipment in its operating position on the North York Moors.

**Best wishes Gordon G0EWN**

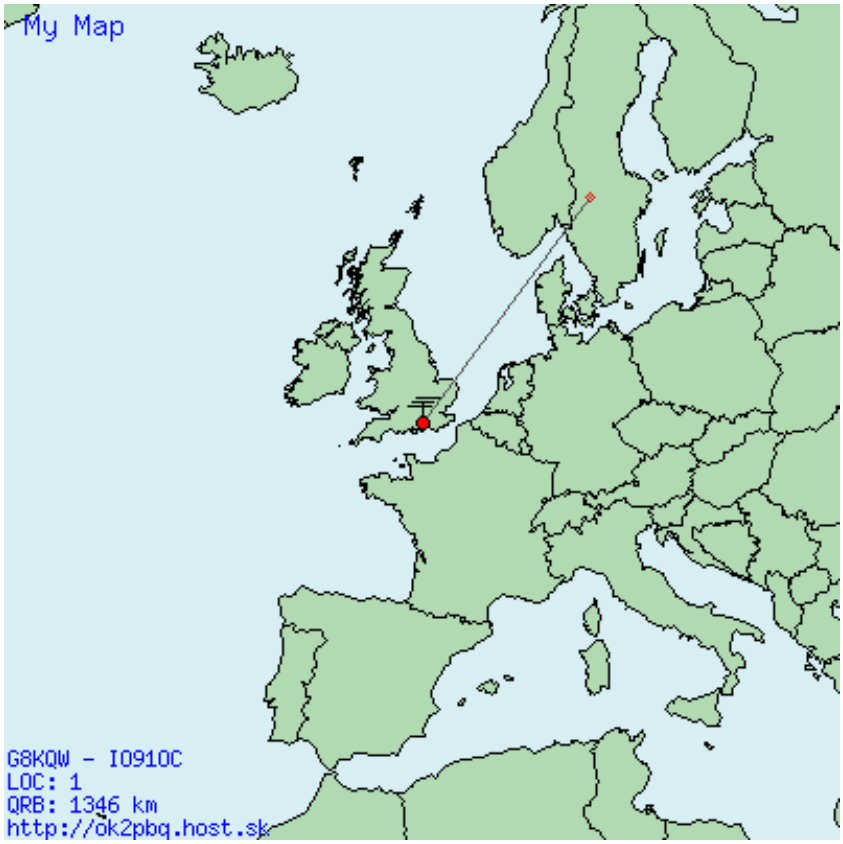
## New red light record

8 Sept 2012 Red Light 129.1km

G8AGN/P at IO93FH13 to G0EWN/P at IO94MJ96 mode AM

# 10GHz UK Distance Record

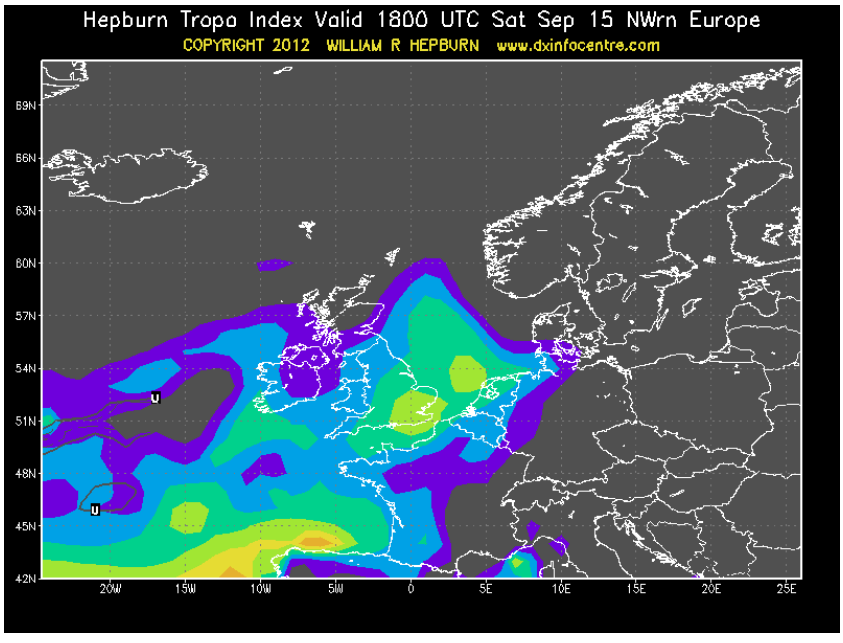
**John G4EAT**




It is interesting to compare the propagation and activity of the 15th September 2012 QSO with the previous 16th July 2006 UK 10GHz record QSO. In 2006 Hepburn alerted everyone to typical North Sea path propagation. The evening of Saturday 14th had some activity mainly with coastal stations working each other with good signal strength. Sunday morning however had additional overland ducting both in SM and UK which is quite rare. **SM4DHN** (JP60va) was very strong on 23cms in JO01/02 but only **Ian G8KQW** (IO91oc) was in the high level duct and one of the few (if only) further west able to hear him on 23cms. QSY to 10GHz was straightforward and was a record at 1347km.

As can be seen almost 70% of the path was over sea.

15th September 2012 Hepburn again provided an alert for western UK through western France albeit with good but not super conditions into southern France. These types of Hepburn forecasts are quite common but more often than not result in only providing sea paths and little overland tropo enhancement.

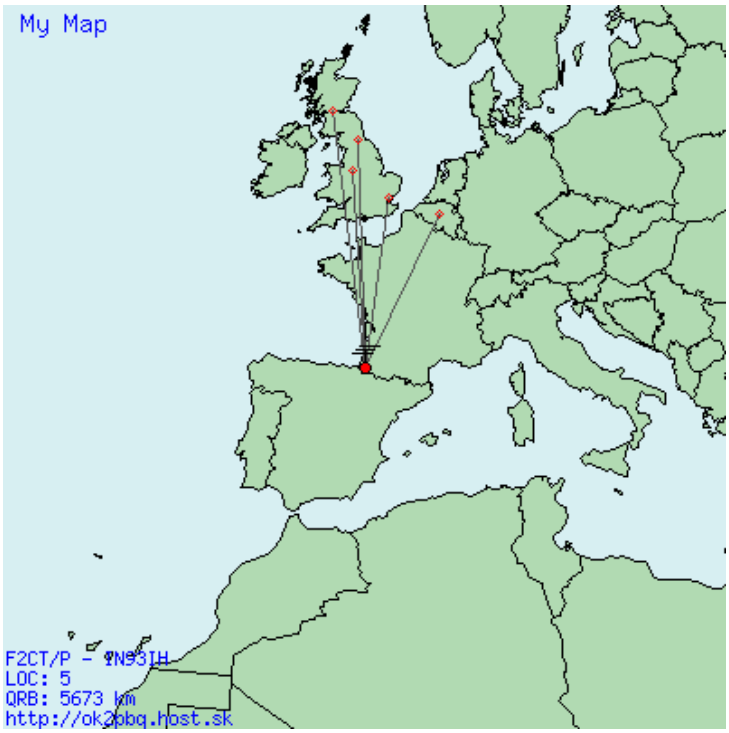



Beaconspot.eu shows that on 15th September there were no UK or French 10GHz beacons spotted. The only UK spotted 23cms beacon >600km was HB9EME by G4KUX. Interestingly there was little/no activity on 23cms.

**Guy F2CT/P** at Baigura mountain, IN93ih, worked several F-stations on 3 and 6cms and then tried UK stations. Having worked **ON4IY** (JO20-946km), **G4EAT** (JO01-946km), **G4CBW** (IO83-1,086km) and **G4KUX** (IO94-1261km), **Alan GM0USI/P** was alerted and set out portable to IO76xa and had immediate success at **1427km**.

What is noticeable that although there was high pressure in the Atlantic moving east and good sea path propagation, the paths worked were almost entirely overland.

From F2CT's location at Baigura Mountain 900masl, you can see an inversion on the horizon.



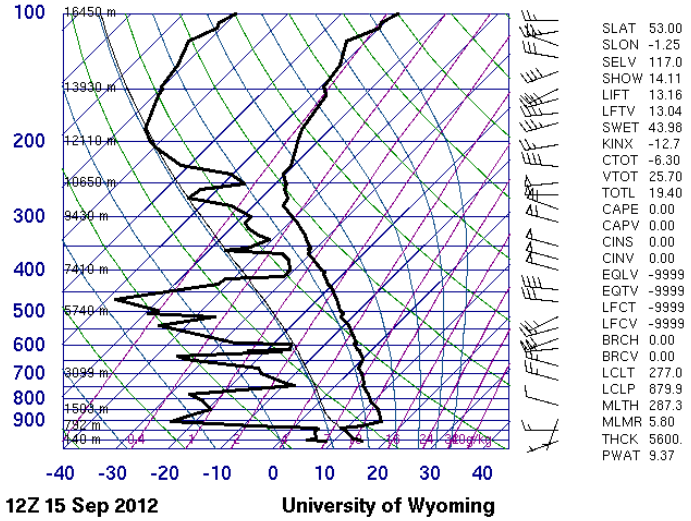

The following Radiosonde data at Bordeaux (closest to Guy), Trappes (north-central France), Brest (N-W France) and Nottingham (mid-UK) all show multiple high level (starting at 800 to 1500masl) temperature inversions. In NW Europe it is very unusual to see overland ducting over such a long path. The extensive high pressure clearly kept the high level Atlantic jet streams away.

Lessons I have learnt from both events:

•Hepburn gives good initial warning. Get monitoring and testing.
•Don't rely only on beacon spots. Ducts do strange things with radio signals! Sometimes beacons are in the duct but can often be below.
•Portable ops generate activity by testing paths. Watch their progress (cluster and/or ON4KST chat) and join in when suitably sited.
•Activity is especially high at weekends. Makes you wonder how many other opportunities may get missed during weekdays.

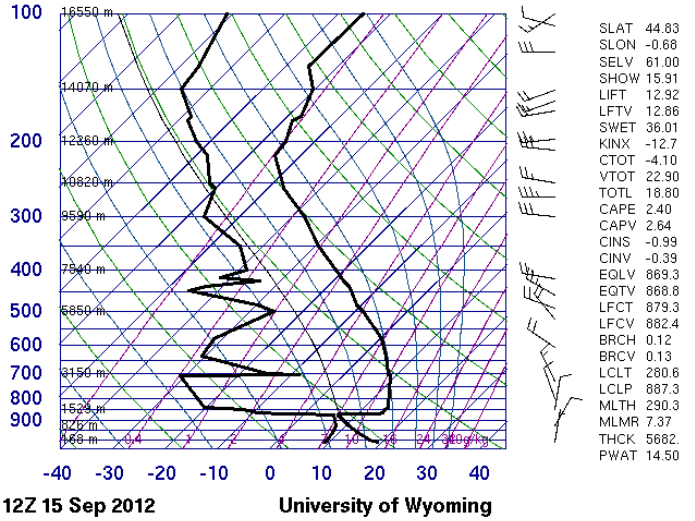
**John G4EAT**

**03354 Nottingham**



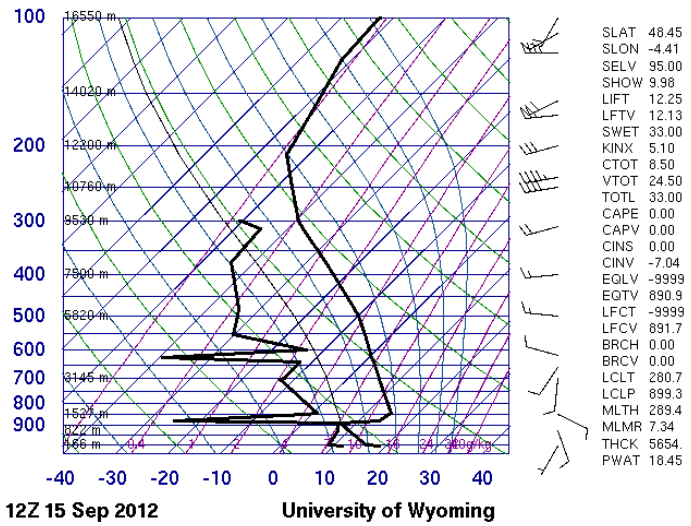

12Z 15 Sep 2012 University of Wyoming

**07510 LFBD Bordeaux Merignac**



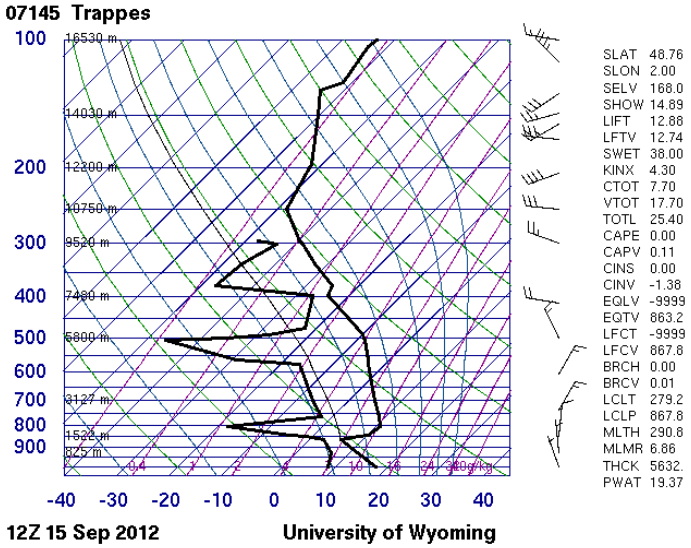

12Z 15 Sep 2012 University of Wyoming

**07110 LFRB Brest**




12Z 15 Sep 2012 University of Wyoming

**07145 Trappes**




12Z 15 Sep 2012 University of Wyoming

# That Tropo Record: IO76xa to IN93IH

**By Alan GM0USI/P**

Here are some pics etc from yesterday's [Saturday 15 Sept] amazing qso with **Guy F2CT/P**.

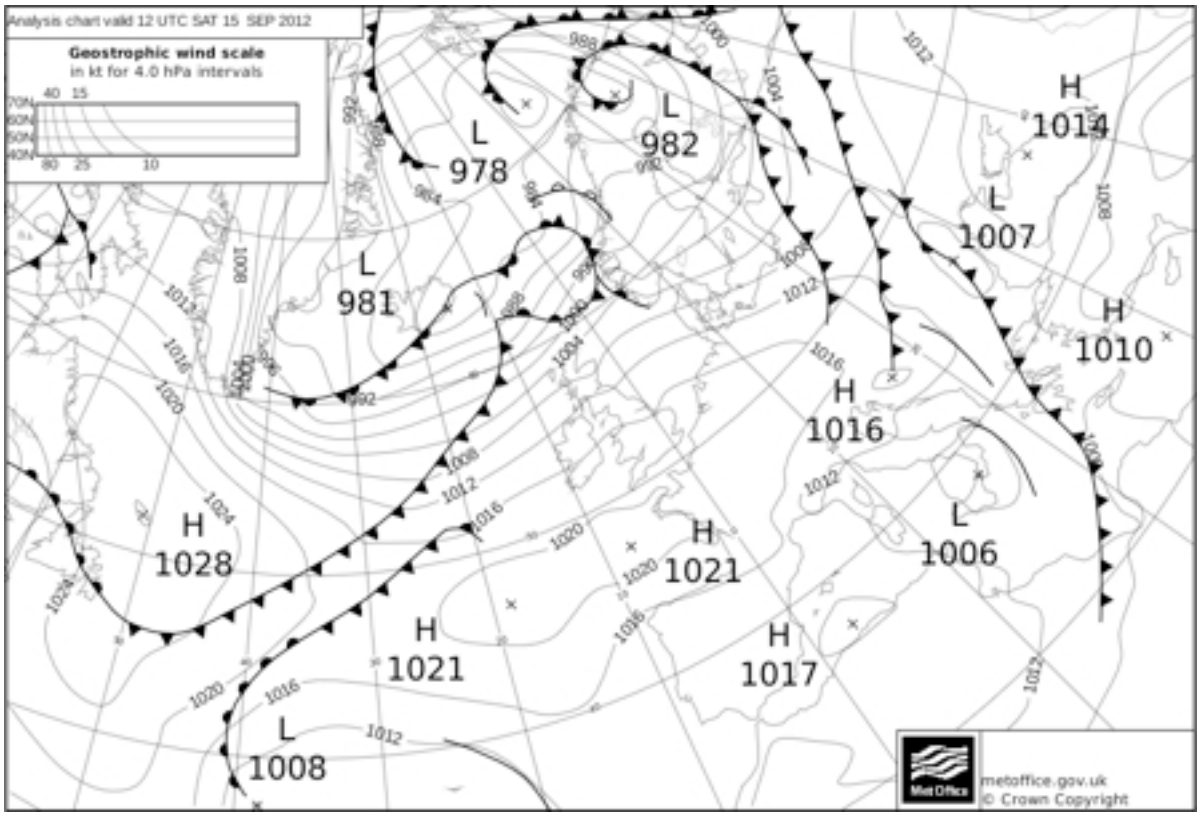
I thought I should give you an idea of the amazing tropo conditions yesterday. I had an email from Ralph G4ALY saying how he expected condx to be good this weekend as I looked out the window to the same high winds we have had all week thinking sometimes I wish I lived a bit further south – little did I know what was to come.

It had been a busy week workwise and hadn't checked any tropo forecast because of the wild wx we were having. I had been out all morning but received a phone message from Nix G4KUX saying he had just worked over 1200Km to the Pyrenees! Nick is 200k to the SE of me in a super location but I felt I should make the effort as we get so few tropo openings up here.

I arrived at the usual /P site at IO76xa 330m asl around 1400local finding it still very gusty but thankfully dry. The rain I thought was on the hills was actually fine mist. I did have to use guys and my usual 40lb weight [not 6lb!] Could only manage the 78cm dish but after getting ready Tony G4CBW kindly stayed around to give me an exact calibration to the dish – his signals were very variable but generally much weaker than normal – I think I was weak with him – normally 56-ish, this happened a week or two ago when condx were good further south.

At this stage I was sure I was probably just on the very edge of any propagation if any. KST was working fine with my new dongle but I had not charged the netbook battery – had 30min left! I hadn't expected to be out.

I heard Guy F2CT/P within seconds of his CQ loop coming on –- couldn't quite believe it -right on 171deg, never had to touch the dish- his signal had long slow QSB more like lower bands but peaking to 539 with an average of 529. Managed some quick phone recordings and we quickly exchanged 529 each way and then realised the QRB was – I make it 1428km! I was then told this was a new UK record which I didn't realise.




I tried with a Maurice F6DKW and Marc F6DWG/P near Paris but nil heard. A test with John G4EAT failed also.

So, quite an amazing and unexpected end to the day. A very big thanks to Nick to alerting me and to Tony as always helping me to calibrate the dish with such accuracy.

I was running about 9W to a 78cm dish DB6NT transverter gps locked with a DK6JL lna and PA Guy was atop Mount Baigura just under 1000m asl with 30W to an 80cm dish.

On a different tack – I will be popping up to IO77dj on Wednesday this week with 23 and 3cm just for a few hours in the PM 1400–1530? local and on Thursday at IO67wd in Elgol on Skye [qrv in the am]. I have never used the IO77dj site – will be interesting to see if I can hear/work anyone.

**73 Alan GM0USI/P**

PS: John G3XDY had asked me to give some details of my 3cm qso yesterday [15/09/2012] with F2CT/P at 1344z. Signals were 529 each way with Guy peaking 539 at times. My exact location was IO76XA61FN and I believe Guy's on Mount Baigura was IN93IH50BG giving the QRB to be **1428.7km**

# Activity News

**By John Worsnop G4BAO**

***Please send your activity news to:***

***scatterpoint@microwavers.org***

As I write the second two-month column of the year, despite the bright sunshine and warm weather here on the Fen Edge, summer is nearly over,. I always reckon that once the September 144MHz open is finished, it's autumn.

I am currently QRT on 1296 and 3400MHz for "a rest" and my 24GHz Thales system has sadly died and is beyond economic repair. I'm still QRV on 10GHz and on 2320MHz EME, but have "gone over to the dark side" (70 and 50MHz) to have a last fling at the sunspot cycle over the coming winter and spring.

We have an incredibly successful EME2012 behind us. The committee and all those involved are to be commended on what many have said was the best moonbounce conference ever. With a significant number of UKuG members presenting papers and the UKuG's investment of £6000 to set up the conference safely returned to our Treasurer, you as a group can feel proud to be members and that your tiny £6 subscription has been well spent.

This is beginning to sound like a "Chairman's Editorial", so on to the activity news for late July, August and September.

## Activity reports from out correspondents and the web

Early August saw Canary Island stations **EA8TJ** (IL18rj) and **EA8BFK** (IL38bo) working the sea path on 1296MHz up to mainland Spain (EA7). The path is well over 1200km, with ODX being QSOs on the 9th and 12th between **EA8TJ** and **EA7UB** (IM77gh) at 1430km. No reports of UK stations working them though.

August the 11th threw up some nice tropo further North and East on 1296MHz with a number of reports of QSOs over 800km. **GM3UAG, G4KUX, GW3TKH** and **M0DTS** all report hearing the **HB9EME** beacon (JN37kb) at 1296, 1041,881 and 826km respectively, but sadly no reports of subsequent QSOs

The 18th and the 19th produced more propagation on 1296 down the West of the UK with **EA2TO/1** (IN83fd) being worked by **GD8EX**I, (IO74pc 1221km), as well as **G6GIE** (IO90su) and **G4ALY** (IO70vl).

As I write this column (8th September), we are in the middle of a few days of good conditions, with some good QSOs reported on all bands.

Ralph **G4ALY** (IO70vl) reports on his 10GHz and 5760MHz activities. On 10GHz on the 6th at 1856, Ralph worked **F6DRO** (JN03tj, 935km) then, at 2014, **OK1JKT** (JO60rn) reported the **GB3SCX** beacon (1107km) and went on to work **F6DKW** (JN18cs) 832km and **G4EAT**, (JO01HR), 903km)

On the 7th at 0644, he copied the **HB9G** beacon in JN36 at 987km, and then at 0809, worked **F6DRO** (JN03) 889km.

Later in the evening at 1701 Ralph worked **EA1GHE/P** (IN73bp). The Spanish station was running just 200mW and was his first 10GHz QSO with G. There is a video of the QSO from the Spanish side here.

On 5760MHz Ralph reports QSOs with **F6CBC** (IN94qv) 676km, **F9OE** (IN78qg) 247km, **G3LRP** (IN93ho) 399km and the **HB9G** beacon at 35dB/N at 883km.

**Roscoe M0BTZ** (IO90gx) sent me this report from near Romsey, Hampshire.

(I was slightly amused that Roscoe described himself as “age 29.” I hope this is not a sad reflection on the amount of grey hair prevalent amongst microwavers that anyone under the age of 50 feels obliged to point it out!) Ed.

“I am currently building my 1296MHz station. Most of the gear is homebrew, apart from the IC251E and I hope to be QRV next year on 1296MHz SSB/CW with the following setup :-

IC251E+mutek, DB6NT Transverter, 15W PA M57762, 38 ele G3JVL loop yagi

I have an old 2 x 2C39 1296MHz power amplifier and a homemade 1.2kV PSU as a means of generating about 100W+ of RF, but this will need more work (a larger blower!) to get it operational. The PSU is fully built and working though.

I might even finish debugging my 2320MHz transverter during 2013, and become active on that band too! IC251E+mutek, DB6NT Transverter running 1.5W barefoot to a 48ele G3JVL loop Yagi. I also have a 60W SSPA for 2320MHz that needs a suitable heatsink and 28V PSU.

I am looking to get QRV eventually on 1296MHz EME but this ambition is a very long way off becoming reality! I am part way through building a 2.8m mesh dish from some scrap materials in my garage and have been working on the rib structure using some of the aluminium in my garage.

I have lots to do to get everything together and operational, but am aiming to be QRV on 1296MHz with the loop-yagi antennas with a simple setup to operate tropo and in the contests on 1296MHz next year.”

**Roger G8CUB** reports on the Cumulative Contest of 29th July 2012 on 5.7 / 10 / 24 GHz. He operated from the Ridgeway in IO91gn, 230m asl. Equipment was 5.7GHz 2.5W 0.9dB NF, 10GHz 5W 0.9dB NF, 24GHz 1.5W 2.5dB NF all on 80cm dish 7m agl.

There was exceptional rain scatter all day, with unfortunately the odd heavy shower overhead. **Jim G4WYJ/P** was worked first on 5.7 & 10G, at 124km. But despite hearing good signals each way on 24G could not complete a QSO. It was good to work home stations mainly by scatter on 10G including, **G3UKV** (direct on

10GHz), **G4ALY, G4NNS, G3FYX, G4RGK, G4KUX** (345km 55/55), **G8DTF, G3VKV, G4DDK, F6DKW** (406km 52/52) and **G4EAT**. **G3ZME/P** was a huge signal on 10G, while **Lehane G8KMH/P** responded to a CQ call on 10GHz, to complete a scatter contact.

I also heard a good signal on 24GHz from **John G4EAT** at 146km, but again no QSO.

Best DX was **Alan GM0USI/P** on CW at 525km, oddly this sounded like a tropo signal rather than scatter. The only 24GHz QSO was with **Brian G4NNS** via rain scatter. Last contact on 10GHz was with **M0DTS/P** where we just made an SSB QSO at 326km.

**Jim GM3UAG** reports on his activities "This was another high pressure that looked like it would not produce any DX. I had been doing some maintenance on my 2m dish and was checking that all was well on the morning of Saturday 11th August.

At 0945, I logged **HB9EME** on 1296MHz peaking 59 but with deep QSB. According to beaconspot's 1295km, it was a mutual ODX. There were no other signals, beacon or otherwise. It was there until about 1300. **GB3MHL** was copied, just, at 1330 and had reached S5 at 1810 but that was short-lived.

On Sunday 12th August at 2000, out of the blue, there was **PI7ALK** on 1296MHz at S8 and on 2320MHz at S5. Nothing else was heard. The only Netherlands station on KST was **PA0EZ**, so a quick meep and Arie was worked comfortably on 1296MHz SSB and marginally on 2320MHz. All quiet by 2130.

**Alan GM0USI** has been out and about again and reports on a number of trips around South West Scotland.

First, the Isle of Whithorn IO74TQ on 10GHz. The gear worked well apart from the gps going out of lock. I managed to work 12 stations which is good for me! Highlights were **Ralph G4ALY** 1st GM and an SSB QSO Two with **G3WIM/P** (JO01bb) at 504km. Two stations were on from GM – **Mark GM4ISM** and **Ed GM3SBC/P** both 59 with lots of RS.

Beacons were much in evidence all on RS – **GB3XGH** 59s **GB3CAM** 51s GB3LEX 51s and **GB3CCX** 52s.

**On the isle of Whithorn**


My 10GHz test with **Tony G4CBW/P** at Pendeen Watch [sea path] IO70dd to IO74np Mull of Galloway was a success. The weather at my end was very windy – gustier than when I have been in Skye so a bit tricky. Even with a 6-lb weight and 3 guys I could still see the tripod moving out the ground by an inch or two! I used the smaller 78cm Triax dish – It was just too windy for the bigger 1.1m one.

I did hear initially **XGH** beacon on RS but weak – also **Bob G8DTF**'s beacon but only for a short time. **Mark GM4ISM** was tried first and as expected very strong with a trace of RS. After checking the bearing to Cornwall Tony's signal was a solid 529 rising to 549 on peaks. The test with **Chris GW4DGU/**P (IO71ow) using a 10dBi horn was a solid 519. A final test with Tony around 1330 UTC found **Ralph G4ALY** on the microphone with much improved signals but also much higher gusts of wind – one of which loosened the release plate – I just managed to catch the transverter before any damage was done – reconnected things and Tony was still there at a very respectable 54-57 on SSB at just over 500km. It sounded like troposcatter to me but may have had some aircraft assistance.

The weather in Kintyre was far better than the winds of yesterday down at the Mull of Galloway. The wind was low so managed the larger the 1.1m dish – the path to **G4CBW/P** at Pendeen Watch (IO70dd) in Cornwall is 620km - no troposcatter was heard today but random  AS was successful on a number of occasions including SSB. Signals were however fleeting, with the max duration being around 4sec with Doppler at times of 300 Hz or more - levels from S1 to 4.  I imagine the reflections were from planes going across the Irish Sea rather than a N/S path.. Neither of us had Planefinder available at the sites to optimise communication.

**Mark GM4ISM** came on and was 59 with 40w and 35cm dish. **Chris GW4DGU/P** arrived at IO71ow 420km just after 1500 local – his troposcatter signals were up to 57/89 but QSB to around S4, almost the same level from our previous test from Isle of Cumbrae last month. Many thanks to everyone especially **Tony G4CBW** for all their efforts.

## Impromptu mm band activity day

Good to see former UKuG Chairman, **Ian G8KQW,** back in the UK and active on Microwaves again. He organised an impromptu mm wave activity day on August 22nd involving eight other stations on 24, 47 and 76GHz. The picture show's Ian's setup at Ventnor on the Isle of Wight. Click the link for details of the activity.
Clickable link to download pdf

## EME Reports

**Peter G3LTF** reports on his EME activity for June and July. He worked **TM8PB** on July11th on 5760MHz (initial #34) and on 3.4GHz, worked **G3WDG** and **G4KGC** on 25th June. In the 3.4GHz Activity Weekend July14/15th worked **LZ1DX, K5GW, ES5PC, K2UYH, DL1YMK, OK1KIR, VE6TA, WW2R, OH2DG, G4CCH**, (initial #40) **W5LUA, DL1YMK, OZ6OL** and **WA6PY**. He heard and called **SP6GWN**, (they just got the band). Peter's System on 3.4GHz is 25W at the feed of 6m dish with a W5LUA type preamp.

On the 23rd July, **André F1PYR** (JN19DA) worked **LX1DB** on 24GHz

Finally, here on the Fen Edge, I'm making progress on improving my own 2320MHz EME system, I now have the new 1.9m RF Ham design dish up and running, but I still need to make some tweaks to the feed system to get an extra dB or so, and to make my homebrew transverter more reliable. I have a G4DDK VLNA2 with a sub 0.3dB noise figure and currently am running about 150 Watts at the OK1DFC Septum feed.

At the end of July I had CW QSOs with **G3LTF, OH2DG** and **F2TU**, and, remarkably, had a partial SSB QSO with **F2TU** who was copyable here but just could not make out my report to him.

**73 and Good DXing on the microwave bands.**
**John G4BAO www.g4bao.com Twitter@g4bao**

Must be your accent, John. Ed.

# Contests & Activity Dates 2012

***Source: http://www.microwavers.org/?contesting.htm***

## *September*

| | | | | |
|---|---|---|---|---|
| 1.3GHz Activity Contest | Arranged by VHFCC | 18 Sep | 1900 - 2130 | RSGB Contest |
| 2.3GHz+ Activity Contest | Arranged by VHFCC | 25 Sep | 1900 - 2130 | RSGB Contest |
| ARRL Microwave EME | Arranged by ARRL | | | |
| 5th 5.7GHz Cumulative | F, P,U,R,L | 30 Sep | 1000 - 1600 | |
| 5th 10GHz Cumulative | F, P,U,R,L | 30 Sep | 1000 - 1600 | |
| 5th 24GHz Cumulative | F, P,U,R | 30 Sep | 1000 - 1600 | |

## *October*

| | | | | |
|---|---|---|---|---|
| 1.3 & 2.3GHz Trophies | Arranged by VHFCC | 6–Oct | 1400 - 2200 | RSGB Contest |
| 432MHz & up | Arranged by VHFCC | 6–7 Oct | 1400 - 1400 | IARU/RSGB Contest |
| ARRL EME 2.3GHz & Up | Arranged by ARRL | 6–7 Oct | | |
| 1.3GHz Activity Contest | Arranged by VHFCC | 16 Oct | 1900 - 2130 | RSGB Contest |
| 2.3GHz+ Activity Contest | Arranged by VHFCC | 23 Oct | 1900 - 2130 | RSGB Contest |

## *November*

| | | | | |
|---|---|---|---|---|
| ARRL EME 50-1296MHz | Arranged by ARRL | 3–4 Nov | | |
| 1.3GHz Activity Contest | Arranged by VHFCC | 20 Nov | 2000 - 2230 | RSGB Contest |
| Low band 1.3/2.3/3.4GHz 4 | F, P,U,R,L | 25 Nov | 1000 - 1400 | |
| 2.3GHz+ Activity Contest | Arranged by VHFCC | 27 Nov | 2000 - 2230 | |

## *December*

| | | | | |
|---|---|---|---|---|
| ARRL EME 50-1296MHz | Arranged by ARRL | 1–2 Dec | | |
| 1.3GHz Activity Contest | Arranged by VHFCC | 18 Dec | 2000 - 2230 | RSGB Contest |
| 2.3GHz+ Activity Contest | Arranged by VHFCC | 25 Dec | 2000 - 2230 | RSGB Contest |

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

**73 John G3XDY, UKUG Contest Adjudicator**

UKµG Contest Portal: microwave.rsgbcc.org/cgi-bin/vhfenter.pl

Perhaps you could consider doing something for UKµG in your area at your local rally? (Assuming you don't do so already!)

We have flyers & posters available for download.

**Contact any committee member**

# Events calendar 2012

| | | |
|---|---|---|
| Sep 14–16 | Amsat-UK Colloquium, Holiday Inn, Guildford, Surrey | www.uk.amsat.org/Colloquium/ |
| Sep 14–16 | 57.UKW Tagung, Weinheim | www.ukw-tagung.de/ |
| Sept 23 | Crawley Roundtable (date confirmed) | |
| Sept 28–29 | National Hamfest, Newark | www.nationalhamfest.org.uk/ |
| Oct 6–7 | British Amateur TV club convention and BiAGM, Basingstoke | www.batc.org.uk/club_stuff/convention/ |
| Oct 12–14 | RSGB Convention, Horwood House, Milton Keynes | www.rsgb.org/rsgbconvention/ |
| Oct 18–21 | MUD 2012, Santa Clara CA | www.microwaveupdate.org/<br>mud2012@pacbell.net |
| Oct 28 - Nov 2 | European Microwave Week, Amsterdam RAI<br>NB European Microwave Conference 2012 is 29th Oct - 1st Nov | www.eumweek.com/ |
| Nov 3 | Scottish Roundtable | www.rayjames.biz/microwavert |

## 2013

| | | |
|---|---|---|
| April 6 | CJ-2013, Seigy | cj.ref-union.org/ |
| May 17-19 | Hamvention, Dayton | www.hamvention.org/ |
| Oct 8-10 | European Microwave Week, Nuremberg | www.eumweek.com/ |

## 2014

| | | |
|---|---|---|
| August | EME2014, Pleumeur-Bodou near Lannion | |

Don't forget that

**Every Monday evening is Microwave Activity Evening**