



An Amateur Radio publication for the Microwave enthusiast

# MICROWAVE NEWSLETTER

Published by the Radio Society of Great Britain and edited by G3PHO and G8AGN.

Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE

## FROM THE EDITOR

2004 – MAY

There's just one issue to go now, after this month's edition, before we become "Scatterpoint" the newsletter of the UK Microwave Group. In the centre pages of this issue is a form which we ask you to pull out and return to the editor **as soon as possible**.

You can reply by email if you wish (the email address is at the foot of this page) by scanning the completed document or typing the essential details (i.e page 9 only) into the email. That is left to you! We have arranged for the present RSGB Microwave Newsletter subscription list to be transferred to the UkuW Group at the end of June but as there is a two tier subscription for Scatterpoint we need to know how you wish to receive the newsletter from the July issue onwards and also to confirm that you will indeed be continuing with your subscription. **Please note the change of the annual renewal date from Jan 1st to July 1st.** This has been made to keep the Christmas/New Year period free of the "admin" which renewals create. As a subscriber to Scatterpoint you will, regardless of your location in the world, also become a full member of the UK Microwave Group!

Our thanks go once again to everyone who has sent in articles or other items this month. You keep the newsletter afloat !

The summer has arrived, we think, and already there have been some interesting microwave contacts being made. Read about them in the Activity News section.

The recent Microwave Round Table, held at R.A.L near Didcot, was a resounding success. Our thanks go to all who made it happen, in particular to Dr.Mike Willis (G0MJW) and his colleagues at the Laboratories. We will have a full report in the next issue of the Newsletter.



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News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown below. The closing date is the Friday at the end of the first full week of the month if you want your material to be published in the next issue.



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G3PHO, Peter Day,  
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G3PHO: Email: [microwaves@blueyonder.co.uk](mailto:microwaves@blueyonder.co.uk)

**SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO RSGB HEADQUARTERS AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE AND NOT TO THE EDITOR ..**



## 3.4GHz gear

- \* Two @ 3.4GHz 17watt PA (Ionica) £35 plus P&P
- \* 3.4GHz Rx (Ionica) £20 plus p&p

**Matt Biddles, G7OBR**  
[mattobr1@ntlworld.com]

## A NEW MICROWAVE ACTIVITY TROPHY

We are delighted to announce that Wood and Douglas, the well-known UK communications equipment company, have very generously sponsored an annual microwave activity trophy, to be administered by the UK Microwave Group and to be awarded to the operator who, in the opinion of the UK Microwave Group Committee, has achieved most on a specific band in any one year. A different microwave band will be chosen each year, the idea being to stimulate UK activity on that band. This year, 2004, the band chosen is 3.4GHz.

The final decision is up to the committee and the winner may not necessarily be the one with most stations and countries worked. However, anyone with ambitions to win the trophy must at least have a regularly updated entry in the annual Microwave League Table, (published at intervals throughout the year in this newsletter and available monthly on the Internet at [www.g3pho.org.uk](http://www.g3pho.org.uk)).

More details will appear shortly but for now be active on 3.4GHz! Full rules for the League Table appear on the website shown above and will be published in the newsletter next month.

## HAVE YOU REGISTERED FOR MICROWAVE UPDATE 2004?

A contingent of UK microwavers has already booked flights and hotel rooms for this year's Microwave Update, to be held in mid-October at Dallas, Texas. Along with amateurs from all over the world, the editor has attended a number of these events in the past and can heartily recommend the idea to Newsletter readers. You should treat yourself to at least one Update in your life!

Now is the time to book flights, before prices are due to rise and while the US Dollar/Sterling exchange rate is so favourable to us in the UK. The hotel in which the convention is being held is just a couple of kilometres from Dallas-Forth Worth airport and a free shuttle service operates between the two. If you are interested and would like to join G3PHO, G3PYB, G4DDK, G6GXX and G8UBN, who have already booked flights and rooms, then log onto the North Texas Microwave Society's webpage at :

[www.ntms.org](http://www.ntms.org)

from where you can find a direct link to the hotel and book your room online. A double room for the period 13-17th October inclusive is just \$308 and is an even more economical "buy" if you decide to share it with someone.

Flights are as cheap as £316 (from Manchester) leaving on the morning of the 13th and arriving back in UK on the morning of 18 October. Check [www.travelocity.co.uk](http://www.travelocity.co.uk) for availability.

**SEE YOU ALL THERE!**

## ERRATA

**G4JNT, Andy Talbot**[[ACTALBOT@mail.dstl.gov.uk](mailto:ACTALBOT@mail.dstl.gov.uk)]:

**GPS DO. home page.**

**There are a couple of mistakes in the circuit diagram of the GPS Disciplined Oscillator as printed in the March 2004 Microwave Newsletter:**

- The third 74HC390 needs to have its two input pins 1 and 7 swapped around - then it can divide by 10 properly.
- Using the other Exclusive-OR phase detector in the 74HC4046 works better than the edge triggered one - in fact this is the one I used eventually and produced the plots from, but supplied an old drawing to both the web page and the Newsletter!
- Take the connection to the R/C network from pin 2 (PD 1 output) rather than pin 13 as shown (PD2).

The diagram on the web page will be updated in due course.

**Andy, G4JNT**

# The 49th Weinheim VHF Convention

*This excellent VHF/UHF/SHF convention being held over the weekend of 11th and 12th September 2004 in Weinheim and Bensheim, Germany. Like Microwave Update in the USA, you owe yourself at least one visit to this event during your amateur radio lifetime! Unfortunately, due to a number of factors, a similar event is scheduled for a fortnight earlier than the one described here and this has led many to be confused as to which to attend. All we can say is the event described below is the traditional Weinheim Convention and is highly recommended :*

The traditional event with lectures, trade fair and flea market will be held in the Karl Kuebel Schule in Bensheim on Saturday (11.09). This new venue offers considerable advantages with respect to all aspects of the VHF Convention:

- two large, fully equipped lecture rooms and a third room, which is also suitable for meetings.
- long corridors for the commercial exhibition.
- extensive grounds outside for the flea market and parking.

Some flea market stands may be accommodated indoors and some vendors will probably be able to sell from their cars if they wish.

The school is ideally situated close to the Bensheim exit of the A5 motorway (14 km north of Weinheim) and the car park is large enough to accommodate both exhibitors and visitors.

Plans for Sunday (12.09) include discussions with speakers and a mini flea market at the "Wasserhaus" (the clubhouse of A20, the Weinheim branch of DARC, DLOWH) within the framework of a late breakfast or brunch.

Camping will be possible adjacent to the clubhouse as usual (*this is a really great place to meet microwavers and VHFers from all over Europe!...editor*). Martin & Martina will again be organising the "Hamfest" on Friday and Saturday evenings .... and this is also where talks will be taking place on Sunday.

Although we have already received many enquiries from potential lecturers, there are still one or two gaps in the programme, so don't hesitate to contact Achim, DH2VA, if you would like to pass your knowledge of a particular aspect of VHF technology on to others (in German or English).

Preparations for the home-brew competition are already in full swing. If you would like to enter, please contact the office.

The programme for the Convention is being put together at the moment.

Further information can be obtained from the office, on our Internet site at <http://www.ukwtagung.de> or under "UKW" for packet radio, as soon as it becomes available.

## The tried-and-trusted team of organisers:

<b>Convention Managers:</b>	Helmut Bahner, db2iz, and Juergen Guenther, df6ih, facw@gmx.com
<b>Lecture organisation:</b>	Achim Vollhardt, dh2va, dh2va@amsat.org
<b>Exhibition organisation:</b>	Reinhard Hueller, dd0id, facw@gmx.com
<b>Technical organisation:</b>	Volker Winterscheid, df7it, df7it@aol.com
<b>Flea market:</b>	Tanja Riedel, dg9uat, dg9uat@aol.com
<b>Hamfest:</b>	Martin and Martina Schmiedel, dl1iaq, dl1iaq@gdx.de
<b>Office (for all queries):</b>	Silke Mahlke, dl2iak, tel: 06201-592091, fax 06201-5092092,
<b>Packet Radio:</b>	dl2iak, eMail: dl2iak@amsat.org

# Running beacons from an unstable 12 Volt supply

... by Andy Talbot, G4JNT

From the outset we aimed to run the GB3SC# family of beacons from a 12 Volt battery backed up supply in order to simplify individual units and make them less susceptible to short mains outages (like using a kettle on site which drops the mains voltage to 120V!). The 2.3 to 5.7GHz beacons were made up as normal, designed to accept the straight 12V input from the battery which was often used directly for DDK004 type multipliers and crystal heaters - we never thought about the implications of interactions between equipments.

The first version of GB3SCX had been built using a mains power supply giving 14V and had proved adequately stable. When converting to 12V operation at its rebuild stage to uprate the PA last year, I noticed that the RF line up was quite susceptible to frequency shifts with supply voltage. So, from the outset, I had to ensure it was properly regulated and able to cope with whatever a battery supply could throw at it. The DDK004 RF multiplier needed at least 11V to give enough RF output so, assuming a battery voltage that could shift over the range 11 to 15V, it was obvious that simple linear regulators were out. The head unit with its 2.5 to 10GHz multiplier and PA, included its own regulation, so could be left to fend for itself using raw battery supply. So now it was only necessary to supply the DDK004 source. The Farnell / RS catalogues list a plethora of small low cost encapsulated DC / DC converter modules rated from 1 Watt upward. The cost of these increase considerably with power rating so the lower rating we can get away with, the better. Since a target voltage of 13.8V seemed to be about right, and I wanted to include a linear regulator anyway, a raw converted output of at least 15V is called for. To minimise the rating needed for the DC/DC unit, the isolated output from this can be added to the source voltage, rather than supplying all of it, so the DC/DC module only has to supply a portion of the power needed for the final unit.

I already had a 1 Watt rated 12V to 12V converter (NME1212S, Farnell Part No. 178-197, the cheapest they do) from an earlier project and used this in a circuit similar to Figure 1. It could only give 80mA output which rather marginal, but just about sufficient for the DDK004 alone. An LM317\* was used as a linear regulator to allow 14V output (7812 regulators jacked up with a couple of diodes are disgusting and should be banned by law!). With DC/DC converters, EMC is always an issue and I fully expected to have to include plenty of decoupling to remove spikes and noise at the switching frequency. Filtering was built in from the start and proved to be necessary. Even with the one input and two output stages of filtering as shown, sidebands at -60dB are detectable on the RF output at a few hundred kHz away. All worked as expected and this PSU is the version in current use on GB3SCX. It works properly over the input voltage range 10.5 to 15 Volts (although with slightly reduced power output at the lowest input voltage, down to the design of the 2W PA stage)

As a number of listeners know and complain about, GB3SCC, the 5.76GHz beacon, operates on a time cycle which was initially 40 seconds on and 40 seconds off (now 40 and 20 seconds respectively for a trial period). I noticed that the frequency of GB3SCF on 3.4GHz changed audibly - in fact by about 30 - 40Hz when GB3SCC switched on and off. As this uses raw 12V for some of its stages, the frequency shift is to be expected. What I hadn't bargained for was a slight (about 10Hz) residual shift on GB3SCX in spite of the, now, highly stable supply. Also it wasn't a sharp shift such as that observed on 'SCF. Instead the frequency would change slowly over a few seconds and even appeared to overshoot slightly at times. It looked as if the crystal heater was to blame, changing the frequency as it warmed and cooled with the approximately 150mV supply voltage variation. I haven't measured this effect any more accurately, and the next version of the beacon will use a phase locked approach, not calling for a crystal heater. I will also need to adopt an uprated DC/DC converter to supply the PLL unit as well as the multiplier. It is not necessary to generate 12V in order to add to a worst case battery input to get 14V, and a lower output is desir-



## NEW EUROPEAN LIGHTWAVE RECORD

The following email from Michael, DB6NT, tells of a new European red laser record:

On April 21st, 2004 we had a connection about 106 km with laser 660nm (red) with 56...59 signals (QSB) in AM.

Time: 19.00 UTC. DG0EB / DG8EB were on the Fichtelberg (JO60LK) and DB6NT/DB2NP were on the Wetzstein (JO50RK)

- Output power about 5 mW

- 120 mm lens

**vy 73 Michael, DB6NT**

***Congratulations to Michael and the rest of the team ... editor***

***From GOMRF (one of our own UK light wave record holders) comes the following comment ....***

*I forwarded Michael's news to a group in France, led by Yves F1AVY, who earlier had a 104km QSO and I received this interesting reply ....*

*They seem to have set up a cloudscatter beacon using a multi tone system known as Jason. (This has been used on LF with success and is free from [www.weaksignals.com](http://www.weaksignals.com))*

*What is surprising about this is the laser is quite low power (10mW) and in the Infra Red range.*

*Anyway, it's nice to know that the French are also experimenting with DSP modes and **there are now 3 groups in Europe 'playing' lasers.***

**G4RFR & G4BRA  
PORTABLE AT  
BELL HILL,  
IO80UU,  
DURING THE  
MAY 2004 RSGB  
432MHz & UP  
CONTEST**

**02 05 2004**

# About the UK Microwave Group (UKuG)

The Group was formed in the Autumn of 1999. In early 2004 it became the representative voice of the UK amateur radio microwave enthusiast after the Radio Society of Great Britain disbanded its own Microwave Committee. As a result, the UK Microwave Group took over the former RSGB Microwave Newsletter and will now publish it as **Scatterpoint**, which was the Group's own quarterly newsletter up to 2003.

The Group is affiliated to the RSGB and, through the Group Committee, works with the RSGB Spectrum Forum in matters of interest to the amateur microwaver.

**Membership of the UK Microwave Group is open to all interested in amateur microwaves whether they are resident in the UK or not.**

Membership benefits include the Group's newsletter, Scatterpoint, which is published ten times a year, discount on Group products, representation via the Group committee on the RSGB Spectrum Forum, fully voting rights at Group meetings, UKuG-organised microwave events in the UK such as contests and "microwave roundtable meetings", operating awards and trophies. The Group's Annual General Meeting is held, each November, at Martlesham, Suffolk.

**Membership enquiries and applications should be sent to the Group Secretary. A membership form is available at [www.microwavers.org/ukugmemb.htm](http://www.microwavers.org/ukugmemb.htm)**

**Annual Subscription rates (renewable on or before July 1st each year)** are as follows and include 10 copies of Scatterpoint per year:

**(This information supercedes any published in the past)**

## **UK residents:**

£12.00 Sterling per annum including a printed version of Scatterpoint

£6.00 Sterling per annum, including Email (PDF) version of Scatterpoint

## **Eu zone residents outside UK:**

£15.00 (Sterling or Euro equivalent) for printed Scatterpoint

£6.00 (Sterling or Euro equivalent) for Email PDF Scatterpoint

## **Residents outside Europe and Eu Zone:**

£20.00 (Sterling or US\$ equivalent) for an **airmailed**, printed Scatterpoint

£6.00 (Sterling or US\$ equivalent) for Email PDF Scatterpoint

**Subscriptions can be paid by any of the following methods. Please note that we cannot, at present, accept payments by credit card. (Contact G4KNZ if any problems)**

- **UK cheque payable to the "UK Microwave Group"**
- **Cash (only Sterling, Euro or U.S dollars) posted in an envelope at your own risk**
- **Banker's draft (expensive!) or International Money Transfer to the Group's bank account**

<p><b>Chairman and Scatterpoint Editor:</b></p> <p><b>Peter Day, G3PHO</b></p> <p><b>Email:</b> microwaves@blueyonder.co.uk <b>Located:</b> Sheffield (IO93GJ) <b>Address:</b> 146 Springvale Road, SHEFFIELD, S6 3NU, United Kingdom <b>Home Tel:</b> ++44 (0)114-2816701</p>	<p><b>Secretary:</b></p> <p><b>Martyn Kinder, G0CZD</b></p> <p><b>Email:</b> martyn@czd.org.uk <b>Located:</b> Crewe (IO83) <b>Address:</b> 12 Jessop Way, Haslington, CREWE, Cheshire, CW1 5FU, United Kingdom <b>Home Tel:</b> ++ (0)1270-505930</p>	<p><b>Treasurer:</b></p> <p><b>Steve Davies, G4KNZ</b></p> <p><b>Email:</b> steve.davies@nokia.com <b>Located:</b> Bracknell (IO91PJ) <b>Address:</b> 17 Haywood, Haversham Park., BRACKNELL, RG12 7WG, United Kingdom <b>Home Tel:</b> ++44 (0)1344-484744</p>
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## **UK MICROWAVE GROUP MEMBERSHIP AND SUBSCRIPTION DETAILS (Interim changeover period)**

From July 2004 issue, the RSGB Microwave Newsletter will become **SCATTERPOINT** the Microwave Newsletter of the UK Microwave Group.

**The RSGB will be transferring all unused newsletter subscription monies over to the UKuG on 1 July this year, along with the latest subscription address database. However the UKuG needs some advanced information from you to enable a smooth changeover ... hence the form opposite.**

- **To receive SCATTERPOINT from July onwards this year, you must become a member of the UK Microwave Group on 1 July 2004. This is necessary due to the UK Data Protections Act which states we cannot keep data records for non-members.**  
If you wish to join UKuG please indicate opposite. Your present RSGB Newsletter subs will be credited to you if they extend beyond 1st July 2004. If the subs expire before 1st July then you should send the full amount of your UKuG subs to the Treasurer (see previous page for addresses and subscription details) by that date. 1 July will become the annual subscription date for everyone.
- **If you do not wish to join the UKuG,** the balance of your former RSGB Microwave Newsletter Subscriptions as at 1 July 2004 will be refunded to you. Please indicate your wishes on the form opposite. Make sure you fill in your address so that the UKuG treasurer can contact you with the refund.
- **Shortly after 1 July this year,** all members will receive a letter from the Group Secretary detailing their current subscription situation.

**Subscription rates are shown on the previous page and are current for the year 2004-2005.**

**The Subscription Rate for the email (PDF) version of the newsletter and UKuWG membership is £6.00 Sterling for anyone, anywhere.**

**Remember ... for information only, contact the Group Secretary  
... to subscribe, send money to the Group Treasurer**

**\*\*\* THE FORM OPPOSITE SHOULD BE RETURNED TO G3PHO  
WHETHER YOU INTEND TO JOIN UKuG OR NOT. IF YOU DO NOT  
RETURN THE FORM, AFTER FOUR WEEKS FROM THE JULY RENEWAL  
DATE THE UKuG WILL ASSUME YOU NO LONGER WISH TO RECEIVE  
THE NEWSLETTER AND YOUR OUTSTANDING SUBS WILL BE  
REFUNDED TO YOU \*\*\***

# UK Microwave Group

## Membership details – updated as at May 2004

Please provide the details asked for below and send the completed form **to arrive no later than Monday, 28 June 2004** to:

UKuWG Chairman and Newsletter Editor, Peter Day, G3PHO:  
146 Springvale Road, SHEFFIELD, S6 3NU, United Kingdom.

Or: email the information to: [microwaves@blueyonder.co.uk](mailto:microwaves@blueyonder.co.uk)

**PLEASE PRINT ALL INFORMATION CLEARLY ...**

**NAME:**

**CALLSIGN:**

**LOCATOR SQUARE  
or GRID ( eg IO93FB)**

**FULL  
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ADDRESS:**

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**PRESENT RENEWAL DATE FOR THE RSGB  
MICROWAVE NEWSLETTER:**

Please indicate the format in which you want your copy of SCATTERPOINT:

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**I WISH TO DO ONE OF THE FOLLOWING ON JULY 1ST 2004:**

- Become a full member of the UK Microwave Group and  
and receive Scatterpoint for the next 12 months
- I do not wish to become a member of the UK Microwave Group  
Please refund my RSGB Newsletter subs outstanding on July 1st

**PLEASE DO NOT SEND ANY MONEY WITH THIS FORM!**

To help to make the newsletter appeal to a wide range of microwave enthusiasts, we are using this document to gather a few details about your microwave interests and activities. If you intend becoming a member of UKuG please tick the bands upon which you are presently operational, or for which you are building equipment.

<b>MICROWAVE BAND SURVEY</b>	<b>1.3 GHz</b>	<b>2.3/2.4 GHz</b>	<b>3.4 GHz</b>	<b>5.7 GHz</b>	<b>10 GHz</b>	<b>24 GHz</b>	<b>47 GHz</b>	<b>76 GHz</b>	<b>136 GHz</b>	<b>200 GHz +</b>
I have working equipment for these bands:										
I operate these bands on a regular basis:										
I am presently making equipment for these bands:										
My power output is (watts):										
I use the following modes (ssb, cw, fm, EME, ATV etc) on these bands:										
My antenna is:										
My best DX is:										
I would like to see more articles in the Newsletter about these bands:										
I am willing to write articles for the newsletter about these bands:										
My job involves working with micro-waves on these frequencies										

# 13cm to 6cm Wideband Amplifier using an LNB

... by Mike Parkin G0JMI

## 1. Scope

A wideband amplifier is described that is based on the two-stage GASFET amplifier taken from an Amstrad "Blue Cap" Low Noise Block (LNB) satellite TV down-converter.

## 2. Performance

Measured gain for 1mW drive at:

2320.1MHz: 17dB approx.

3400.1MHz: 17dB approx.

5760.1MHz: 15dB approx.

Typical output power out:

2320.1MHz: 60mW

5760.1MHz: 50mW

Measured using HP Power Meter 430c into 50 ohms load.

## 3. Summary of Construction

The GASFET amplifier was built using two of the three amplifier stages from an Amstrad "Blue Cap" LNB TV receiver that link the input to the mixer.

The LNB module was obtained from a Rally for about £1. The pcb is removed from the LNB's box with access to it being gained by drilling out the four outside rivets and then removing the screws from the internal screening. The screw holding the +5 Volts d.c. regulator needs to be removed and the output wire cut before the pcb can be removed from the box.

Using a sharp knife or scissors cut out the two-stage GASFET circuit as shown in Figure 1. Remove the copper track runs for the integral tuned circuits and track runs as shown in Figure 1. A pcb drill fitted with a small grinding tool was used for this purpose, however a needle file can be also used with care.

Note that the input capacitor C1 uses the modified first inductor where it is soldered into place. Remove sufficient of the inductor to accommodate the surface mount capacitor.

Note that the output capacitor C3 uses the modified circuit track from the Drain of GASFET F2. Remove sufficient of the track to accommodate the surface mount capacitor.

Capacitors C1 and C3 are de-soldered from the remaining LNB board, use the "white" capacitors used to couple the MMIC amplifier chips together or to decouple them.

For 5670MHz use (6cm) leave the strip-line capacitor in place. For 9cm and 13cm remove enough of this capacitor to accommodate another "white" surface mount capacitor recovered from the remaining pcb (C2).

Keep the GASFET +Ve supply and bias circuits intact, but remove supply lines.

Drill 1mm holes close to the +Ve supply circuits (marked R and C in Figure 1) and counter-sink them with a 4mm drill on the earth-plane side of the board to provide sufficient insulation for the +5 Volts supply lines that are fed to the supply circuits from under the board (P1 and P2).

Drill a 2mm hole as shown in Figure 1 for the -1.5 Volts bias supply.

Once this process has been completed, the box for the amplifier can be made up from double-sided copy clad board as shown in Figure 2. Solder the LNB two-stage amplifier to the long side of the box (solder both the earth-strip on the upper side of the board and the earth-plane lower side).

Suitable holes are drilled in the shorter sides as shown in Figure 2 to accommodate BNC sockets that are attached using 8BA (or equivalent) short length nuts and bolts. Note that the input

and out BNC sockets are not symmetrical because of the LNB board layout. Add the BNC sockets and then solder the end walls together to form three sides of the box (both inside where possible and the outside as shown in Figure 2). Solder the BNC socket inner connectors to points X1 and X2 as shown in Figure 1.

Once the three sides of the box are soldered together, solder the earth-strip of the LNB to the "output" wall and solder the lower side's earth-plane to the these side walls where possible on the inside.

Remove the 7805 +5 Volts Regulator from the remaining LNB. Drill a hole in the longer side wall to accommodate the Regulator under the LNB two-stage pcb (i.e. the earth-plane side) and secure with a 4 BA nut and bolt. Drill suitably sized holes to solder feed-through connectors for the +Ve Supply (12v) and the -1.5 Volts bias supply (e.g: a battery). Solder the input rail wire of the Regulator to the feed-through, the earth rail to the side of the box and the output rail to the +5Volts supply rails run to the RC supply circuits to the GASFETs F1 and F2. The Regular's input and output rails are decoupled to earth using 1000pF disc-ceramic capacitors. Solder a suitable length of wire to the feed-through connection point on the outside of the box.

Next add the GASFET bias rail. This is thin strip of pcb with the two 22k Ohms pre-set variable resistors soldered to it. The "variable" rail from each variable resistor being carefully soldered to the RC junction of the surface mounted bias circuit on the LNB. Solder the remaining variable resistor rail to the wall of the box. Solder the -1.5 Volts d.c. supply wire (insulated) to the pcb strip and pass this through the 2 mm access hole mentioned earlier. See Figures 1 and 2 for details.

Once the +/- Supply rails and the Regulator are in place, add the floor of the box that is also made from double-sided copper clad pcb.

Add the remaining wall of the box and solder wire tabs across the corners to ensure good connectivity.

Add a suitable wire to allow the -1.5 Volts to be connected.

Add two suitable length earth wire leads for the supply and bias.

## 5. Testing

Connect the amplifier's output (X2 BNC) to a suitable 13, 9 or 6cm receiver and connect the -1.5 Volts bias supply before the +Ve supply (12v was used).

The F1 and F2 Drain volts are set to about +3volts using a Digital Volt Meter to check the setting by adjusting the Bias variable resistors. (Check that F1 and F2 Drain volts can be varied from about +1.8 to +4 volts).

Connect a suitable aerial to the input (X1 BNC).

Tune the receiver to a suitable signal source (e.g. beacon).

Adjust each 22k Ohms variable resistor for best maximum signal.

For use as a low power transmit amplifier, supply about 1mW of drive at 13, 9 or 6cm. Then adjust the 22k Ohms variable resistors for best output (one circuit gave about 80mW at 6cm, but

## 6. In Use

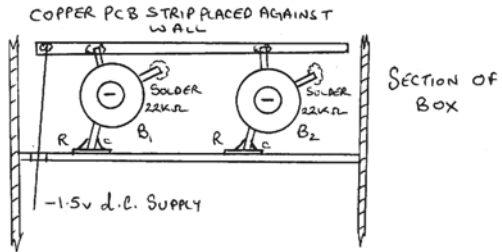
The design has been used from 13cm to 6cm on both the Rx and Tx systems for my transceivers. Many QSO's have been made, including across the Channel, using these amplifiers as Rx and Tx amplifiers on these bands. For 6cm, two such modules are cascaded to give sufficient gain for the receiver.

A four-stage unit has been made up from two LNBs and tuned to act a multiplier from 1152MHz to 10368MHz, using two tuning pots made 13mm plumbing copper closed cylinders and copper 4 BA bolts to link stages.

**Mike, GOJMI April 2004.**

FIGURE 1: LNB BOARD CONVERTED FOR USE.

GASFET BIASING ARRANGEMENT



LNB MODIFICATIONS

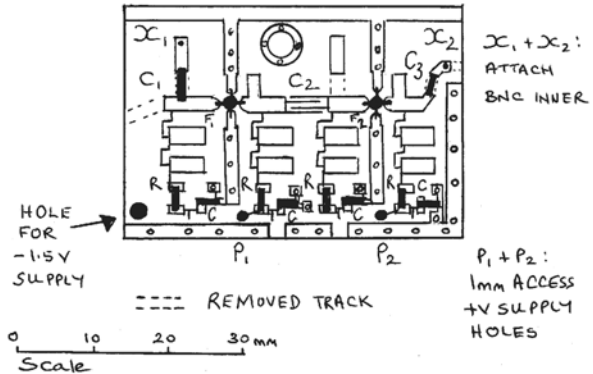
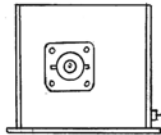


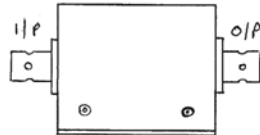
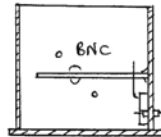
FIGURE 2: BOX CONSTRUCTION

BOX MADE FROM COPPER CLAD PCB

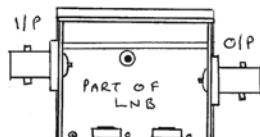
BNC



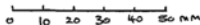
+5V FEED TO BOARD



FEED-THROUGHS



Scale





# ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

Not many of you are writing in these days. Please let us know what you are doing so that others may be so inspired!

This month starts off with a report from **Ralph, G4ALY (Cornwall, IO7OVL)**:

The microwave bands are starting to come to life! I worked F6DKW on rain scatter 27th April on 3cm plus F6APE on 6cm on 28th April and 9th May. Stations worked during the contest of 1/2 May 2004 were:  
**3cm:** G4NNS G3FYX G4MAP/P G8VOI/P GORRJ G4RFR/P G3LRP G4LDR. 6cm G4NNS G8IFT/P GORRJ G4LDR .

**13cm:** GORRJ G4RFR/P G4LDR G3OHM/P.

**23cm:** G3OHM/P GORRJ G4WYJ/P G3LRP G4RFR/P GDOEMG G4LDR MOGHZ G4EAT.

Many of you may or may not know the St. Austell 23cm beacon was stolen, so the band is not necessarily dead to the south west! Please turn your beams this way. I hear lots of stations off the back of the beam but cannot attract their attention.

**Thanks, G4ALY.**

**The Flight Refuelling Amateur Radio Society** is an extremely active group (*we wish more groups were like this ... editor*). Here's their report on the May RSGB 432MHz and up contest...

**G4BRA and G4RFR operated /P from the Bell Hill site at IO80UU59** for the May 70cm and up contest, with all bands to 24GHz except 5.7GHz. Best DX on each band was as follows:

432MHz - DL0GTH at 507km  
1296MHz - PA0BAT at 619km  
2320MHz - GDOEMG at 397km  
2320MHz - GDOEMG at 397km  
10GHz - GDOEMG at 397km  
24GHz - G8ACE/P at 78km

The usual 10GHz station of M0EYT was being run, 4 watts/1m offset dish. A few improvements will be made to this system to reduce the overall system NF of

2.8dB to something under 1dB. A mast mounted solution is also being considered to put the whole transverter up 20ft to overcome tree clutter on Bell Hill.

M0EYT's 3.4GHz system was recently put together based on a DEMI 3.4GHz transverter, a 50 watt PA and an ex-LNB 3.4GHz low noise amplifier. It seemed to go pretty well and received good "on air" comments; John G3XDY said we were the loudest ever signal he'd ever heard on 3.4GHz!! The 3.4GHz system has an overall signal gain of 40dB and a noise figure of 1.8dB - as tested at the recent RAL event.

Chris G8BKE brought along his 24GHz system and made a contact over 78km to John G8ACE. This was an interesting path as it was via the large clump of trees on Bell Hill - but the signal reports each way were good. FRARS would like to thank Chris for bringing the much needed 24GHz system on site for the contest.

The 1296MHz and 2320MHz systems were a combination of GOAPI's and G4RFR's equipment, and all seemed to go fairly well, with some good DX being worked.

G4BRA provided their excellent 70cm station as used in last year's NFD event and this also worked perfectly.

G0GJV, G4DDN, G8FUO, G3YGF, G3PFM, G4JNT, GOAPI, M1NCD, G6NLC, M0EYT operated the stations.

Further information along with pictures can be found on the FRARS website at:  
[www.frars.org.uk/cgi-bin/render.pl?pageid=1263](http://www.frars.org.uk/cgi-bin/render.pl?pageid=1263)  
(*There's an excellent set of photos on the event ... well worth a look! .... editor*)

**Doug, GW3ATM**, deep down in the Wye Valley near Chepstow, found himself in the thick of excellent rainscatter conditions during the 4th and 5th of May. Doug uses a "flyswatter" antenna on 10GHz (described in the Newsletter some months ago) to good effect. On the 4th May, he worked the long distance across the UK to G4EAT in J001HR(55s/54s reports on cw), G4ALY(IO7OVL) at 53s/52s, G4BRK (IO91DP) 58s/54s, all on cw plus a further contact with G4BRK on ssb at 59/57.

The 5th May saw Doug make the nearer but very difficult path to G3JMY in IO81RM. Reports of 57s/55s were exchanged along weird dish headings .... 070 degrees from Doug but 360 degrees from Ted!

From this seemingly hopeless microwave location, Doug has made 20 contacts this year (43 since May 2003). The Flyswatter antenna has opened up home station microwaves for him ... a lesson to all of us who complain about being poorly located (your editor included!).

**From: Martyn Vincent G3UKV**  
[ukv@globalnet.co.uk]

Report for weekend 1/2 May 432 and up RSGB Contest + 10 GHz Trophy. Portable on Brown Clew IO82QL.

# Low-band Microwave Contest - 28/March/2004

# Adjudicated scores

## RAW BAND SCORES

## FINAL NORMALISED SCORES

1.3GHz	Best DX	Located	Dist	QSOs	Score	1.3	2.3	3.4	Total
G4BRK	PA5AO	JO31GW	569	24	3801	1000	1000	0	2000
G4WYJ/P	G3LRP	IO93HO	313	22	2961	772	0	1000	1772
G3PHO/P	G4WYJ/P	IO90WV	288	17	2935	779	702	0	1481
M0GHZ	PE1EWR	JO11SL	399	19	2594	682	230	237	1149
G3TCU/P	G3LRP	IO93HO	271	21	2412	635	252	223	1110
G8AIM	G3AUS	IO80DN	246	12	1331	350	311	0	661
G0JPU	G3LRP	IO93HO	185	8	568	121	68	223	412
G8BKE/P	GW3TKH	IO81JM	123	6	459	149	74	97	320
G0MIC	G3MEH	IO91QS	63	4	157	41	0	0	41
G6XDI	G4WYJ/P	IO90WV	73	2	105	28	0	0	28

2.3GHz	Best DX	Located	Dist	QSOs	Score
G4BRK	PA0WWM	JO22FE	428	15	1846
G4WYJ/P	G4ALY	IO70VL	291	10	1295
G8AIM	G4DDK	JO02PA	196	6	574
G3TCU/P	G4DDK	JO02PA	149	6	466
M0GHZ	G4MAP	IO82XH	98	7	425
G0JPU	G8AIM	IO92FH	47	4	136
G8BKE/P	M0GHZ	IO81VK	90*	3	125

\* One way

3.4GHz	Best DX	Located	Dist	QSOs	Score
G3PHO/P	G3PYB/P	IO90LU	277	8	1748
M0GHZ	G3PHO/P	IO93EH	213	4	415
G3TCU/P	G3PHO/P	IO93EH	245	3	390
G8BKE/P	M0GHZ	IO81VK	90	5	390
G0JPU	G3PHO/P	IO93EH	150	2	169

## LOW BAND MICROWAVE CONTEST—ADJUDICATOR'S COMMENTS

There were 10 entries, 6 fixed stations and 4 portable. There seemed to be a few more stations about than last year but conditions were either average or poor, depending on where you were.

**Neil G4BRK** was the leader on two bands, and also the overall winner. Neil was running 200W on 23cm to a 35 ele Yagi, and 30W on 13cm to an 80cm dish, from IO91DP. Neil worked a few Dutch stations on 23cm, and just the one 13cm, describing conditions as 'nothing special'.

**Peter G3PHO/P** was second overall, and the leader on 3.4GHz, operating from Houndkirk Moor IO93EH, with 23cm (18W to 23 ele Tonna) and 9cm (15W to 1.2m dish). Peter found conditions quite poor, not being able to work outside England on either band. The weather consisted of strong winds and low cloud on Houndkirk.

Thanks to everyone who sent in an entry. A similar event is scheduled for November - lets hope for a little more activity next time - and please send in your entry, however small!

G6XDI commented that this contest might be better held on the first weekend in March, when much of Europe runs a contest covering bands to 10GHz and above (the RSGB has just 144/432MHz). Any comments on whether that would be a good idea for 2005 or not would be welcome.

Regards, Steve Davies G4KNZ, Contest Adjudicator

Due to other commitments, the Telford & DARS crew made a scaled down effort for this weekend. 10W to a 23 ele on **1296MHz** raised just 6 QSOs, with the only real DX being PA6NL in JO21BX (461km). Activity LOW.

On **3.4GHz**, Mike G4NKC raised 4 contacts, the best being down to G4RFR/P in IO80UU, which wasn't bad with just 0.25 watts TX and manual change over of coaxies!

Up on **5.7GHz**, also QRP, only the B'ham group on Shenlow was worked. A dual feed horn and 1 metre dish was used on 3.4/5.7GHz.

Martyn G3UKV and Dave, G8VZT stuck with **10 & 24GHz**. They had 14 QSOs using 1 watt narrowband, and a DRO TX for WB ATV QSOs at the top of the 10 GHz band. We were only on for about 5 hours and found propagation exceedingly ordinary, with just a bit of rain-scatter doppler on some paths. Best DX for these bands was a 24GHz QSO with Mike G0MJW/P in IO91IN over a very obstructed path (Cotswolds in the way) of 135km. We had to exchange info digit-by-digit on CW, confirming as we went along on 2m, and there was continuous rain scatter observed on signals both ways making copy very difficult.

The paperwork needed for this multiband entry and the 10 GHz Trophy together took a couple of hours to complete; **it needs drastically simplifying.** (VHFCC please note!) We're still basically using the same cover sheets & summary sheet as we were in the 1970s....Hard copy or e-mail - it comes to the same thing.

**From: Paul Marsh MOEYT**  
**[pjmarsh@compuserve.com]**

A report on the rainscatter event for Monday 10th May 2004 :-

WX forecasts for the IO80 square looked variable for the evening with some very heavy rain forecast - sure enough, on the way home from work it started, and was pretty big rain! Listening around the beacon band on 10GHz resulted in the following being heard:

GB3RPE @ 165K, GB3SCX @ 23K, GB3KBQ @ 74K, GB3CCX @ 139K. There was a hint of something about 7KHz below GB3SCX, but it was far too weak to

resolve.

Next, I visited [www.ON4KST.com](http://www.ON4KST.com) where there was a lot of chat about RainScatter. I proceeded to work the following:

G3LTF - CW @ 72K, G4EAT - CW @ 216K - later in SSB with a very strong signal, G4BRK - CW @ 104K, then after CQ'ing in CW for a bit, GORRJ came back on the key and we managed a good two way in SSB. This QSO was then tail ended by G4LDR who I also worked in SSB.

I live in IO80XR at about 5m ASL with virtually no horizon. My 10GHz system was on it's tripod in the garden, with the dish about 2m off the deck. Following this excellent 10GHz rain scatter session, I'm going to put up a North Region minidish for further rain scatter QSOs.

Meanwhile, over on 3.4GHz, the GB3SCF beacon increased to around S7 for about an hour perhaps due to Rain or Hail scatter.

### The May 24/47GHz Cumulative Contest

Just enough room to summarise three reports:

**G3PYB/P** operated from Walbury (IO91GA) and later at Lane End (IO91JA). Activity was very low. Two good contacts on 24GHz from Lane End were made thanks to G8BKE and G1JRU. G8BKE's GPS locked transmitter confirmed my ovened 24GHz LO had only moved a small amount after being unused for many months.

**GW3UKV/P accompanied by GW8VZT/P** were on Halkyn Mt near Mold, IO83JF74... good access onto common land, but extremely foggy on this occasion. Had 3 QSOs on 24GHz, with **Paul G0HNW/P** on Winter Hill (63 Km), and with **Peter G3PHO/P** on two of his 'roving' sites, Merryton Low 84km and Alport Heights 111km, very obstructed path. We exchanged 55/53 reports from this latter QSO, but couldn't be heard on 47GHz. However, we did manage one-way QSOs with G0HNW/P and with G3PHO/P on Merryton on the higher band, which was very satisfying. size of these devices, you'd understand why !

**More on this contest next month ....**

**73 to all for now ..Peter, G3PHO, Editor**