An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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2008 JANUARY

Guy Gervais **EA2/F2CT/p** activated **IN92** square on his latest trip to Spain (26th-29th Dec, 2007)
This is serious microwave activity! More details in Activity News (p20) **Photos: F6AJW/F2CT**

In this issue ...

Latest News ...

- **G6XM now Silent Key**
- **2007 UKuG Contest Results show declining entries but good activity on some bands**
- **Excellent "lift" conditions bring early Christmas presents to UK microwavers**

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

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From the Editor's Desk

Welcome back! I hope you had a really enjoyable Christmas/New Year period and that you have made the usual New Year Resolutions to do something different this coming year, be it get on a new microwave band or even write the odd article or two for Scatterpoint!

While you've "been away", some great things have been happening on the microwave bands. You can read all about the excellent tropo lift of December in Robin's Activity News starting on page 16.

This edition contains a lot of contest information —- rules and calendar for 2008 and some results of last year's contests. If you are not a contest person please bear with us. Many people enjoy coming on during the contests which are, for some of us not blessed with good home locations, our only chance of working lots of stations on the microwave bands. John, G3XDY, has tried his very best to provide something for everyone. There are several marked changes to previous contest programmes. Please take part and send in your logs after the contests (they are most useful as check logs and an indication of activity even if you don't want to enter the competition). Your comments on the new contest programme are also most welcome.

Many thanks to all who have supplied us with material for this month's Scatterpoint.... we depend entirely on people like you so please keep the articles rolling in folks!

73 from Peter, G3PHO — Editor

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G3PHO, Peter Day, 146 Springvale Road, Sheffield, S6 3NU, UK

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

WEAR YOUR BADGE WITH PRIDE

Newer members maybe unaware that UKuG has a very attractive, small lapel badge, gold motif on a blue background, available at just £2.00 including postage. They are of similar size to RSGB and other national radio society badges. Apply to the Secretary for one today!

2006 SCATTERPOINT IN PUBLIC DOMAIN

Each year at this time we release a whole year's worth of Scatterpoints into the public domain. Anyone can now download all the 2006 series for free from:

www.microwavers.org/scatterpoint/2006/

HAVE YOU RENEWED YOUR UKuG SUBSCRIPTION YET? YOU CAN CHECK THE RENEWAL DATE ON YOUR ENVELOPE ADDRESS LABEL IF YOU RECEIVE A PRINTED SCATTERPOINT. THE DATE IS SHOWN UNDER YOUR ADDRESS. IF YOU STILL DON'T KNOW YOUR RENEWAL DATE PLEASE EMAIL THE SECRETARY, G8KQW, AS SOON AS POSSIBLE!

SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO THE UKuG GROUP SECRETARY AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE

BILL JAMES, G6XM - SILENT KEY

Just a few days before this edition of Scatterpoint was being put together, news came in from that Bill, G6XM, had passed away. His son Richard writes:

"My father, Bill James, G6XM, died on 1st January. He'd been fading away for the last few months and went into hospital in November with minor infections but, at 93, nothing is really minor and he just got weaker and finally let go. As you may know, he'd been a lifelong VHF and UHF enthusiast, building his own gear from 5m to 24 GHz that I know of - he got a dummy-load license in 1928 and his full license in 1932 - almost 80 years in amateur radio ...."

Tributes to Bill will appear in next month's Scatterpoint ... please email ours to the editor.

GREMLINS!

A few errors crept into last month's Scatterpoint. The editor can only use anno domini as his excuse! In the list below, the words in **bold** type are the corrected version:

- Joe Taylor is **K1JT** not W1JT
- 'In this issue' title on page 1 should refer to the GB3CAM **Beacon**, not repeater...
- The minutes of the UKuG AGM should read: Election of Officers for the Year **2007-8**: Due to two committee members (M0EYT and G4KNZ) deciding to stand down this year there was an election to replace them. Two nominations were received as a result of which the following were elected to the committee:
- the table on page 16 (transitions) seems to have slipped a row! The correct version is shown below:

Waveguide	Freq GHz	Probe Dia	Probe Length	Backshort Distance
WR28	24	0.5mm	2.4mm	2.14mm
WR28	38	0.5	1.76	1.7
WR28	47	0.5	~1.8	~1.8 ***
WR22	38	0.5	1.5	1.5
	47	0.5	1.43	1.35
WR10	76	0.25	0.735	0.714

*** WR28 NOT RECOMMENDED at 47 GHz. (The book range is 26.5 to 40 GHz.) With the transition probe in the center of the guide, there is a large resonance at ~50 GHz, upsetting the transition operation at 47 GHz enough so that there is no probe dimension that gives decent return loss.

Chelmsford Talk - The GHz Bands

.... a reminder from Trevor M5AKA

On Tuesday 1st April the Chelmsford Amateur Radio Society (CARS) is privileged to have a talk on "The GHz Bands" given by the highly respected RadCom Microwave columnist Sam Jewell, G4DDK.

UKuG members are most welcome to attend the meeting which will be held at the Marconi Social Club (MASC), Beehive Lane, Great Baddow, Chelmsford, CM2 9RX.

The doors open at 7:15 pm and car parking is free. The meeting formally starts at 7:30 pm.

In a separate room adjoining the meeting hall is a reasonably priced Bar where refreshments can be purchased.

For a map see: http://tinyurl.com/dwsud

For further details contact:
Martyn Medcalf, G1EFL
Tel: 01245-469008
Email: info2008 at g0mwt.org.uk
CARS website: http://www.g0mwt.org.uk/

MICROWAVE UPDATE 2008

will be held Friday - Saturday, October 17-18th 2008 in the Twin Cities of Minneapolis/ St. Paul, Minnesota, USA (The actual city is Bloomington, Minnesota, but nobody will recognize that!)
There will also be unoffical activities on Thursday the 16th. Details will be available in early January on the www.microwaveupdate.org web site.

Minneapolis/St. Paul has really good air connections to Europe, and we hope to be able to attract a number of European microwaves to the conference.

73 from Donn Baker - WA2VOI/0
Chairman Microwave Update 2008
<wa2voi@mninter.net>

CAN ANYONE HELP?

Adrian Whatmore, G4UVZ, is looking for a 4 to 5 watt solid state 10GHz PA to replace ihis now defunct TWT and PSU. If anyone has something gathering dust on a shelf he'd be pleased to hear from you. You can telephone him on:
01823 342484 or email him at:
Adrian.Whatmore@tst.nhs.uk

Home location is in Taunton, Somerset.

An Introduction to Direct Frequency Synthesis (DFS)

Dave Powis, G4HUP

Introduction

This article is a brief introduction to the concept of Direct Frequency Synthesis, as a method of producing a high quality, stable signal in the 90 to 120MHz range, locked to a 10MHZ GPS or OCXO source. This technicque is attractive due to there being no control loops to introduce excessive noise, no phase comparators and no subdivision of the reference for comparison at a low frequency. In this first part of the article I will explain the basic operation and some of the chioces I made in producing a PCB. In subsequent articles I will present some specific implementations of DFS designs on that PCB – a 124.5MHz design for 24GHz transverters (24.048MHz with 144MHz IF), and a 106.5MHz design for 10GHz transverters.

The information presented here has been previously presented at Microwave Update 2007 and Martlesham Microwave Round Table 2007.

Single Loop DFS Designs

I had seen DFS examples – WA1ZMS, G4DDK, WW2R – for locking transverter LOs, presented at our Round Tables. These were all single loop mixing synthesisers, as shown in Fig 1 below.

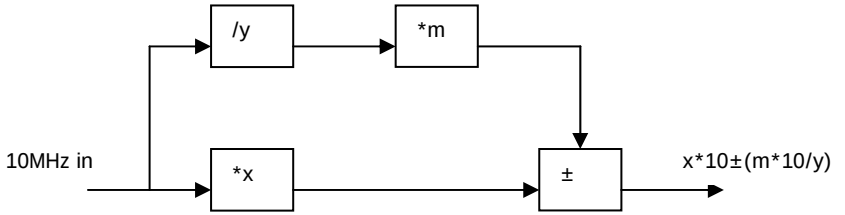

Fig 1 – Single Loop DFS function

In this diagram, **x** would typically be 9, giving an output for that stage of 90MHz. This would be mixed with a lower frequency signal derived by dividing the 10MHz and multiplying the resultant – for instance, 10MHz/5 gives 2MHz, which multiplied by 3 will give 6MHz. Added to the 90MHz, we have a 96MHz output (cf G4DDK design) – thus we can lock our 23cm transverter LO to GPS – and we know exactly what frequency we are transmitting on!

Other designs by WW2R are also directly applicable to common microwave operation – 90 and 90.667MHz for 13cm. Dave has also produced (but not published yet) a 116MHz design for 2m transverters/SD radio applications. Sam, G4DDK, proposed an architecture for 117MHz at last year's Martlesham Round Table, as part of his 134GHz paper. All of these designs can be achieved with a single loop system.

From my work with the 3cm EME station WC8VOA last year, I needed better control of the frequency stability of the DEMI transverter that we were using – this was approx 35kHz off the nominal frequency but was also drifting considerably with temperature. The DEMI design uses 189.333MHz as the crystal frequency. Half of this is 94.6667MHz – nicely within the range of the DFS technique. However, given the limitations of available digital dividers and the frequencies involved, this was not possible from the type of circuits published so far.

Achieving 90MHz and also 4MHz were quite straight forward and, with a different division ratio (15 instead of 5), 667kHz can also be derived from 10MHz. So, I decided to breadboard a design using two dividers and two mixing loops – a technique I've named the dual loop DFS, for want of anything better! The block outline of the principle is shown in Fig 2 below.

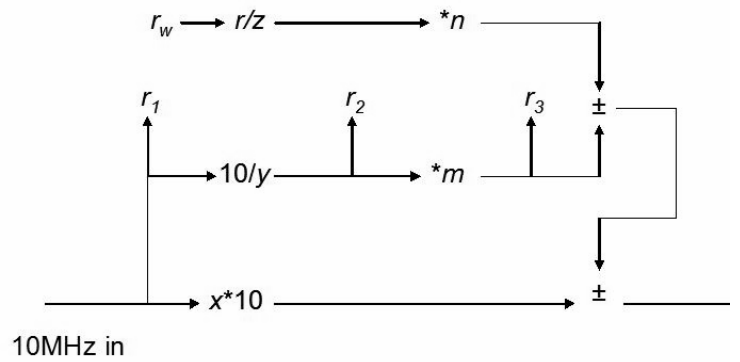

Fig 2 – Dual Loop DFS outline

The Dual Loop DFS

The DEMI transverters are not so common on this side of the Atlantic but are widely used in North America. The following example is used to explain the dual loop system, although it is appreciated that, for most readers, the specific application has little interest.

To get 94.667MHz, I needed to create a 4.667MHz signal to mix with the 90MHz. Referring to Fig 2, with ***x*** set at 9 to give the 90MHz, the first divide value, ***y***, was set to 5, giving me 2MHz out. An ***m*** value of 2 produced the 4MHz signal. Further dividing the 2MHz in a second divider, with ratio, ***z***, of 3 gave the 667kHz signal. Mixing these two low frequency components produced products 3.333 and 4.667MHz, allowing selection of a suitable signal to mix with the 90MHz.

The first prototype, built 'ugly style', was used to prove the concept and particularly to investigate the filtering required – see Fig 3. The results were better than expected, given the construction method, with better than -45dBc for spurious signals. However, this style of building was in no way suitable for installation into a system, so I set out to produce a PCB for the design.

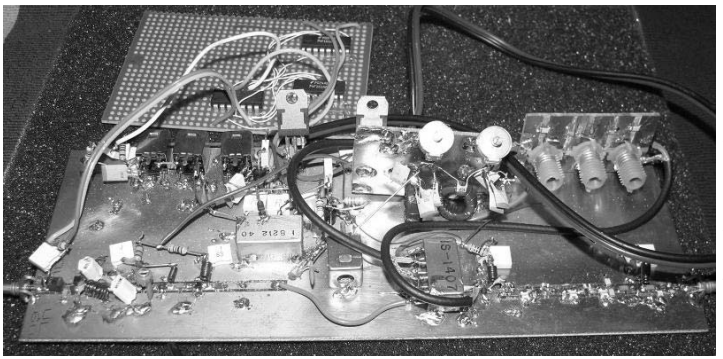

Fig 3 – Prototype F-DFS

Input to front left with x9 multiplier, logic dividers at rear (on stripboard), MF/LF amplifiers and filters to rear of PCB material. Note crystal filter is missing (front right)

The 'Flexible' DFS

This was the point at which the 'flexible' DFS concept came about. By the nature of DFS designs and the degree of frequency specific filtering required, there is no single solution that will suit all possibilities. Where the output of a divider is the wanted frequency – eg the 667kHz in the example above – then a simple LPF is all that is required but, where the divider output needs multiplication to reach the required frequency, then a tuned amplifier/multiplier is needed. What I really didn't want to do was put a lot of effort into a PCB that had only a single application! So, in order to maximise the potential for the PCB, I made a number of choices:

- The divider ratios would be programmable, allowing any ratio from 2 to 16 to be selected
- The divider outputs would be selectable – a 50% duty cycle is good for picking odd harmonics, but an 80/20% duty cycle can be better for even harmonics
- Following each divider, either an LPF or a tuned multiplier would be selectable.
- Wherever possible, to use pre-wound coil sets, and provide flexibility between manufacturers (eg Toko/Coilcraft)
- Aware that even with 2 dividers there are still some frequencies that cannot be achieved, an external input would be provided so that incremental signals, for instance from a reference locked DDS, could be added into the mix. This would allow virtually any frequency to be synthesised but has the advantage that if the DDS signal is very low in frequency compared with its clock rate (eg <1MHz for a 10MHz clock), then it would be a clean signal.

I also recognised that some aspects of flexibility, whilst desirable, were not practical:

- One of the flexibilities is in where the second divider input is taken from. Referring to Fig 2, you will see $\mathbf{r_w}$ as the second divider input and $\mathbf{r_1}$, $\mathbf{r_2}$ and $\mathbf{r_3}$ indicated on the first divider chain. These represent the main options for the divider 2 input and each give their own set of output options. However, to provide jumper selection of these is not practical on a PCB, since these points occur at different phyisical locations on the layout; I decided it would be better to 'cut and strap' for the changes when needed, rather than have relatively long traces lying redundant.
- It would have been nice to be able to produce a design in which the output frequency could be easily changed – a number of people have made this comment – but even if a daughter board were used as a 'personality module' to achieve this, probably 50% of the circuit would be on that board!

What if I don't have a GPS locked source?

A GPS locked source is the ideal – HPZ3801A or similar – and a lot have been taken out of commercial service over the last few years, either as upgrades on the grounds of efficiency, or in the change over from GPS derived timing to Internet controlled timing. Most of these units are 10MHz reference sources but some are 15MHz, for example the Lucent RFXtG series and later models. 15MHz also has it applications for amateur DFS use, as I will show you.

However, as compared to a crystal in a transverter LO, even one running with a crystal heater, a good quality OCXO at 10MHz is a very good second best to a GPS source, and significantly better than the original crystal solution. It's also better than non-locked solutions such as the DF9LN or G8ACE oscillators.

Why use a DFS?

Why indeed? There are other frequency control solutions available which also allow locking to GPS – Luis, CT1DMK's RefLock for example - and there are other PLL solutions possible (eg ON4IY, 2007). However, these solutions use traditional PLL techniques where both the reference

and the oscillator signal are divided down and compared at a relatively low frequency, with a control loop to the VCO – a known source of noise pick-up.

The DFS achieves a phase noise performance better than PLLs since there is no control loop or VCO. Measured phase noise on DFS samples so far is of the order of -158dBc/Hz at 10kHz.

DFS Implementations

In addition to the work of Sam and Dave, a number of F-DFS solutions have been built so far:

- 94.667MHz for the 3cm DEMI xvtr replacement
- 101.75MHz for DB6NT 9cm LO replacement
- 106.5MHz for DB6NT 3cm LO replacement
- 124.5MHz for 24GHz (24.048 with 144MHz IF)

Further examples are planned and details of possible frequency schemas for common transverter LOs are available on the DFS website.

In subsequent articles I will present the 124.5MHz and 106.5MHz implementations.

Website

DFS information can be found on my site at **http://g4hup.com** – navigate through Products to the DFS pages. As well as general information, you will find the details of specific implementations, along with their filter components etc, and an Errata page for issues that have been noted since the PCBs were produced, or have surfaced in specific implementations.

PCBs, Parts, etc

PCBs, boxes and standard parts are available from me, either through the website, or via **g4hup@btinternet.com** – but please note, I do not carry stocks of crystals for the filters!

References

CT1DMK: Reflock – Dubus - various issues 2002/3

G4DDK: DFS96 – UK Microwave Group – Scatterpoint

G4DDK: 134GHz – The New Frontier: UKuG Proceedings 2006-7

ON4IY: Xlock – Getting Accurate Frequencies up to the mm Waves: MUD 2007,

WA1ZMS: Millimetre-Wave LO References and Phase Noise Considerations: UKuG Proceedings 2005-6

WW2R: VHF drivers for Microwave Local Oscillators; UKuG Proceedings 2006-7

UK Microwave Group Beginners Workshop

Saturday the 27th of October last year saw a small band of dedicated UKuG members, including G8KQW, G4NNS, G4DDK and G3LYP, "invade" RSGB Headquarters in order to put on a Microwave Workshop for Beginners. Apparently this went down very well with RSGB, especially it's President Angus Annan. This short report contains emails to Ian, G8KQW, from two of the "customers " who obviously found the workshop of great interest and are now in the process of becoming dedicated microwavers themselves.

The RSGB workshop was the 6th of its kind, the first being the Sheffield Beginners Workshop held in May 2006. Things come around full circle in July 2008 when Sheffield hosts its second microwave workshop (this time at intermediate level) on the first day of a two day Microwave Roundtable, to be held over the weekend of July 12/13th.

From: Cliff Hepburn 2E0XKR
Ian G8KQW writes: Following the RSGB workshop ,Cliff Hepburn 2E0XKR has taken a Solfan and an AEI module off my hands. Here's extract from Cliff's email. David King G6KWA from Cambridge area has also just joined UKuG and he is involved with a number of others on WBFM in that area. Cliff writes ...

"I'm looking forward to this microwave challenge. I've located some internet information today by Peter G3PHO on building a 10GHz wideband transceiver using a Solfan module, so this will be my initial guide. He has stated that this is the best route and apprenticeship for someone (like me) who is new to microwaves with very limited knowledge of both radio theory and practical operating/construction experience. As such, I'm sure I willneed some guidance on this project, so I hope to be able to make occasionalcontact with the various members of the UKuG Technical Support Team and I'm also going to see if there is a microwaver in my club, Worthing & District ARC, who is willing to offer this locally.

The AEI burgler alarm is a lovely surprise, thank you, and I will developthis when I've made some progress with the Solfan. At this early stage, I don't feel competent to attempt both projects at once.

I'll keep you informed of my progress. Thanks for this interest! I may be a bit slow at first, but I'll speed up with time."

From: Phil, G3MGQ [parkie@mail.adsl4less.com]
Just a quickie to say how interesting and worthwhile I found the workshop yesterday. Just a shame that the M25 denied me the benefit of Sam Jewell's introduction and talk on the bands & propagation but I'm already delving into the CD! That JNT terrain profiler is great - I'd really struggled with the one from the ARRL 20th Ed. Antenna Handbook, which uses satellite imaging. I'd resorted to Google Earth, checking heights by running the cursor down the line, in my quest to characterise my site and, in particular, check what height my TV aerial would have to be to "see" the Bluebell Hill transmitter above Maidstone to get a decent terrestrial digital signal - I can't get Dover because of trees and Heathfield has a null in our direction because it would interfere with the French! So you can see, I'm already into microwave (well, near) reception! Thanks to you guys, it's now less of a "giant step" to get going on the amateur microwave bands. I've already got ideas about /P for the Windmills-on-the-air weekend - think of the elevation you'd get from the top of one of those sails!!

Please pass on my appreciation to Sam, Brian, Mike & Murray too for giving us the benefit of their considerable expertise and, so generously, their valuable time. Their presentations (and yours) were technical but totally comprehensible, and their obvious enthusiasm was catching. Hope to catch all of you further down the log!

73 de Phil, G3MGQ

UKuG MICROWAVE CONTESTS 2008

Aims and comments:

The calendar has changed this year, with some events that were trialled last year removed due to lack of support. The other major change is the inclusion of 24GHz with the 5.7 and 10GHz cumulative contest, and the creation of a 47/76GHz cumulative event. 24GHz systems have matured to the point where many are capable of non line of sight contacts and several home stations are now active on the band. Distances that can be worked on 24GHz are increasing to the point where a link with 5.7 and 10GHz makes more sense. On the other hand, equipment for 47 and 76GHz is generally low power and works on line of sight paths, using tripod mounted equipment from portable sites, so there is a three leg cumulative for these two bands, with two of the dates aligned with coincident RSGB/IARU multiband events.

The 1.3GHz/2.3GHz/3.4GHz lowband events have continued to be popular in 2007 and will continue in 2008 with the addition of an extra date in December.

In planning the year's contests we have tried to avoid clashes and adjacent weekends with major VHF contests and events such as rallies and microwave meetings but, inevitably, this has not been possible in all cases.

Entries will continue to be listed in one table, but leading entries in certain categories marked, with certificates awarded where appropriate. These categories include Portable, Low-power, Radio-only talkback, and New entrant. The exception is that there will continue to be a separate Restricted section for the 10GHz cumulatives.

Microwavers in Europe are most welcome to join in our UK contests. There is already a core of French, Dutch and Belgian stations who appear regularly in our summer contests. We would like many more to do the same!

THE RULES listed below are final and binding for 2008 (there are some changes from 2007). The following contests are scheduled for 2008:

- Low Microwave Bands - 1.3GHz/2.3GHz/3.4GHz (4 contest days).
- 5.7GHz Cumulatives (5 contest days with 3 to count for scoring purposes), on the same days as the 10GHz/24GHz Cumulatives.
- 10GHz Cumulatives (5 contest days with 3 to count for scoring purposes), on the same days as the 5.7GHz/24GHz Cumulatives.
- 24GHz Cumulatives (5 contest days with 3 to count for scoring purposes), on the same days as the 5.7GHz/10GHz Cumulatives.
- 47GHz Cumulatives (3 contest days with 2 to count for scoring), on the same days as the 76GHz Cumulatives.
- 76GHz Cumulatives (3 contest days with 2 to count for scoring), on the same days as the 47GHz Cumulatives..
- In addition there are seven non-competitive activity days on the last Sunday in the month.

The full contest program and rules are published in the January 2008 issue of the Scatterpoint Microwave Newsletter and are also available on the Internet on the UKuG website at http://www.microwavers.org

General Rules (applicable to all events)

The Contests are open to all comers (you do not have to be an RSGB or UK Microwave Group member). Stations located outside of the UK (G, GW, GM, GI, GD, GU, GJ) may enter a contest, and will be tabulated within the overall results tables but will only be eligible for their own awards.

Contestants are expected to enter in the true spirit of the event and to adhere strictly to any equipment or power restrictions that apply to the particular contest.

Operators may enter as home station or portable (either mixed or separately); in multi-band contests, single-band entries are always acceptable.

Stations: Entrants must not change their location or callsign during the contest, unless the Rover rule is invoked. In multi-band events, all stations forming one entry must be located within a circle of 1km radius.

Contacts: Only one scoring contact may be made with a given station on each band, regardless of suffix, eg /P, /M, etc, during an individual contest or cumulative activity period, unless the Rover rule is invoked. Contacts made using repeaters, satellites or moonbounce will not count for points. Contacts with callsigns appearing as operators on any of the cover sheets forming an entry will not count for points or multipliers.

Scoring: Contacts are scored on the basis of 1 point per kilometre for full, two-way microwave contacts and at half points for one-way (ie crossband) contacts.

Exchanges: Contest exchanges on the microwave bands consist of RS(T) + serial number (starting at 001). In addition, the six (or eight) figure QTH Locator must be exchanged either via the microwave band or on the talkback frequency. Where the Locator is not known, a full six-figure National Grid Reference (UK only) must be provided. In multiband contests, the serial number will start at 001 for each band (ie a common sequence across the bands is NOT to be used). No points will be lost if a non-competing station cannot provide an IARU locator, serial number, or any other information that may be required. However, the receiving operator must receive and record sufficient information to be able to calculate the score.

Talkback: Talkback can be used to assist in setting up a QSO but note that the contest exchange must be made via the microwave band. It is not permissible to use the talkback as a means of checking the report or serial number – they must be copied via microwaves – and after the QSO is complete, care should be taken to avoid accidentally repeating the exchange via talkback. There is no restriction on the talkback methods that can be used – other amateur band, internet, phone, etc. In setting up the QSO, it is also permissible to send back received audio to the other station, for example to help with antenna alignment. An exception is that our contests **do allow** one way (cross-band) QSOs for half points, and in this case, the other band can be used by one of the stations.

Paperwork/Entries: Contestants are asked to make sure their entries have been scored correctly and that all relevant bonus points and multipliers have been claimed.

All entries must be prefaced with a summary/cover sheet showing: Title of contest, name(s) of operator(s), location(s) of station, section entered, callsign used, band score(s), multipliers or bonus points, final claimed score. The sheet should also detail equipment used, particularly the power output, antenna and receiver for both the microwave band and the talkback. This is very important if the logs are entered in one of the restricted sections. Where the contest has a 'rover' facility, it is essential that each location used is clearly stated.

Where Locator squares and/or countries are used as multipliers for bonus points, a summary list of the squares and/or countries worked must be attached to the contest cover(summary) sheet. This list should include the callsign and date of the first contact for each square/country.

Log entries are preferred to be received by email but may also be submitted on paper. For electronic entries, the format should be one of the following: ASCII text, Microsoft Excel, Microsoft Word, or the G4JNT contest software format, IARU REG1TEST format. E-mail entries will be acknowledged to confirm receipt.

All logs should be sent to the **Contest Adjudicator, G3XDY**, *within 16 days of the end of the contest*. G3XDY's email address is: g3xdy@btinternet.com . Postal entries should be sent to 12 Chestnut Close, Rushmere St Andrew, Ipswich, IP5 1ED, UK

Awards: Certificates will be awarded to overall contest winners and individual section leaders and their runners up. Additional Certificates of Merit will be awarded to stations in certain categories, as indicated in the rules for each event. With these, as with the logs, the adjudicator's decision is final.

Special Rules: Applicable if called up for the specific contest:

Rover Concept: The 'Rover' concept is to encourage lightweight, low power portable activity. This allows the location of the station to be moved as many times as desired and by a minimum of 16 linear kilometres, at any time during the contest period. From each new location, stations worked from any of the previous locations during the event may be worked again, both stations involved in the contact gaining points. The serial number, however, will not revert to 001 each time a move is made but will carry on consecutively from the previous contact.

Low Band Microwave Contest Rules

First introduced in 2004, these contests aim to encourage operation on the three lowest bands in the amateur microwave allocation, particularly as there is growing UK interest in 3.4GHz equipment and triband antenna feeds for these three bands. For 2008, there are four of these events, in March, April and June and December. The March event is a shorter duration event, timed to overlap with the last 4 hours of UHF/SHF events in other IARU Region 1 countries, and it aimed more at home stations, though portable operators are, of course, welcome to enter. The April and June events are more likely to suit portable operators, and the June event is also timed to overlap with UHF/SHF events in some other IARU Region 1 countries. This year there is an additional event in December to round off the year.

1. The General Rules listed above apply.

2. There are four contests, one in March, one in April, one in June and one in December. The March event runs from 1000 to 1500 UTC, and the April, June and December events run from 0900 to 2000 UTC.

3. There is one section but the leading stations in a number of categories will marked in the results table, with certificates awarded (see below).
4. Each band will be scored and tabulated separately. The total points for each band will then be normalised by the adjudicator to 1000 and the normalised band totals added up and tabulated.
5. Each event will be scored separately - there are no cumulative scores.
6. For each session, certificates will be awarded to the leading entry plus runner-up on each band, the overall leading entry and runner-up across the three bands, plus for each band the leading stations in each of the following categories: home station, portable station, and new entrant.

5.7GHz Cumulatives Rules

The 5.7GHz, 10GHz and 24GHz cumulatives are being run concurrently to take advantage of the growth in activity on 5.7GHz and 24GHz. Although they are on the same days, they are completely separate contests. Any band or all bands can be used on any of the 5 days, and any three days submitted for any band.
1. The general rules shown above apply.
2. There are five, monthly, events, from May to September inclusive and the events run from 0900 to 2000 UTC on a Sunday.
3. Any three of the five events may be used for final scoring purposes. Logs for all events entered should be submitted.
4. There is one section but the leading stations in a number of categories will marked in the results table, with certificates awarded (see below).
5. Moving location during the contest is allowed - the Rover concept is applicable.
6. The final, total kilometre score for the best three cumulative sessions will be multiplied by the total number of different Locator Squares ("grids"), for example IO92, IO81, etc) contacted over the entire cumulative (ie up to the five events maximum). To claim this bonus it is therefore essential to submit logs for all events entered, not just the best three. Please include a separate check list of the squares worked with your cover sheet. A one-way contact to a new locator square can be counted as a square for the purposes of the multiplier.
7. Certificates will be awarded to the leading station and runner-up, plus leading stations in each of the following categories: home station, portable station, low-power (1W or less), radio-only talkback, new entrant. The G3KEU Memorial Trophy will also be awarded to the leading entry.

10GHz Cumulatives Rules

The 5.7GHz,10GHz and 24GHz cumulatives are being run concurrently to take advantage of the growth in activity on 5.7GHz and 24GHz. Although they are on the same days, they are completely separate contests. Any band or all bands can be used on any of the 5 days and any three days submitted for any band.
1. The general rules shown above apply.
2. There are five, monthly, events, from May to September inclusive and the events run from 0900 to 2000 UTC on a Sunday.
3. Any three of the five events may be used for final scoring purposes. Logs for all events entered should be submitted.
4. Contestants may submit logs for either of the following sections:
Open
No power or antenna restrictions (other than those laid down in the amateur licence) on either 10GHz or on the talkback band.
The 'Rover' concept does not apply to this section.
Restricted
10GHz transmit output not to exceed 1.0 watt to the antenna.
No power restrictions on the talkback band. No antenna restrictions
Moving location during the contest is allowed - the Rover concept is applicable.
5. The final, total kilometre score for the best three cumulative sessions will be multiplied by the total number of different Locator Squares ("grids"), for example IO92, IO81, etc) contacted over the entire cumulative (ie up to the five events maximum). To claim this bonus it is therefore essential to submit logs for all events entered, not just the best three. Please include a separate check list of the squares worked with your cover sheet. This multiplier is applicable to both sections. A one-way contact to a new locator square can be counted as a square for the purposes of the multiplier.
6. The final results table will show entries in rank order for each section. In addition to the usual leader/runner-up certificates for each section, the following certificates/trophies will be awarded:

- leading entry in the Open section - The G3RPE Memorial Trophy
- leading entry in the Restricted section - The G3JMB Memorial Trophy
- certificates to the leading home station, portable station, radio-only talkback station and new entrant in each section.

24GHz Cumulatives Rules

The 5.7GHz,10GHz and 24GHz cumulatives are being run concurrently to take advantage of the growth in activity on 5.7GHz and 24GHz. Although they are on the same days, they are completely separate contests. Any band or all bands can be used on any of the 5 days and any three days submitted for any band.
1. The general rules shown above apply.
2. There are five, monthly, events, from May to September inclusive, and the events run from 0900 to 2000 UTC on a Sunday.
3. Any three of the five events may be used for final scoring purposes. Logs for all events entered should be submitted.
4. There is one section but the leading stations in a number of categories will marked in the results table, with certificates awarded (see below).
5. Moving location during the contest is allowed - the Rover concept is applicable.
6. The final, total kilometre score for the best three cumulative sessions will be multiplied by the total number of different Locator Squares ("grids"), for example IO92, IO81, etc) contacted over the entire cumulative (ie up to the five events maximum). To claim this bonus it is therefore essential to submit logs for all events entered, not just the best three. Please include a separate check list of the squares worked with your cover sheet. A one-way contact to a new locator square can be counted as a square for the purposes of the multiplier.
7. Certificates will be awarded to the leading station and runner-up, plus leading stations in each of the following categories: home station, portable station, and single session entry.

47GHz Cumulatives Rules

This year there will be a change to the format of this event, it will be combined with a 76GHz event, and 24GHz has been dropped (although you may of course still use this band to assist with dish alignment) The activity is primarily portable, and the dates mainly fall in the summer months; the exception is October, where is date is chosen to overlap with the IARU Region 1 UHF/SHF Contest. Although they are on the same days, the 47GHz and 76GHz events are completely separate contests. Either band or both bands can be used on any of the three days, and any two days submitted for either band.
1. The General Rules listed above apply.
2. There are three sessions to the 47GHz cumulative in May, July, and October, and the events run from 0900 to 1700 UTC on a Sunday. The best two sessions out of three will be used for scoring purposes.
3. There is one section, but the leading stations in a number of categories will marked in the results table, with certificates awarded (see below).
4. Operation may be from portable sites or home stations.
5. Moving location during the contest is allowed - the Rover concept is applicable.
6. Certificates will be awarded to the leading station and runner-up for the two sessions combined, and to entrants making their first appearance on either band.

76GHz Cumulatives Rules

76GHz is being added to the calendar for the first time, to encourage activity on this band. The activity is primarily portable, and the dates mainly fall in the summer months; the exception is October, where is date is chosen to overlap with the IARU Region 1 UHF/SHF Contest. Although they are on the same days, the 47GHz and 76GHz events are completely separate contests. Either band or both bands can be used on any of the three days, and any two days submitted for either band.
1. The General Rules listed above apply.
2. There are three sessions to the 76GHz cumulative in May, July, and October, and the events run from 0900 to 1700 UTC on a Sunday. The best two sessions out of three will be used for scoring purposes.
3. There is one section, but the leading stations in a number of categories will marked in the results table, with certificates awarded (see below).
4. Operation may be from portable sites or home stations.
5. Moving location during the contest is allowed - the Rover concept is applicable.

6. Certificates will be awarded to the leading station and runner-up for the two sessions combined, and to entrants making their first appearance on either band.

Other Microwave Contests

The first weekend of May sees the RSGB 432MHz -248GHz Multiband Contest staged in parallel with the Region 1 IARU UHF/SHF Contest. The 10GHz Trophy is run in parallel by the VHF Contest Committee on the same weekend, and the rules can be found in the VHF contest rules.

The first weekend in July is VHF National Field Day which includes 1.3GHz as one of the bands.

The first weekend of October sees the RSGB 432MHz -248GHz Multiband Contest staged in parallel with the Region 1 IARU UHF/SHF Contest. The 1.3GHz Trophy and the 2.3GHz Trophy are run in parallel by the VHF Contest Committee on the same weekend, and the rules can also be found in the VHF contest rules.

The RSGB also runs a Cumulative contest on 1.3GHz and 2.3GHz on the third Tuesday of every month, from 2000 – 2230 local time.

In addition there are other Continental UHF/SHF Contests held during the year and interested UK microwavers are urged to be active during these. Their details may be found on the Internet.

UKUG MICROWAVE CONTEST CALENDAR 2008

Dates, 2008	Time UTC	Contest name	Certificates
27-Jan	0900 - 2000	All-band Activity Day	Non competitive
24-Feb	0900 - 2000	All-band Activity Day	Non competitive
2-Mar	0900 - 1400	Low band 1.3/2.3/3.4GHz 1	F, P, N
30-Mar	0900 - 2000	All-band Activity Day	Non competitive
6-Apr	0900 - 2000	Low band 1.3/2.3/3.4GHz 2	F, P, N
27-Apr	0900 - 2000	All-band Activity Day	Non competitive
4-May	0900 - 1700	1st 47 / 76 GHz Cumulative	N
25-May	0900 - 2000	1st 5.7GHz Cumulative	F, P, L, R, N
25-May	0900 - 2000	1st 10GHz Cumulative	F, P, L, R, N
25-May	0900 - 2000	1st 24GHz Cumulative	F, P
8-Jun	0900 - 2000	Low band 1.3/2.3/3.4GHz 3	F, P, N
22-Jun	0900 - 2000	2nd 5.7GHz Cumulative	F, P, L, R, N
22-Jun	0900 - 2000	2nd 10GHz Cumulative	F, P, L, R, N
22-Jun	0900 - 2000	2nd 24GHz Cumulative	F, P
20-Jul	0900 - 1700	2nd 47 / 76 GHz Cumulative	N
27-Jul	0900 - 2000	3rd 5.7GHz Cumulative	F, P, L, R, N
27-Jul	0900 - 2000	3rd 10GHz Cumulative	F, P, L, R, N
27-Jul	0900 - 2000	3rd 24GHz Cumulative	F, P
24-Aug	0900 - 2000	4th 5.7GHz Cumulative	F, P, L, R, N
24-Aug	0900 - 2000	4th 10GHz Cumulative	F, P, L, R, N
24-Aug	0900 - 2000	4th 24GHz Cumulative	F, P
21-Sep	0900 - 2000	5th 5.7GHz Cumulative	F, P, L, R, N
21-Sep	0900 - 2000	5th 10GHz Cumulative	F, P, L, R, N
21-Sep	0900 - 2000	5th 24GHz Cumulative	F, P
5-Oct	0900 - 1700	3rd 47 / 76 GHz Cumulative	N
26-Oct	0900 - 2000	All-band Activity Day	Non competitive
30-Nov	0900 - 2000	All-band Activity Day	Non competitive
7-Dec	0900 - 2000	Low band 1.3/2.3/3.4GHz 4	F, P, N
28-Dec	0900 - 2000	All-band Activity Day	Non competitive

Using the Rel Comm WG22 switches at 24GHz

Brian Coleman G4NNS

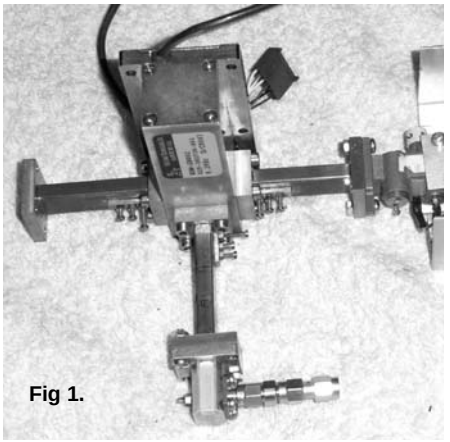

Fig 1.

Waveguide switches for use at 24GHz are highly desirable but can be hard to find. That is until the Wellington VHF Group offered some WG22/WR28 switches for sale at NZ$80 each or about £35 including postage See Fig 1. At 24GHz most of us use WG20/WR42 but these switches are quite useable and suitable adaptors are not hard to make. I have tried two methods. Both involve making a special flange which accepts WG20 but has fixing holes to fit those on the Rel Comm waveguide switch which are for WG22 flanges. One method is to make these special flanges with integral ¼ l chokes as described by Dick Kolbly K6HIJ in Microwave Update 2004 P295. The other is to simply add matching screws close to the transition.

In fact I found that the ¼ Lambda l chokes also needed matching screws to achieve a good match so I consider there to be little point in the additional complication of machining the choke when a plain flange appears to work just as well.

Another possibility is to use WG22 throughout your system in which case the problem of interfacing moves away from the Rel Comm waveguide switch perhaps to other devices such as pre amplifiers and Power Amplifiers which may require WG20. I have not tried this configuration but expect that matching screws will be needed near the transition. This approach will be attractive to those who have plentiful supplies of WG22.

Fig 2

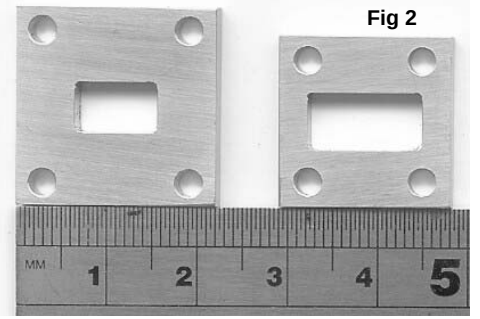

Fig 2 shows the two kinds of special flanges. On the left is one that fits WG22 but has fixings for WG20 while on the right is one to fit WG20 but with fixing holes to suit WG22. Ian, G8CPJ, has made both kinds of flange and I have a small stock available at £15 + P&P for a set of 3. If there is demand, Ian is happy to make more at the same price.

Figs 3 and 4, on the following page, show the WG20/WR42 to WG22/WR28 adaptors. The flange on the left, closest to the tuning screws, has fixing holes to suit waveguide 22 but the waveguide cut out is for WG20. The screws need to be close to the WG20 – 22 interface.

I found that I could achieve a return loss from a WG20 source, through the waveguide switch to a known good WG20 load of 20dB or more. I could also get the insertion loss down below 0.5dB. Some patience is required to achieve both these figures at the same time! I do not have calibrated test equipment at 24GHz but my relative measurements are likely to be reasonable. You will need a 24GHz source, a WG20 directional coupler and reasonably good WG20 (and / or WG22) load to set the switch up (unless you have access to more exotic test equipment such as a network Analyser).

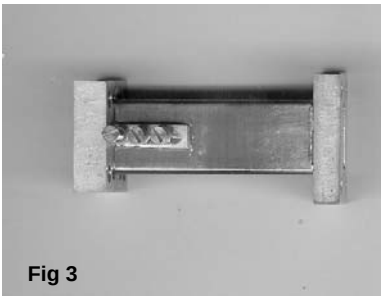

Fig 3

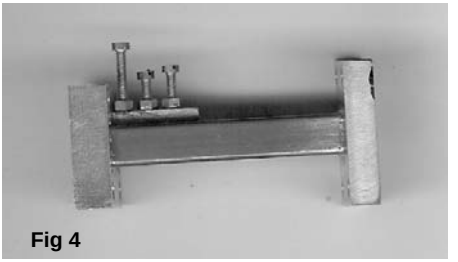

Fig 4

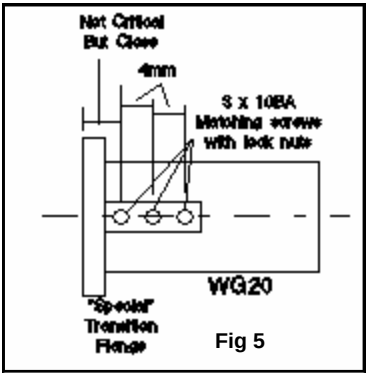

Fig 5

If you need help please ask a member of the UkuG Technical support team.

The switch requires a supply of 8.2V and is of the latching type so it requires only a change over switch to operate it, see Fig 6. Tell tale contacts are included so an interlocked PTT signal can be made available which, if combined with the PTT signal to operate the transmit section, should obviate the need for a sequencer. Isolation was measured as in excess of 60dB so provided care is taken over the matching, particularly on transmit, the switch should be satisfactory at power levels of up to 20W maybe even more.

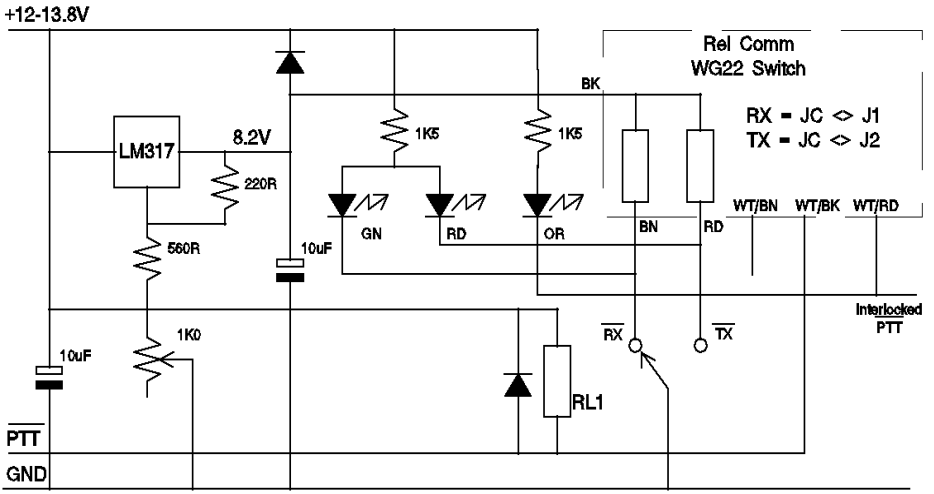

Fig 6

By Robin Lucas, G8APZ

After the big European opening of 11th-14th October which UK stations were on the edge of, it seemed as though we may have had to wait a long time for another opening on that scale.

We did not have to wait long, and for five or six days in December, there were widespread conditions on the lower microwave bands. Once again, those in mainland Europe got the best of it, but nevertheless, there were some excellent contacts made from the UK.

Tremendous distances were covered in excess of 1500km. On **23cm** for example, GM4CXM - SP4MPB at 1613km, and in mainland Europe DL7YC - OY9JD at 1604km.

Now that the hectic Christmas and New Year period is behind us, it is now time to start to think about our next microwave band! For some of our readership, who have yet to make the move onto their **first** microwave band, it will be an opportunity to make a New Year resolution. Having said that, I must remember to order a transverter for **13cm**!

The New Year brings with it a new contest calendar. The full year calendar should be on the UKuG website <http://www.microwavers.org/> by the time you read this.

CONTEST & ACTIVITY REMINDER

Jan 15th 1.3/2.3GHz Activity Contest
2000 - 2230 (RSGB Contest)
Jan 27th All-band Activity Day - Non competitive
0900 - 2000 (Last Sunday in month)
Feb 19th 1.3/2.3GHz Activity Contest
2000 - 2230 (RSGB Contest)
Feb 24th All-band Activity Day - Non competitive
0900 - 2000 (Last Sunday in month)

DECEMBER 2007 OPENING

The opening started around 14th December, and went on until 22nd December for some. It did not favour all of the UK however, and stations to the west were not as fortunate as those in the north and east.

The high pressure 1036mB isobar included most of the UK, Southern Norway and Sweden, the Baltic, and also covered most of North Eastern Europe, with central pressure reaching 1043mB over a large area.

The first of our reports is from **Ray James, GM4CXM**(IO75tw) who worked **SP4MPB**(KO03ht) on CW 539 both ways at a distance of 1613Km. Ray is claiming this as the first **GM**-**SP** on **23cm.** Marek also says it is a first, and there is currently nothing claimed on the UKuG firsts list which John, **G3XDY** maintains. Congratulations to both stations.

Twenty contacts were over the 1000Km mark, all but one on CW. To conclude his top ten, here are the best of the rest:
SM1HOW (JO97) 1407km, **SM7LCB** (JO86) 1296km (SSB), **DK3WG** (JO72) 1294km, **DL7VTX** (JO62) 1230km, **DL7YC** (JO62) 1213km, **DL6ABC** (JO62) 1204km, **SM7GEP** (JO77) 1199km, **SK7MW** (JO65) 1095km, and **DJ8MS** (JO54) 1051km.

During the five days, he worked 36 stations at 750km or more, in over 21 different locators. That brings Ray's total squares worked to 47 in little over 2 years, and all of this is on **23cm** !
In his own words, Ray adds:

I always had the impression I was on the edge of everything, and most of the signals were not "needle bending" by any stretch of the imagination. It was a pity that more **SP**s were not active but, despite trying hard, there was no reception of **EW6FS**.

It was fortunate that the **23cm** NAC/UKAC coincided with the opening and this brought out a lot of activity and high scores.
DL7YC (JO62) was worked a number of times over the duration of the opening at 1,213km and one such contact confirmed that we should never rely 100% on beacon reception to know if a band is open as contact was possible without any **DL** beacon

being audible at the time.

This was the first big opening I have experienced since upgrading my station last year and it certainly made a massive difference. 73 Ray **GM4CXM**

This kind of achievement should be a great encouragement to other operators who may be a long way from local activity.

At the opposite end of the UK however, it was a different story. For some, there was a similar range of stations to be worked but it very much depended on where you were.

For most of the opening, **Dave Cox, G4RRJ** in Andover didn't hear much on the microwave bands, but on 18th Dec on **23cm** he worked **SK7MW** (JO65mw) and **OZ2LD** (JO54tu). On the 21st Dec he worked **OZ2OE** (JO45) and **OZ2LD** again.

Likewise, in the South West, Ralph Bird, **G4ALY** (IO70vl) reports that on 20th December conditions were very good on **3cm**, **6cm**, and **13cm** with beacons well above normal.
The Bell Hill group of beacons (**GB3SC***) were the strongest he has heard them all year, but nothing was worked on those bands, even though attempts were made to Germany and Denmark.

23cm on the other hand was more fruitful, with **OZ1FF** 1000km, **OZ1CTZ** 1094km and **DK6AS** 1059km all in CW.

Ralph was heard in Sweden whilst working an **OZ** but unfortunately missed that contact. Two attempts to contact **SM7ECM** (1290km) who was 419 with QSB then 529 with QSB both resulted in failure. He was running considerably more power than Ralph, and it was not to be.

It is over 400Km overland before the **G4ALY** signal reaches the North Sea but Ralph said it was an exciting time none the less.

From: Graham Murchie, G4FSG (JO02pc)

14th Dec There were vague signs that things might be looking up. Nothing around on **23cm** until I went to switch everything off in the shack at 22.30 when I heard **M0ELS** working **F9OE** in IN78 on **23cm**. I called Claude straight afterwards and had a QSO peaking 59 at a distance of 599km for a new square!
17th Dec The weather map looked even more hopeful so switched on early and at 07.54 worked **GM4LBV** (IO86) on **23cm** at 567km for another new square. Back early from work and to find that Ray **GM4CXM** had worked **SP**. Worked **SP4MPB** (KO03) 1305km on **23cm** at 17.30 for a new country and square. His signal remained constant at 519/529 for about 1hour.
18th Dec SP4MPB heard again on **23cm** for about 30 minutes at 16.30. From about 18.30 REALLY BIG signals from Scandinavia on **23cm**. In the early part of the evening **SM6AFV** at 853km was the best DX from JO67 square. It then got even better with **SM4DHN** (JP60) at 1170km at 54. I persuaded him to try **13cm** but only managed a one way. Then disaster struck and I succeeded in defeating the sequencer on **23cm** and blew up the masthead pre-amp whilst working **SQ6QA** (JO78) so did not complete. Despite no pre-amp I could hear a number of **SM** stations. Overall 8 stations worked over 700km.
19th Dec Took the mast down to retrieve the pre-amp box at dawn in freezing temperatures!! Mast back up and immediately worked **SM3LBN** (JP80) 1334km on **23cm** at 529 with no preamp. Tried on **13cm** and managed one way (again). Had to leave for work at 10.00 and heard Sam **G4DDK** working **SM3LBN** on **13cm** as I switched off!!!
20th Dec In the morning decided that conditions had disappeared so didn't re-install the pre-amp before going to work. Arrived back from work at 16.00 and immediately realised that conditions were back! Mast down to fit pre-amp. Checked pre-amp working with mast wound down and horizontal – could hear **OZ** station on **23cm**!! Worked **SM7LCB** (JO86) 1094km at 57 both ways. Heard **SM4DHN** on **13cm** working **OZ1FF** on SSB! Then heard again on CW but going down. Around 18.40 worked **SM6HYG** (JO58) 940km at 59 both ways and **SM4LMV** (JO79) 1175km.
21st Dec Around 09.00 worked **DL7YC** (JO62) 816km but conditions fading so went to work!
22nd Dec Convinced (again) that conditions had gone but at 15.46 worked **SP4MPB** (again) but this time on SSB at 55/52. Very selective conditions as Sam, **G4DDK** worked two other **SP**s on SSB whereas Simon, **G3LQR**, and I couldn't hear them. Simon and I are slightly further inland and both 20m or so higher than Sam...Conditions really did disappear after this!

23rd Dec Finally had time to check my **23cm** output power. The Bird had been indicating low but never fully convinced that the Bird gives consistent results on **23cm**. Proper testing shows that the 100W SSPA is only giving 25W!! Has one half failed?? More to check but again shows that relatively low power is all you need when conditions are so good.....

In summary, very good on **23cm**, with an increase from 48 to 57 squares worked and best DX up from about 970km to 1335km!! Frustrating on **13cm** with nothing worked but several 'one ways'. Not sure that the middle bands were working too well unless you were just in the right place at the right time. At one stage there was lots being worked on **3cm**.
73, Graham

From: John Wood, G4EAT (JO01hr)
For me, the opening started on Monday 17th December and lasted until Saturday 22nd.
I operated mainly on 2m, 70 and **23cm** but occasionally **3cm** and **1.2cm**.

Patience was required throughout this period because good DX was being worked almost 24/7 (witness the cluster) but my location was only in the main duct with strong signals for limited sessions. As often happens, stations in JO02, only 50km away, seemed to be better placed at times.

Because of the high levels of activity, dropping down to 2m and 70cm proved successful for finding QSOs when the microwave signals were too weak and in several cases lead to QSYing to the microwave bands.

Frustratingly, **3cm** throughout the opening was poor and few **3cm** DX QSO's were seen on the cluster. The most pleasing part for me was finding **23cm** (50W 4x23ele) working well into IP, JP and KO fields.
17th Dec Worked 2m only to the east and north east but signals were weak unlike for the more northerly GM and G stations (IO83/93) giving S9 reports.
18th Dec A very good day for **23cm**. Early afternoon worked **SP4MPB** (KO03ht) 1361km on **23cm.** In the evening **23cm** was open to Scandinavia for the NAC contest. Many strong signals from stations in **OZ** and **SM**. My ODX was **SM4DHN** (JP60va) 1233km at 59.
19th Dec 2m and 70cm only to LA, SM and OH (1600km-my 70cm ODX).
20th Dec 23cm weak to **SP4MPB** (KO03), **SP1FJZ** (JO84), **SP3JMZ** (JO82) but strong **23cm** signals from **OZ**, **SM** and northern **DL**. In average **10GHz** conditions, **DC6UW** (JO44) was 59 on **3cm** with his 2m dish and 300W TWT! Look out for him in the 2008 RS-season !
21st Dec Got a surprise call on 70cm when beaming N-E from **GM4ODA/P** (IP90el) 985km (Shetland) and QSY'd to **23cm** for a QSO.
22nd Dec At last some **10GHz** conditions to **DB0VC/B** at 730km which was 599 on peaks but no DX stations worked! There were a few weak SP stations on **23cm**.

I think I was lucky to be on the edge of the opening as **ON** and **F** stations did not seem to get any tropo enhancements. Stations in Northern Germany stations had a choice of west or east DX, and I worked several off the back of their beams. From Berlin, **DK3WG** (JO72) worked as far to the east as he did to the west.
73, John

From: Gordon Fiander, G0EWN (IO93FK)
Sheffield <gordonfiander@hotmail.com>

I run a fairly modest setup on **23cm**, consisting of an old transverter based on a VHF/UHF handbook design, with a G0MRF pre-amp made from kit, a 15w PA made from a Mitsubishi module, and a 44el yagi. All of the contacts mentioned below are on 23cm, unless otherwise noted.

14th Dec Worked **F6DKW** at 581km in a difficult direction but **15th Dec** was all very quiet.
On the **16th Dec** The main event got going with strong beacons fron Sweden e.g. **SK4BX/B** (JO79li). The best DX on 16th was **SM0SBI** (JO99cf) 1370km. The **17th Dec** was also quiet, and I didn't work any stations.

On **18th Dec** things hotted up with the best best DX being **SP4MPB** (1457km) and widespread DX to the NE and E. I also gave **OZ1FF** his 1st **G** contact on **6cm** and worked **DC6UW** on **3cm** He was a HUGE signal with his 300w into a 2m dish!!
The **19th Dec s**tarted with working **DC6UW** on **6cm,** again with a HUGE signal and another 300w into the 2m dish! Lots of good contacts including **SM3LBN**, (JP80io) 1335km,

SM1HOW (JO97gl) 1338km, **SM7LCB** (JO86gh). A post on 'KST said my signal had been heard by **YL3AG** in KO26 (distance over 1700km) at 559 but I wasn't alerted in time to try a contact.

20th Dec Better still. **SP**'s worked in JO83ve, JO82kj, JO91qw plus many closer squares. The day's best DX was 1419km. On **21st Dec** there were still great conditions. The Radiosonde data showed a strong duct 1000m thick over IO93 from 500m to 1550m. Fatigue was setting in, and less stations were on the band but some good squares were worked including JO84, at 1176kms plus **SP4MPB** (KO03ht) who was strong enough for SSB at 55.

In total, my squares tally jumped from 19 to 42 on **23cm** (something like 75% of all the dry squares in JO field).

On the higher bands, there were less takers, and a few tests failed. I finished up with 2 new squares on **6cm**, and one new one on **3cm**.

Despite all of this, I have still not worked IO83, JO03, IO92 and many other UK squares!! However, I have started hearing **G3AUS** (IO70) regularly by A/r when in sked with **G0FNP**.
73, Gordon, G0EWN

BEACON NEWS

23cm
From: Bryan Harber, G8DKK
I am soak testing the new drive unit plus old PA for the **GB3DUN 23cm** beacon. It is running a **DB6NT** "1.3 Bake" module kindly donated by the South Birmingham Radio Society. The module is supplied with a crystal for around 1296.900. The PA is an old Mitsubishi brick built by **G3JVL** about 20 years ago and designed to mount on the tower near the antenna. The correct frequency crystal is running in the temporary beacon at the **GB3DUN** site and will be swapped out when I install the new beacon.

The beacon keeper for **GB3DUN** is Ray Penberthy, **G3ZFP** to whom reports should be directed (*Bryan points out that he can QSP reports if needed - Ed*).

The keying needs sorting out before installation as it's currently inverted according to Graham, **G4FSG** and others.

It's really waiting for better weather as the site is about 1km off the main road so the most likely date will be March for the installation.

The antenna is still at roof level (2.4m) until the BT riggers can install the beacon and PA back at the 50m level on the tower.

3.4GHz
From: Mike, G0JMI Alton, Hants. Recently, I have been "out and about" with my **9cm** equipment on Holybourne Down, Alton, Hants, (IO91me) and can report that **GB3OHM** (IO92aj) was readable at 329 at 151km and **GB3SCF** (IO80uu) was 559 at 100km.

I was very pleased to copy **GB3OHM** which was the main purpose for going out to this site to check it out.

5.7GHz
From: Dave Cox, G4RRJ (IO91) On 20th Dec **GB3FNM** on **5670.919MHz** was heard by **OZ1CTZ**. **SM6HYG**, (JO58rg) and **OZ1FF**, (JO45bo) also reported hearing it.

I tried to work both stations but nothing was received at either end. I am 47Km further west than the beacon.

I know that Christophe **ON4IY** (JO20) has also heard the beacon so that's some very encouraging reports for the short time the beacon has been on, thanks to the fine efforts of **G4NNS**, **G8ACE** & **G8KQW**.

24GHz
From: Dave Cox, G4RRJ (IO91)
On two occasions in recent months I have heard **GB3SCK** (IO80uu) via rainscatter on **24GHz** over a very obstructed 66Km path.

On Christmas Day I copied **GB3SCK** in (IO80uu) on **24048.905MHz** for the fourth time via rain scatter. It is a very obstructed path so I was very pleased to hear it again.

On the 1st January there was some nice rain enhanced signals from **GB3FNM** on **24GHz** coming up to 53S over a 47Km path.
73 Dave, G0RRJ

3.4GHz and 5.7GHz ACTIVITY

From: Mike, G0JMI Alton, Hants

On 15th Dec in the freezing cold on 15th December 2007, Del, **G1JRU** and I (**G0JMI/P**) worked on **9cm** SSB at signal strengths from 51 to 55 between Holybourne Down, Alton (IO91me), and Del's QTH at Hythe (IO90hu). The distance is about 48km. We both ran 300-400mW to 60cm dishes.

The distance between **G1JRU** (IO90hu) and me (**G0JMI**, Alton, IO91MD is about 45km. We had S2 to S5 signal strengths depending upon the rain.

Del runs 400mW to an 18 inch dish at about 20 feet agl while I use 1.7W to a 2.5 ft dish and Flyswatter at 25 ft.

24GHz ACTIVITY

From: Dave Cox, G4RRJ (IO91) Andover
On the 22nd December, I noticed some rain scatter on the **GB3FNM 24GHz** beacon at 47Km. I tried with Ian **G8KQW** (IO91oc) which is a very obstructed path. Ian told me I was 59s (and could copy me in CW, SSB & FM) but Ian currently has only QRP (50mW) and my preamp is a DMC gain block so regrettably I could not hear Ian.

I am now up to 3 squares from home (IO91, IO90 & IO81) and I have worked the home stations of **G4NNS** (IO91ff), **G4LDR** (IO91ec) **G1JRU** (IO90hu) and **G8ACE** (IO91ib).

On the 31st December, I extended my overall best DX to 70Km on **24GHz** when I worked Brian **G4NNS/P** on the Isle of Wight in IO90jo (Ventnor Down) who was assisted by Ian **G8KQW**. We exchanged 57 reports in SSB and even managed to work each other in FM.

Ian, G8KQW operating G4NNS/p on 24GHz
Photo: G4NNS

John Wood, G4EAT (JO01) reports being heard on **24GHz** by home station **G8KQW** (IO91oc) at 120km. At the time, John could not hear **GB3FNM/B** (IO91of) on **24GHz**.

Please remember to send your activity news for this column to:

scatterpoint@microwavers.org

23cm EME NEWS

Howard, **G4CCH** posted some news on the "UKMicrowaves reflector" on 27th Dec, 2007

"….Bodo, **DL3OCH** is on expedition in Peru and was operating using the callsign **OA4BHY**. I'm pleased to report that I managed to complete with Bodo this morning on **23cm** EME using JT65c - O/RO. Bodo was running only approx 50W (due to reduced ac mains voltage) to the feed point of a 5m long yagi (linear horizontal)

My system is 5.4m dish, **W2IMU** circular feed, 400W, and 0.31dB LNA.

I should point out that a large proportion of my firsts were with Bodo, **DL3OCH** using the highly efficient system that he developed with Heinrich **DJ9YW**.

The yagi that he uses was specifically designed to be lightweight and suitable for portable work, with repeatable performance in any weather conditions. Its a 5m long 59 element yagi. It may look like a standard yagi, but the results somewhat better than your standard antenna.

This shows what can be done using relatively low power... why not have a go?"
Best 73 & Happy New Year, **Howard, G4CCH**

AND FINALLY...

Shortly before Christmas, Jacques **F6AJW**, and Guy **F2CT** announced another trip to **EA2** from 26th to 29th December. The expedition was to be on **13cm**, **3cm**, and **24GHz** from La Pierre Saint Martin in IN92px at an altitude of 1700m.

On Thursday 27th Dec, **EA2/F2CT/p** had **3cm** QSOs with **F6CBC** , **F1PYR** , **F1DBE** , **F6DKW** and **F6DWG/P** (745 km) from IN92px, and on on the evening of Friday 28th, the tropo was "fantastic" to the East. The **F5ZPS** beacon was 59+40 dB and **F5ZWM** (JN05ve) was 59 but nobody was QRV! They only had one qso with **F6APE** at 496km with very weak signals!

On 28th and 29th Dec **EA2/F2CT/p** tried to make it with **G4ALY** on **3cm**, without success.

Guy remarked "Having our feet in lots of snow, one hour outdoors was enough at any one time!" but adds that they will be going back there! The front cover picture shows Guy with his rig and tripod set up in the snow!

That's it for this month. Good DX **73, Robin**

UKuG CONTEST RESULTS

5.7GHz Cumulatives 2007

This year the number of stations active held steady, with 25 different callsigns in the logs received and with one additional entry, compared with 2006. Conditions were unexceptional with the best contact being between G4WYJ/P and G3PHO/P at 342 km. Scores were somewhat lower this year this year as a result.

Congratulations to **Jim G4WYJ/P for a second successive win** in this event from his site at Ditchling Beacon (IO90WV) on the South Downs. Runner up is **Peter G3PHO/P** who operated from Winter Hill (IO83RO) and Pocklington (IO93PW) in Northern England for the three sessions he was active. Both stations will receive certificates, as will **M0GHZ(/P)** as a new entrant this year. **Keith GW3TKH** as the leading fixed station entry and **G3ZME/P** as the leading single session entry.

5.7GHz Cumulatives 2007

Pos.	Callsign	May	June	July	Aug	Sept	Points	Multip	Total	Certificate
1	G4WYJ/P	1593	1857	1366	684	1418	4868	8	38944	*
2	G3PHO/P	1368	1626	1720			4714	6	28284	*
3	M0GHZ(/P)			1036	437	932	2405	6	14430	*
4	GW3TKH	649	1036	820	182	729	2585	3	7755	*
5	G3ZME/P					499	499	3	1497	*

25 stations QRV according to the logs

10GHz Cumulatives 2007

There was a decline in the number of stations active (from 74 to 63) and in entries (down by one in each section) compared with 2006. Propagation was generally rather uninspiring too with no major rainscatter or tropo events during the contest periods. The overall effect was to depress the leaders scores this year by about 50%. The best DX recorded in the logs was between G3PHO/P and F6DKW at 610km in the May event.

Once again John **G4EAT** (Essex) was victorious in the Open section, with a convincing lead over Peter **G3PHO/P** in second place, largely due to the greater number of multipliers worked. Very few stations other than G4EAT made more than one or two contacts outside the UK, his contacts into France, Belgium and Germany made a big difference to his score and multiplier totals.

In the Restricted section Steve **G1MPW/P** gained the edge over **Jim G4WYJ/P**, again mainly due to an extra locator square multiplier. Both stations were located within a few km of each other on the South Downs. Keith GW3TKH takes the award for leading fixed station in this section.

Mention should be made of the Telford club **G3ZME** who went out on their travels. Despite making only a single contact from the Isle of Arran on their Scottish trip, they also appeared from Wales and from their usual site in the Clee Hills to provide some additional interest for participants.

Certificate winners are marked with an asterisk in the tables below.

10GHz Cumulatives 2007 Restricted Section

Pos	Callsign	May	June	July	Aug	Sept	Points	Mult	Total	Certificate
1	G1MPW/P	2406	2646	1763	1605	1756	6815	12	81780	*
2	G4WYJ/P	2117	2554	2050	1681	975	6721	11	73931	*
3	G6KIE/P	1413	2745	1765	803	1808	6318	11	69498	
4	M0GHZ(/P)			1679	638	1879	4196	8	33568	
5	GW3TKH	1054	875	652	242	729	2658	4	10632	*

10GHz Cumulatives 2007 Open Section

Position	Callsign	May	June	July	Aug	Sept	Points	Mult	Total	Certificate
1	G4EAT	3778	3712	2424	2677	4716	12206	18	219708	*
2	G3PHO/P	4211	3929	3493			11633	14	162862	*
3	G4ZXO/P	2914	3412	2766	1891	1905	9092	13	118196	
4	G(M)(W)3ZME/P			332	1579	742	2653	7	18571	

63 Callsigns logged

Editor's comment: With 63 callsigns logged why do so few people send in a contest entry? Please send in your logs this year! They are very important to show others just how much activity there is on our bands.

The photo right shows Steve, G1MPW/P, the winner of the Restricted Section of the 2007 10GHz Cumulatives. Steve and his pal G6KEI/P usually operate from Firle Beacon in SE England.

Autumn 1.3GHz – 5.7GHz Cumulatives

This series of evening events through November into early December was very poorly supported, with no entries at all for the last two sessions, and only three sets of logs submitted overall.

Congratulations go to Keith GW3TKH who won all four bands through being active for two sessions. Ray GM4CXM was runner up on 1.3GHz with a respectable score on the date that coincided with the RSGB activity contest, and Graham G4FSG filled second place on 2.3 and 3.4GHz. All will receive certificates.

This event will not be rerun in 2008.

Autumn 1.3 - 5.7GHz Cumulatives 2007

1.3GHz		DATES:						
Position	**Callsign**	**04/11/07**	**12/11/07**	**20/11/07**	**28/11/07**	**06/12/07**	**Normalised Score**	**Certificate Winner**
1	GW3TKH	310	129	0	0	0	2000	*
2	GM4CXM	0	0	3636	0	0	1000	*
3	G4FSG	182	0	0	0	0	587	
2.3GHz								
1	GW3TKH	310	129	0	0	0	2000	*
2	G4FSG	182	0	0	0	0	587	
3.4GHz								
1	GW3TKH	175	129	0	0	0	1962	*
2	G4FSG	182	0	0	0	0	1000	*
5.7GHz								
1	GW3TKH	175	129	0	0	0	2000	*

24/47GHz Cumulatives 2007

Only two entries were received for the 24GHz event, and one for 47GHz. 13 stations appeared in the 24GHz logs, and there were 5 callsigns active on 47GHz. G3ZME/P made no contacts in the first session on 24GHz, then missed the August session where G8KQW/P made 9 contacts. Both stations were active in the October event which coincided with the IARU contest, with 5 contacts each. On 47GHz G8KQW/P made 3 contacts in the August, and two in October.

Changes to the calendar for 2008 are intended to promote more activity, a final plea is for everyone taking part to send in an entry to demonstrate the activity on these mmwave bands.

Congratulations go to Ian G8KQW/P who won both bands.

(The results table is on the next page.....)

24GHz Cumulatives 2007

Position	Callsign	July	August	September	October	Points	Certificate
1	G8KQW/P	0	640	0	299	939	*
2	G3ZME/P	0	0	165	312	477	*

47GHz Cumulatives 2007

Position	Callsign	July	August	September	October	Points	Certificate
1	G8KQW/P	0	183	0	95	278	*

FOR SALE AND WANTED

For Sale by Peter G8ZKZ:

Bird Model 43 Thru-Line power meter plus a Bird TermaLine dummy load and two N-type patch leads. The Model 43 power meter is in mint condition and comes in the Bird simulated leather carrying case with with three elements, i.e. for 10 watts and 50 watts at 2 metres and 10 watts at 23cm. It has interchangeable connectors, either N-type or BNC (two of each) and the Bird instruction book is included.
The Termaline dummy load is model 8125 (I think, the label is not very legible), 50 ohm 50 watts. It is oil-filled, finished in grey crackle enamel and measures 2" wide by 4" high by 6" long (plus the N-type connector). I believe that this series of Termaline loads are only officially characterised up to 1 GHz but this one seems to match OK at 23 cm.
Buyer collects from Petersfield, Hampshire (just North of Butser Hill).
For sale as one lot, **£185.00**, no offers.
Phone 01730 300414 or email:
Pete.weedon@ntlworld.com

For Sale: Dummy Load.

This is Model number 634C, made by Microwave Devices Inc., a subsidiary of the Bendix corporation. It is a 50 ohm load, 0 to 3000 MHz, and is rated at 150 watts continuous. It measures 6" wide by 7" high by 7" long (that's the cooling fin stack size) plus a 5" tapered snout with the connector on the end. The fitted connector is a bayonet-C but it comes complete with a bayonet-C to N-type adaptor.
Buyer collects from Petersfield, Hampshire (just North of Butser Hill).
For sale at **£35.00**, no offers.
Phone 01730 300414 or email:
Pete.weedon@ntlworld.com

For Sale items by Gordon G0EWN

I'm having a major clear out to raise some project funds. For more information/photos on any item please email:
g0ewn191-at-yahoo.com

Dishes

- 30cm plastic Cassegrain fed WG22, useful for 24ghz (see G4EAT's original system) by Nortel. Light and also works well at 47GHz. **£20**
- 48cm Procom with Procom WG20 feed. Made for 24GHz. **£30**

Transverters

10GHz: White box base unit—separate TX/ RX chains. RX chain has pre-amp. For conversion + may have some other useful bits to get a system going at low cost. **£30**

24GHz: Main parts to put together a compact, modern system with 23cm IF using Alcatel components. Includes Alcatel TX unit, RX unit, half watt PA plus LO multiplier—2 units. Just requires dish, relay and ocxo to complete. RX unit will require image reject switching to opposite image but has good NF: **£110**

47GHz: Basic transverter. DB6NT boards housed in milled alloy housing, including LO doubler for sub-harmonic mixer. Complete multiplier chain consisting of OCXO with separate PLL board, G4DDK x 24 board, G3WDG x5: **£100**

Other bits

PLL brick on 10224MHz. 106.5 MHz reference reqd: **£30**
PLL brick on 12.6GHz (originally 11.5ghz). Maybe useful to drive commercial tripler for 76GHz or 134GHz. 8mw: **£30**

FT790 IF radio—Leather case: **£60**

FT 0 IF radio---bought at rally may need alignment, leather case: **£50**

3 port Waveguide relay, made for 47ghz, manual changeover: **£30**

4 port waveguide relay, WG 22, manual changeover. Professionally made by Decca: **£12.**