An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

Formerly the RSGB Microwave Newsletter and now published by the UK Microwave Group

2006 SEPTEMBER

EME MEN MEET AT LAST

Fresh from the EME Conference in Germany, Jeffrey Pawlan, WA6KBL (right) met up on the 5th September for lunch in the Sheffield city centre with Peter, G3PHO and Conrad Farlow, G0RUZ (left). A very pleasant time was had by all and after lunch the two shown here went off to see the sights of the glorious Derbyshire Peak District.

In this issue ...

Latest News ...

- **Doug, GW3ATM now SK**
- **RSGB Microwave Manager retires after decades of service to UK microwavers**
- **Beacon Applications resubmitted**
- **French Laser communication via rainscatter!**
- **Yet another 5.7GHz World EME Record!**

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

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From the Editor's Desk

With this issue comes a separate questionnaire sheet. We'd very much appreciate you taking the time to fill it in and return it, as soon as possible, to the UKuG Secretary, Ian Lamb, G8KQW, whose address is shown above. If you receive your Scatterpoint by email then the questionnaire comes with it in the form of an editable Word.doc file. Just download it, fill it in and email it back to Ian. If you receive a paper Scatterpoint then you can either complete the sheet enclosed and send it by post to Ian or, if more convenient (and much cheaper!), go to the UKuG Microwave Reflector file archives at:
http://groups.yahoo.com/group/ukmicrowaves/files/UKuG%20membership%20Survey%202006.doc
and download the survey form from there. We'd appreciate replies from as many members as possible. Please try to reply during the next few days so that Ian has plenty of time to collate the findings in time for the November AGM at Martlesham.

Secondly, two important voluntary executive positions in UK microwaves will shortly become vacant .. the RSGB Microwave Manager and the UKuG Chairman's positions need to be filled shortly as the present incumbents are retiring. If you think you have what it takes to fill one of these positions, then please contact RSGB HQ for the first post listed or the UKuG Secretary for the second. For details of just what each job entails it would be wise to ask the present practitioners ! Each application should be accompanied by a short CV and the name and address of at least one person who will second your application.

Once again we are most grateful to all the contributors of articles and news items that make up this edition. Many thanks folks! Until next month,

73 from Peter, G3PHO — Editor

G3PHO: microwaves@blueyonder.co.uk

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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 at the end of the first full week of the month** if you want your material to be published in the next issue.

WELCOME ...

The following became members of UKuG since 1 June 2006 . We extend a very warm welcome to them all:

G3RIR .. Neil
G8LJO .. John
M5ABJ .. John
2E1CYT .. Shaun
M1BAI .. John
G3NHX .. George
G1BQQ .. John
LA3QMA .. Kai
M0GAV .. Andy

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 ON THE LOWER RIGHT CORNER OF THE LABEL. 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

SPACE...

The Final Frontier

Taken at the AMSAT-UK Colloquium at the end of July this year, this photograph shows the team who are building the U/S transponder for the forthcoming SSETI ESEO satellite which is expected to be launched into a geo-synchronous transfer orbit in late 2008.

The photograph was taken in front of Freddy's dish and 8.4GHz receiver system which was happily displaying signals from the Mars Reconnaissance Orbiter spacecraft which, at the time, was approximately 370 million kilometres distance from the earth.

From left to right:

Charlie G3WDG - S band PA
Freddy ON6UG - on board antennas
Sam G4DDK - RF units
David G0MRF - PSU and UHF RX
Graham G3VZV - "Co-ordination"
Howard G6LVB - DSP "bits"
(missing from the photo was Jason G7OCD who was away sailing..)

It is planned that the linear transponder will operate with up to approx 10 watts output and provide a 50kHz bandwidth. The transponder will incorporate standard analogue circuits and, additionally, a DSP based alternative system with many enhanced features and functions. It is hoped to setup an experimental test system operating over the air in the East Midlands /Northern Home Counties area before the end of this year.

One of Charlie's earlier S band PA units was provided, at very short notice, to AMSAT-NA for their AO51 satellite. This was successfully launched in 2004 and it has been operating flawlessly in space since then!

73 Graham G3VZV

Hittite device provides low power at 24 GHz at low price

Hittite have just announced their HMC578LC3B device via their website: <**http://www.hittite.com/product_info/product_specs/frequencymultipliers-active/hmc578lc3b.pdf**>. It is an active doubler **mmic**, providing +18dBm out at 24GHz with +5dBm drive at 12GHz. The price is only **$25.00 US**

GW3ATM ~ SILENT KEY

Doug Nasey, GW3ATM passed away, in August this year, just 24 hours before the August 10GHz contest. in which he would have been active had he been well. He adds to the growing list of highly respected microwave Old Timers who we have lost in recent years. He was a very popular chap, as the tributes below bear witness. Doug was buried in Usk, S.E. Wales, on August 30th. The UK microwave community was represented by several operators including Frank, GW8AWM and Keith, GW3TKH.

It's with great sadness that I have to report the passing, on August 19th, 2006, of my old and dear friend **Doug Nasey, GW3ATM**. He died in Cardiff University Hospital where he had been readmitted earlier in the week. He was in his early 80s.

In mourning his death I console myself with the fact that I had very much enjoyed his company at Martlesham and RAL in the past year and had spoken to him on the phone a number of times since RAL. As a fellow Yorkshireman, I always found I had a great deal in common with Doug. Conversation always came easy. He was a most gentle and caring person, always willing to help new microwavers. Indeed, he had recently donated his portable 10GHz station to a new member of the Microwave Group when he realised his own portable days were over.

I always looked forward to trying to work him during the 10GHz activity days. I say "trying to work" because it wasn't always successful as Doug lived in a poor location for microwaves. He relied heavily on rainscatter and his flyswatter antenna to make 10GHz contacts.

He leaves an elderly wife and grown up children. VY 73 SK Doug, from **Peter, G3PHO**

The passing away of Doug is a great shock. He will be greatly missed. I used to look forward to the phone ringing knowing it was Doug with the rain just in the right place to get into that almost impossible location he lived in. He was always around when RS was about. During long chats on the phone, during quiet periods, I got to know him very well. What a gentleman and keen microwave enthusiast! He went on the Blorenge to participate in the contests right up to recent times. The SW is going to be even quieter now he is no longer with us. A sad day indeed. **Ralph G4ALY**

I am very sorry to hear the sad news about Doug GW3ATM. We had many contacts on 10GHz and he always had time for me as a novice WB microwaver even though he ran 0mW. He was one the strongest signals to be heard from /p sites in the Midlands and certainly put Mynydd Maen on the microwave /p map. He will be sadly missed. **Andy, G4MAP.**

Really shocking news. Doug was a really generous guy and we had several quite lengthy rain scatter attempts in recent years (home to home QTH) but never quite made it. Portable from our usual /P sites was no problem, of course. He spent so much effort in recent times supporting his poorly wife, that it seems ironic that he should die first. As a personal tribute, I shall make a special effort to operate from his old portable stomping ground, the Blorenge car park, in one of the forthcoming microwave contests on one microwave band or another. I hope he'll be monitoring. **Martyn, G3UKV**

I am so sorry to hear about Doug. We had several nice contacts on 3cm between our homes. We'll dedicate the August 10GHz event to his memory. **Sam, G4DDK**

I was sorry to hear of Doug's death. I did not know him very well but we obviously had an interest in common and he was my nearest compatriot, although I was relatively the new upstart. **Frank GW8AWM**

I am very sorry to hear that Doug is a silent key. Doug was kind enough to pass on some items to get me started on 3cm and, during a couple of phone calls last year, his enthusiasm for microwaves was very obvious. Doug was a real 'radio ham' and a nice person; this is a sad occasion for all who were fortunate to have had contact with him. **Gordon, G0EWN**

Very sad news indeed. I only met Doug once and discovered him to be a really nice person, fitting in radio activities when he could take time off from caring for his wife. Doug was always first on the band when there was some RS A great loss. RIP friend. **John, G4EAT**

SWR Correction using Stub Matching

Dr. John A. Share, G3OKA

Geomagnetism Laboratory, University of Liverpool.

Forward.

Amongst the array of Wave guide orientated items shown in various text books are assemblies termed "Stub Tuners" and references to the application of a "Matching stub" to correct SWR in Wave guides. What are these mysterious objects, do they work, what are their inherent problems, and are they useful in a real life application?

Wave guide and Resonant Cavities do not "plug and play". Small machining errors are inevitable and these errors can give rise to significant problems. In order to transfer power into a Resonant Cavity it is necessary to form an aperture through one of the side walls. Calculating the dimensions of this aperture so that its impedance matches that of the Wave Guide must include many factors including the thickness of the wall, cavity surface resistance, frequency, cavity Q factor and its mode of operation. To achieve an initial SWR of less than 2:1 can be regarded as very fortunate.

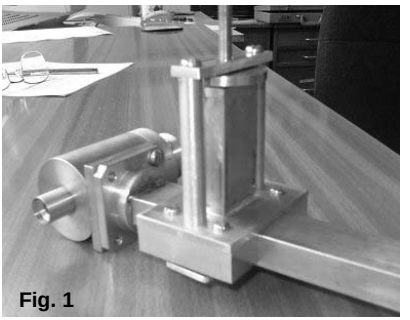


Fig. 1

From experience the best technique is to make the aperture initially slightly under size and to enlarge with a needle file until the unity SWR is reached. This technique does not allow for over enthusiasm and the aperture is enlarged too much, or when the aperture has been initially machined oversize. In either case the entire cavity may be rendered useless unless the resulting mismatch can be corrected.

In theory any mismatch can be corrected using stubs of the correct dimensions placed at strategic positions along the Wave guide. The text books would indicate that this is a simple procedure and implementation is both simple and straight forward. In practice this is far from the true picture.

Simple SWR Correction.

A sensor moved along the length of a Wave guide will show peaks and troughs, the difference in value is expressed as the SWR. At some point between the peak and trough the impedance is equal to that of the Wave guide. Applying a corrective reactance at this point will cause the Wave guide to operate at unity SWR although the SWR will remain at a different value between the correction point and the termination.

The corrective element is termed a "Stub" and is made from a length of Wave guide mounted at right angles to the transmission Wave guide. A plunger varies the depth of the corrective element, over a distance of half a wave length the correction swings from capacitive to inductive. Difficulties arise in making the corrective stub and finding its critical position.

Prototype Attempts.

The first design took the form of an asymmetric "Tee", the logic was that it could be reversed and with a few flange plates of various thickness the location of the critical point could be found by trial and error. In practice the combinations of position and adjustment became unmanageable and the concept abandoned.

Guided by the text book a double stub configuration was constructed. In this case two stubs are mounted 0.625 wave lengths apart, in practice this means mounting them on opposite sides of the Wave guide. With this arrangement it was possible to reduce the SWR dramatically but not

to achieve the goal of unity.

A brief foray into using three stubs, the text book showed combinations of up to five stubs, led to the conclusion that the interaction between the adjustments and the various uncertainties due to the prototype style of construction meant that this was a case of diminishing returns. The text book did advise that there was interaction between the adjustments and this was absolutely correct.

A number of practical lessons were learnt during this phase. The stubs had to be closed and not left open-ended, instinctively it had been assumed that provided the stubs were very long in terms of wave length and with the action of the plunger the far end would not come into the picture. Without the end caps the effect of the stubs changed dramatically when the hand was removed. Whilst there is little theoretical justification, it was found that a stub of about 2.5 wave lengths at the required frequency seemed to be optimum in terms of ease of adjustment and freedom from hand effect.

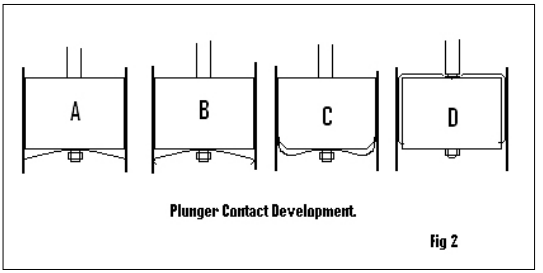
The plunger should make good contact with the inner walls of the Wave guide used as the stub. In an initial rush to experiment these plungers had not been made to any exacting standard, indeed they tended to be a rather loose fit. It was envisaged that electrical conductivity could be achieved using some Phosphor Bronze strip.

In **figure 2**, "A" the strip simply bows out towards the wall, this was fine going upwards but of course it jammed coming downwards. The ends of the strip were curled as shown in "B" but now the springy nature of the strip led to indeterminate variations in depth of the correction and "jumpy" tuning. To overcome this the plunger was cut back slightly at the lower face and the strip formed into the recess between the plunger and the wall as shown in "C", alas it too proved unsatisfactory. In despair the strip was formed along most of the side of the plunger so that it had massive contact with the wall. A slot cut into the plunger held the strip in position and is shown in "D". This was by far the most successful of the designs but was all abandoned in favour of a precision machined plunger that was a close fit to the Wave guide.

An Inelegant Experiment.

Given that the fundamental problem with the single stub match was finding the critical position, what would be the effect of cutting a window into the Wave guide and moving the stub over this window?

Reasoning that a full wave length at 15 GHz is 20mm a number of SWR peaks and troughs must occur in this window and that a correction point must exist. The leading question was the effect of this window on the Wave guide bearing in mind the wall would be missing and the continuity provided by a sliding plate in contact with the outer face. A window was cut in a scrap of Wave guide, a plate clamped to cover the window and the whole assembly measured for SWR into a known line terminator. The effect of the window proved virtually undetectable!



Plunger Contact Development.

Fig 2

An adjustable stub was prototyped and slide over the window. Almost immediately it became obvious why the initial attempts had been so fruitless, the location of the stub had to be positioned within a fraction of a mm. Then the SWR smoothly reduced to unity as the plunger was adjusted. It is the position that is highly critical!

Custom Stub Matcher.

An overall view of the Matcher was shown in the photograph as **figure 1** and the basic essentials of the method of construction are shown in figure 3. The "U" shaped assembly was made from a 40mm by 55mm rectangle of 3 mm brass plate and the sides are from 10mm square section

Brass Stock 40mm in length. The Wave guide must slide freely without skewing along the "U". The final version was made by fixing the sides and plate together with M3 bolts.

The 40mm length of Wave guide forming the stub was soft soldered into position with a millimetre or so projecting through the plate and was then machined flat. The top cap of the stub was made from an off cut of 3mm brass plate and a 4.5mm hole drilled at its centre for the adjuster.

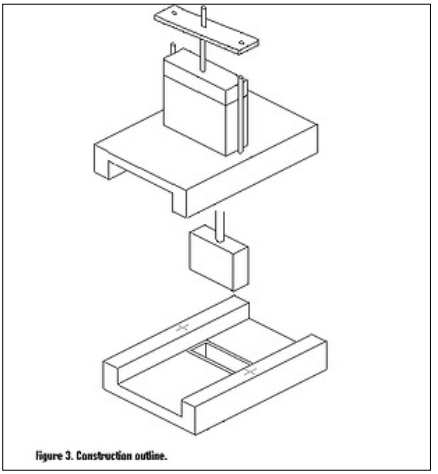


Figure 3. Construction outline.

Two 50 mm pillars support an adjuster retaining plate made from aluminium. These pillars were scrap items and are not critical in any way.

The plunger was machined from brass stock. It is a close fit inside the Wave guide and is tapped M4 on the upper face. A length of M4 studding passed up the inside of the stub and exits through the top cap. The plunger should move freely with a little contact friction along its entire travel.

Adjustment is achieved by rotating a threaded disc that fits between the top of the stub and the retaining plate. Two thin washers were used as packing to ensure that the disc could rotate freely.

The whole assembly is clamped to the transmission Wave guide by a plate that is fixed to the bottom using two M4 bolts. This plate should be of a soft material, pure Aluminium or Dural 2mm sheet would be acceptable. It must be softer than the Brass Wave guide so that it "clamps" rather than "crushes" the Wave guide.

In Operation.

The offending mismatch was due to an oversize Cavity aperture resulting in a 1.8:1 SWR at 14.150 GHz.

At an initial 5 mm depth of plunger setting the stub was slid over the window, at one point the SWR dropped dramatically. The plunger was moved and the stub relocated for minimum SWR. This process was repeated until the SWR was unity. Incredibly this took only a few minutes. Very many hours had been spent trying to achieve the same outcome using the asymmetric "Tee" and shims.

Having some acquired some feeling for this process further Cavities have been matched in a few seconds including one with an initial SWR far exceeding 2:1 that had been declared scrap.

It should be noted that unity SWR will occur at two positions in the window and plunger depth settings will be different for each position. It makes no difference which position is chosen though the purist will opt for the one closest to the termination.

Conclusions.

Single stub matching does work but the position is critical, hence the ability to slide the stub along the Wave guide is extremely useful and results in a functioning system that will provide a unity SWR in a matter of seconds.

Multiple stub matching also works but is fraught with adjustment problems and would only be advised where a wide bandwidth is absolutely essential. Endeavour to optimise the SWR before resorting to using multiple stubs.

Modest engineering of all the major components will result in ready duplication of this design. The one precision item is the plunger and this must be a close fit to the inside of the Wave guide.

JAS 14/06/06

[This work is part of ongoing Research into the use of Microwaves in determining the magnetism of rocks in Geomagnetism / Geophysics and also has been used extensively in applications involving Archaeological samples. It is funded by numerous Research Council Grants and Industrial Co-operative Undertakings for the past decade or more.]

Lower power MOSFET power amplifier modules

Paul Wade W1GHZ ©2006
w1ghz@arrl.net

I've recently been thinking about a two-metre transverter for my SDR-1000 transceiver, to drive microwave transverters. Down East Microwave does offer a nice one which fits neatly into the transceiver cabinet but the output is only 100 milliwatts, which is not compatible with all my microwave gear.

All my microwave transverters are set up for about 2.5 watts input power, to be compatible with the output level of many IF rigs: originally the IC-202 or IC-402, later the FT-290, both Mk I and Mk II, and finally the FT-817. While the FT-817 may be set for lower output power, the power reduction uses the ALC circuitry which produces some spurious outputs at the lower power levels. Having this flexibility has proven valuable, both for backups and for lending out spare rigs.

To maintain compatibility, particularly for rover operation – I haven't figured out a good way to make the SDR portable – I want to have the same 2.5 watt output level. The readily available choices for an output device aren't particularly obvious, either for a discrete transistor or for an amplifier module. A 2 metre version of the module I use in my 222MHz transverter[1] for the FT-817 is higher power, 5 watts, and rather expensive.

A perusal of the RF parts webpage **(www.rfparts.com)** revealed some "New Series Mosfet Power Modules." I knew that Down East Microwave is using some of these in new transverter designs for higher power, but there are also lower power versions, listed for about one-third of the cost of the 222 MHz module. At around $20, this is competitive with discrete transistor solutions and probably requires much less design effort.

I ordered the Mitsubishi RA08H1317M, rated for 8 watts at 12.5 Volts from 135 to 175MHz. One attractive feature was that the data sheet curves showed operation at much lower voltage for lower output power – perhaps 6 to 8 volts for 2.5 watts output.

The only problem is a vastly different pinout than the older bipolar modules, with no ground pins to connect to the PC board, only the flange on the bottom. I made up the test amplifier shown in **Figure 1** by hacking up an old 222MHz transverter PCB and bolting it and the module on a scrap of heat sink with two SMA connectors, and adding some bypass caps on the voltage pins, with plated-thru holes in the PC board to ground the other side of the bypass caps. It looks crude, but if this works, the part is easy to tame.

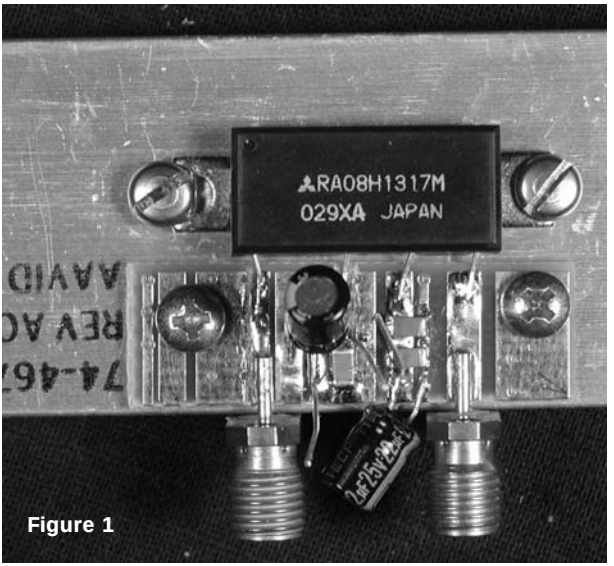


Figure 1

Figures 2 and 3 show my test results at 144MHz. **Figure 2** shows the maximum output

power increasing steadily with drain voltage Vdd toward the rated 8 watts; only 6 volts is needed for 2.5 watts out. In **Figure 3**, we can see that the gain is controlled by varying the idling current Iq, controlled by the gate voltage Vgg. The best operating point seems to be at 8 volts with about 0.3 amps of idling current (Vgg = 3.1 volts); the output power is about 4 watts max, but pretty linear up to 2.5 watts, with about 30dB of gain. The required drive power is only about 3 milliwatts, or +4.5dBm, easily achieved with a MMIC. At 2.5 watts out, the maximum current at 8 volts should be about 0.75 amps, easily obtained from a 7808 3-terminal regulator ***with a heat sink***. I didn't push the output power beyond 7 watts at 11 volts, but I expect that 8 or 10 watts is available at full voltage. At the 3 watt level, output was steady for several hours, and the heat sink didn't warm significantly. Also, the part is rated for 20:1 VSWR without damage at full power, so it is probably fairly bulletproof at the lower voltage. Cables occasionally do get misconnected or forgotten.

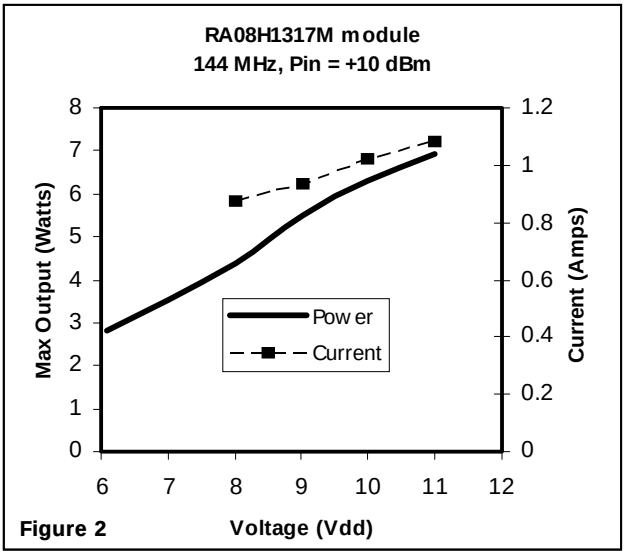


Figure 2

If you have a need for modest output power in a homebrew rig, consider one of these modules. Versions are available for 144, 222 and 432 MHz. The 222 MHz version would be ideal for my 222 MHz transverter, except for the different footprint. If I were re-designing it, I would certainly use this module.

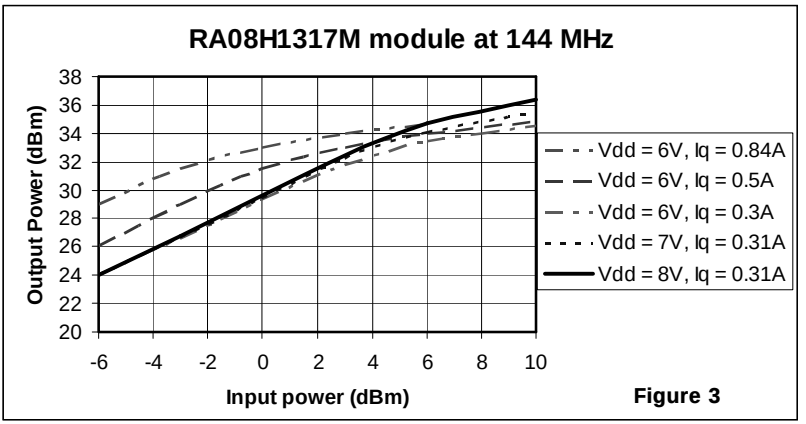


Figure 3

1. P. Wade, W1GHZ, "A 222 MHz transverter for the Yaesu FT-817," *QST*, January 2003, pp. 31-38.

NOISE FIGURE RESULTS~ RAL MICROWAVE ROUND TABLE

Editor's note: This results some how missed the last issue of Scatterpoint. Many thanks to Mike Willis, G0MJW, who both organised the test gear at RAL this year and the tabulation of the information below.

I didn't get time to organise the paperwork before the event and sorry about the 24GHz noise source not being available. However, we had a good time measuring noise figure, gain, ENR, transmitter power, frequency accuracy and spectrum. We do not have a record of all the measurements, so please let Scatterpoint know of anything you are really pleased with and let me know of missing data and details. **73, Mike G0MJW**

Here are some NFs. It says something about modern technology that of the preamps we measured, only those not working properly had a NF above 1 dB.

G0MRF: G0MRF Broadband LNA - 432MHz 0.77dB NF 21 dB Gain
1296MHz 0.53db NF 16 dB Gain
2.4GHz 0.88dB NF 12 dB Gain

G0MJW: G0MRF Broadband LNA - 1296MHz 0.45dB NF
3400MHz 0.9dB NF

G0MJW: WDG026 -1296MHz 0.35dB NF 20dB Gain,
1420MHz 0.32dB NF 20dB Gain,
1475MHz 0.3 dB NF 20dB Gain (Modified with lossy foam over output circuit and MAR-6 not used).

G4NKC: WDG026 - 1296MHz 1.6 dB NF, 35dB gain (this one has a MAR-6 and no foam so was probably oscillating, G0MJW's did the same until the MAR-6 was removed)

G4NKC: 2320MHz 0.68dB NF 40dB Gain.

G4NKC: 3400MHz 0.68dB NF 39dB Gain

G4NKC: 5760MHz 0.75dB NF 12.7dB Gain

G4HRY: Preamp- 1296MHz 0.39dB NF 34dB Gain
1420 MHz 0.505dB NF 30dB Gain

M0EYT: Home made super low noise 22mm copper pipe waveguide input DSN 8.4 GHz LNA, NF XX dB. Sorry Paul, I did not write it down.

G4IEV: 1296MHz Preamp 0.45dB NF 15dB Gain.

G4DZU:1296MHz Preamp 0.34dB NF 33dB Gain

G8ACE: 5.7GHz Transverter 1.1dB NF 30dB gain. This includes all the transitions and relays.

M0FWZ: DB6NT 10GHz TVTR 1.5dB NF 23dB Gain

Here is the ENR Table for the noise source that we used to help for those who measured their own noise source ENRs calculate the results - note, this is a low ENR head, using a high NR head will not give accurate results for modern low noise amplifiers. I will try and get more of the figures in between. I have included all the digits, even though there is probably at least a 0.1 dB uncertainty in these figures.

Freq (MHz)	ENR (dB)
100	5.576
1000	5.373
2000	5.502
3000	5.435
5000	5.349
6000	5.310
10000	5.518
11000	5.556

We measured a large number of noise heads but unfortunately I don't have all the figures. It would be nice to have these so others can see. So, for example:

G0NZO (home made Noise Com diode with 11 dB SMA attenuator)

Freq (MHz)	ENR (dB)
100	7.05
1000	10.02
2000	10.17
3000	9.83
5000	7.42
6000	8.95
10000	6.20

Do you like *glissando*?

... by André Jamet F9HX

When the DC voltage to your local oscillator changes between transmit and receive, the frequency varies and you can therefore produce a splendid frequency *glissando !*

That is very common in mobile operation because the battery voltage is very dependant on its drawn current. If the voltage drops to too low a value, +10V for example, regulators such as the 78L08 haven't enough input voltage to insure the correct output.

A good solution to overcome any battery voltage problem is to insert a DC/DC voltage regulator between the battery and the load [1,2].

To be sure that you do not have any *glissando* with your equipment, here's a simple method to check it:

First, listen to a beacon and adjust your tuning carefully to get a clear signal and beat note. Next, transmit on the same frequency, at full power, for a few minutes. Now change over to receive: you ought to receive the beacon as previously, without any frequency change. Try it, you maybe very surprised!

The articles below may be of interest:

[1] My all purpose Voltage Booster,
N4UAU, QST July 1997
[2] Un survolteur pour batterie 12 volts,
F9HX, Radio-REF September 2002

73 from André Jamet F9HX
<agit@wanadoo.fr>

How to Teach a New Dog Old Tricks ....

Some food for thought from Alan Melia, G3NYK

Hi all ...

After reading the article about a useful piece of 10GHz test gear (Comb Generator) in the August 2006 Scatterpoint, I mused on the fact that it is amazing how often useful old technology gets lost. So, at the risk of being a bore to the digital-with-everything generation, I thought I might drag another couple of analogue ideas before you including one that does not involve super high transition frequency transistors to get fast edges.

In the days of valves, before the one chip PLL, synthesizers often used comb generators in the synthesis regime. One very effective technique was to "modulate" a free running oscillator with a square wave standard frequency signal..... Ah yes! I know you are going to tell me that while the interval between the sidebands is accurate the centre frequency isn't. That is why I put “modulate” in quotes ... you actually switch the free-running oscillator on and off with the standard square wave and then it locks to a harmonic of the standard. I suppose it's a very brutal form of injection locking.

So, if you have a gash DRO out of an old TVRO head, you could quickly produce a comb at 10GHz or any other useful frequency. It would be quite beefy of course and would need attenuating so as not to blow the wires of your front end. If you "modulate" with a 100MHz signal (a PC block oscillator?), it might be possible to select one "tooth" of the comb with a waveguide post filter and have a signal stable enough for NBFM transmission. I will leave the voice modulation system for you to solve.

Another technique used for producing very fast rise-time short pulses was much used in the late 50s and early 60s to drive the sampling gates of sampling scopes.... the only way of looking at microwave signals in the days when a 10MHz analogue bandwidth was the norm on a professional bottom-end 'scope. It was discovered that using a state of the art 200 to 400MHz silicon planar transistor it was possible to achieve nanosecond rise-time short pulses. The trick was to invert the transistor .... yes ,use the emitter as the collector.... the mode was known as avalanche mode. Ferranti made devices and now Zetex have carried this on. There are some interesting application notes on the use of this mode, and some specially designed transistors for it, on the Zetex site. For instance, an inverted BC107 with a short length of solid coax as a pulse former in the collector, would probably replace the two transistors in the circuit in the article.

This is not intended as a criticism, but more another way to do things from the distant past. We must not lose the "biodiversity" of ideas in electronics just because they don’ include a processor and an FFT.

Unfortunately these older ideas are not taught to modern students.....maybe because their teachers don’t know about them !!

Cheers de Alan, G3NYK

AMSAT 9cm Transponder

AMSAT have announced plans to put a Transponder with a 3.4GHz downlink into the new Eagle satellite which is currently under construction.

This will be the first use of the 3.4 GHz band by an Amateur Satellite. Currently, 3.4GHz is available to the Amateur Satellite Service in ITU Regions 2 and 3 but not yet in Region 1.

A presentation on Eagle prepared for the 40th Annual Central States VHF Conference can be downloaded from:

http://mysite.verizon.net/~w3iwi/EAGLE_CSVHFS.pdf

See page 21 in the PDF for information on 3.4GHz (9 cm).

There was a presentation on Eagle at the AMSAT-UK International Space Colloquium which took place over the weekend of weekend July 28-30th.

73 from Trevor M5AKA

UK MICROWAVE GROUP NEWS

UKuG Chairman's post to become vacant in November

The November 2006 AGM at Martlesham will include the election of officers of the UKuG Committee. The present Chairman, G3PHO, will be standing down this year since he has reached the end of the three year period he said he would be happy to do, when invited to take on the position back in 2003. To date, there is one candidate for the position and, if no more come forward, this person will take up the reins as of 13 November. If any UKuG member is interested in the office then please submit your name and seconder as soon as possible to the UKuG Secretary, G8KQW (address on page 2 of this issue).

RSGB Microwave Manager to retire at the end of this year

After decades of loyal service to UK microwave enthusiasts, Mike Dixon, G3PFR is to retire from his position as RSGB Microwave Manager. His replacement is already being headhunted and we hope to have some news of this in time for the next issue of Scatterpoint. Mike has worked tirelessly for the rest of us through the former RSGB Microwave Committee and latterly through the RSGB Spectrum Forum. A more detailed appreciation of his work will be published later this year. Meanwhile, we know that you will all wish Mike a very happy "retirement" from this almost full time unpaid job and many productive years ahead when he can once again get active on the microwave bands he so loves.

Beacon applications (news from Murray, G6JYB)

An interim update:

'Beacon vetting' in Google will now show the following subtle public webpage:-
http://www.microwavers.org/vetting.htm which has

Batch-1: Resubmitted 4-Sep-2006

GB3CMS	10368.960	Danbury	Power Change
GB3COA	1296.920	Paisley	Site Change
GB3DUN	24048.890	Luton	Freq Change
GB3FNM	5760.920	Farnham	New Beacon
GB3FNM	24048.920	Farnham	New Beacon
GB3FNM	47088.920	Farnham	New Beacon
GB3MAN	24048.850	Rochdale	New Beacon
GB3MHK	24048.830	Martlesham	Freq Change
GB3XGH	10368.810	Rochdale	Revised Move
GB3ZME	24048.910	Telford	Freq Change

(it's actually a subtle link on http://www.beacons.org.uk)

The reason why it's not more obvious is that as soon as they were emailed in just over a week a go I got a 'Wont be in the office till Mon Sept-18' autoreply. The above were accompanied by a fast track proposal for many of them (based on BR68's replacement) which sadly was a few days before the Ofcom delay on the new licence was announced (From Oct-1st to Dec-1st earliest). Not great you may think.

By happy coincidence though, Thurs Sept-21 happens to be a Ofcom-RSGB forum meeting (the last being July-11). Whilst progress/delays to the new system will be on a packed agenda, I have Beacon licensing along with 10G, 75G amongst other things. I will see what transpires to get a better progress update ahead of making the vetting info more obvious. Apart from getting some of the above nodded through, it's only when Ofcom have agreed to a fresh/revised public process that we can put a whole lot more info on the web to guide Batch-2+

I also had a discussion with Grant Hodgson in at EuMW in Manchester regarding techie/practical aspects, along with Charlie G3WDG amongst other amateurs over the past few days (Bryan Harber, Mike Dixon, Peter Day, etc). I hope to be at the Crawley round table and the BATC AGM the following week as part of the checking on future frequencies and bandplanning. I would remind you though that some beacons are licensed and not yet operating so, while I struggle with Ofcom, there is no excuse for not assisting others! If Ofcom try the same rule as repeaters, we risk losing several more beacons (ie 6months off and you are out!). The agenda I see has a revocation of packet NoVs for example which, ironically, we need as an emergency plan for 23cm at 1240MHz!

73 from Murray, G6JYB

RSGB MICROWAVE MANAGER VACANCY

Due to the retirement of Dr Mike Dixon, G3PFR, the Society is seeking a new Microwave Manager. Applicants must be knowledgeable and active in microwave operation. The successful applicant will become a permanent member of the RSGB Spectrum Forum and represent the RSGB and the UK Microwave community in discussions with Ofcom on microwave matters and at the International Amateur Radio Union Region 1. He or she will be expected to be part of the RSGB delegation that attends the triennial IARU Region 1 conference. The appointment will start on 1 January2007. As this is a voluntary position, expenses will be paid in line with Society guidelines. Please apply in writing enclosing a CV outlining your amateur radio interests, experience and activities to Peter Kirby,G0TWW, General Manager, RSGB, Lambda House, Cranborne Road,Potters Bar, Herts. EN6 3JE.

The closing date is 1 November 2006

Ditchling Beacon IO90WV, the portable site used by the **G4ZXO/G4WYJ/G4WGE** contest team for the 5.7 and 10GHz Cumulatives. There's also 24GHz gear on that mast. The whole station is carried up the hill from car park using a trolley made from the mast and the operating table!

TWT YAHOO GROUP

I've started a new email group solely dedicated to TWTs and power supplies and related subjects. When it comes to details on the electronics and power supplies, I've been managing a large quantity of emails myself so I think it may be useful to have an email list separated as it may also get other hams that may not subscribe the moon net or mw list.

Anyway, if for some reason it doesn't get used nor useful it will be very simple to delete!

Feel free to join.

Post message:
twt_ham@yahoogroups.com
Subscribe:
twt_hamsubscribe@yahoogroups.com
Unsubscribe:
twt_hamunsubscribe@yahoogroups.com
List owner:
twt_hamowner@yahoogroups.com

73 from Luis Cupido, CT1DMK.

NEW RAIN RADAR WEBSITE

I just picked this up from a link on PG5D's web site:

http://www.buienradar.nl/frame.php?html=3Dhomepage

It provides a really good view of rain over the nearer parts of Europe (and East Anglia).

It is updated every 5 minutes and is only about 5-10 minutes behind real time, so it should prove very useful for rain scatter DX to the East.

73 from John, G3XDY

French radio amateurs bounce laser signals off rain cloud

That Amateur Radio is a hobby with variety and challenge was illustrated recently when two French radio amateurs made a one way contact over a distance of **40km** scattering laser signals from rain clouds.

The flash pulses were at times 12dB above the noise at 40km which seem to indicate that under the right conditions a distance of 150km could be covered.

Laser communication systems are wireless connections through the atmosphere. They work similarly to fibre optic links, except that the beam is transmitted through free space. While generally speaking the transmitter and receiver must require line-of-sight conditions, they have the benefit of eliminating the need for broadcast rights and buried cables. Laser communication systems can be easily deployed since they are inexpensive, small, low power and do not require any radio spectrum licensing. The carrier used for the transmission signal is typically generated by a laser diode.

Laser communication have been a hot topic lately, as solutions for how to satisfy ever increasing bandwidth needs are in high demand. Some have suggested that bandwidth could be distributed in neighbourhoods by putting laser communication systems on top of homes and pointing them towards a common transceiver with a fast link to the Internet. With possible transmit speeds of up to a gigabit per second, this is an exciting area.

Other applications for this technology include temporary connectivity needs (e.g. sporting events, disaster scenes, or conventions), or space based communications.

The French team proved that laser signals can be scattered from clouds thus proving that the notion that laser communication can only be line of sight, and that rainscatter is only found on microwave frequencies, is wrong!

Source: The South African Radio League

BEACON NEWS

GB3OHM: 5.7GHz

Date: Sun, 10 Sep 2006 13:05:17 -0000:
The South Birmingham Radio Society 6cm beacon GB3OHM became active today at 12.00 on **5760.900MHz**. Power Output is approximately 11W to a 16 slot antenna, co-located with the 9cm beacon.
73 from Ian G8IFT

GB3CLE: 1296MHz

After several years, GB3CLE (IO82QL) on Brown Clee, Shropshire, has returned to service on 23cm. Thanks to NoV holder Ken,G8DIR, it has been repaired and serviced, putting out a far stronger signal than in recent years.

Frequency **1296.910 MHz**, broad beam about NNW, with good sidelobes !

For those who like nostalgia, it still sends its QRA as YM48H, as well as QTH. Reports welcome via email. I will pass them on to Ken.
73 Martyn G3UKV <ukv@ukv.me.uk

SCOTTISH MICROWAVE ACTIVITY

There has been some welcome increase in microwave activity from GM this year. With low power, Ray, GM4CXM has been very consistent on the 23cm band as his list of stations worked over 500km this summer shows:

GM4CXM IO75TW - June/July 2006
FT736R 10w LNA 4X 44el Wimo

G3XDY	JO01/564km
G0RRJ	IO91/560
G0MJW	IO91/525
G0NZ0/P	IO80/582
G4LDR	IO91/567
G4BRK	IO91/517
M0GHZ	IO81/520
G8KQW	IO91/587
G8DKK	IO91/518
PI4GN	JO33/768
PI4Z	JO11/731
PA6NL	JO21/709
PA3DOL	JO22/702
SM6AFV	JO67/1045
G3LTF	IO91/525

Note Ray's very modest 23cm set up and what he has achieved with it. We in England could all benefit if we looked to the North a lot more often! The same can be said for **G4ALY in Cornwall**. Ralph has installed a very effective 23cm station but most of his contacts are across the Channel! Why is it that most English microwavers on this band tend to look South or East most of the time? Lurking in the distant SW and the Far North are some exciting contacts... just look for them!

EME NEWS

New 5.7GHz EME world record ....

DX records don't seem to last long these days. After the historic 15931km contact between VK3XPD and OK1DIR back in May of this year, the Aussies have done it again! On August 23, 05:05, **VK3NX** worked **F2TU** 559/529, over a terrestrial measurement of **16445km** for **yet another new world record on 5760MHz**. Philippe, F2TU says it was a very easy QSO !

From Dave Robinson, WW2R(Texas, USA): On Sunday 20 August, I worked G4DZU on 1296MHz off the Moon. He is now the 4th Brit I have worked on 1296 from Texas ... that's over 50% of them worked .... the only escapees now are G3LQR, GW3XYW and G4HUP (who I tried with before Doug and failed)

From Jonathan, G4KLX/ON: 23cms EME with small systems:

At some unholy hour of the morning of 10 September 2006, Howard G**4CCH** worked **PY2MU** on 23cm EME. **PY2MU was using only 20W and a 2m** dish. They used JT65c as the communication mode. 20W to a 2m dish is not an exceptional system and I hope that such results will encourage others to have a go on 23cm EME. There are at least two other stations in Europe who have systems that outperform Howard's, HB9Q and HB9BBD come to mind, so with a small system at least three European EME QSOs are possible. Sam G4DDK has had good success with another relatively modest system, so I hope that others will have a go. LZ1BB worked RN6BN on 2M EME using 40W to a 4ele yagi for example.73 from **Jonathan ON/G4KLX**

From Chris Bartram, GW4DGU (IO71):

On 10GHz, although I haven't been on tropo, I've continued to make EME QSOs. One of the most exciting for me was with DF9QX in JO42 on 15 August. Like me, Matthius uses a 2.4m dish and 35W. We had a very easy QSO completing on CW in about 15min. On the same day I also completed very easily with Paul, WA6PY, (DM13) also on CW. Paul was using a 3.2m dish and 25W.

I now get good echoes throughout the lunar cycle and, just prior to the WA6PY sked, I was able to detect my SSB echoes for the first time. I've heard whistles coming back previously but this was the first time I was able to copy 'Hello Moon' with the 10GHz system!

Other recent QSOs have been with RW1AW near St. Petersburg, on 29 July - a GW (and maybe UK?) first on 10GHz. Alex now has a good 6m dish, and a 30W SSPA. He was good copy, needless to say!

Another possible GW first was with VE4MA on 20 August. The timing wasn't ideal as the Moon was approaching apogee. Barry was running about 30W at the feed of a 3m dish. He wasn't easy copy here, although I gather he copied me well, and the QSO was complete. After the QSO, my echoes seemed a bit weak, and a quick check of Sun noise showed it to be about 5dB down! Investigating showed condensation, due to moisture ingress into the 'focus box', covering the surface of the LNA PCB.

My next major project is to build a new focus box. This will make provision for circular polarisation, a new WG preamp, and the ability to connect the WG output of a largish TWTA...

Oh to be able to retire and spend some time working on the system! **Vy 73 Chris GW4DGU**

TERRESTRIAL MICROWAVES

From Chris Bartram, GW4DGU:

I have my 1.3GHz tropo system running again. Due to other pressures I haven't made too many QSOs but I have listened on the band at times when people further east were playing with rain scatter on 10GHz. That's been very interesting. I've heard the GB3IOW beacon (which is usually below the noise here - unless I wind the tower right up) via rain-scatter from a point somewhere beaming 15 - 20degrees to the west of the direct path. The met. maps suggested that it might be about half way across the Channel at the time.

Also on 1.3GHz, I spent quite a lot of the evening of 23 August listening to what I'm 95% sure were lightning-scatter bursts on the GB3MHL (~400km path) signal. These were short (~500ms) 20 - 30dB signal enhancements with no audible sign of Doppler shift. I was also, as usual, monitoring PI7CIS (~600km path) on 432.413MHz, and could hear 'static' bursts coincident with some of the 1.3GHz signal enhancements. Just occasionally there were also coincident signal bursts on the PI7CIS signal. However, as the PI7CIS signal, which I hear more-or-less continuously, appears to be propa-

gated largely by reflection from aircraft 'stacking' on approach to the London airports, and I hear GB3MHL mainly by troposcatter, it doesn't surprise me that the two paths were behaving differently.

At the time, there were thunderstorms between Gloucester and Birmingham, so I have some confidence in my assertion that I was actually hearing 'lightning scatter'.

FIRST STEPS ONTO 10GHz

Many of us have perhaps forgotten the time when we made our first10GHz QSO. Here are reports from two amateurs who have recently been "baptized" into the 10GHz portable scene ... do they bring back memories of long ago for you?

From John Randall, M0ELS we hear of his first foray into 10GHz portable work:
Well, I finally had everything ready for a 3cm test on the nearest hill. I roped my father-in-law in to help me


M0ELS/P 3cm

carry the equipment, from the car park to the nearest hill, a 150m walk. After setting everything up, I listened for some beacons but nothing heard ... so I checked voltages, etc, and found no problems. I then gave Sam, G4DDK, a call on the mobile phone and, after much searching, checked the battery voltages again which were found to be around 10v! This of course was not enough to run the LO, let alone everything else, although the standard c58 rig had its own inbuilt batteries.

One lesson learned is to ensure I have reliable battery power and good batteries. I hope to be trying 3cm again over the weekend, from the same location which is Eversley Hill, Essex. The batteries were 2x 6v 5A/h gel batteries, which I quickly dumped as useless.

From John Owen, MW1FGQ, nr Mold, N. Wales.
John sent the editor the following email in late August: Many thanks for my first 2 way QSO on 10GHz, I'm cross that I initially doubted my receive side and didn't call you from Halkyn first thing but when like me you've never heard any distant signals of any kind its an easy assumption to make. I went back on the hill in the afternoon and heard your signals again when you were working G4ALY and M0GAV/P. I did put out some calls on 2m but no one came back; the rain did though! I exchanged carriers with G4ZXO/P but I was too weak with them to work SSB but still pleased that everything seems to work. All in all it was a useful outcome. I know what I must do to improve things (e.g learn morse) and how to avoid bent dishes!

I've recently got a 13cm transverter (the one mentioned in Sam's latest Radcom article) from Ian, GM0UHC, at a very good price. Ian has been very kind to me with advice and bits in the past, the transverter is a home built version of a DB6NT design and apparently works well, I'll use one of the offset dishes with simple feed for now. One of Ian's donations was his old G3JVL 10GHz system, I need to generate a -20v supply for the oscillator to get it going and intend to use it as a test source and to loan it out to local club members to work short local paths which might generate some interest.

I'm keener than ever now that I've seen some results and wish I could have got started earlier in the year. **73 John MW1FGQ**

CONTEST REPORTS

August Low Band Contest

This contest drew mixed comments. Conditions were actually quite good for much of the day but activity didn't match it!

Mike Willis, G0MJW, in IO91JO sends a report which sums up one viewpoint:
Well that was a waste of time! My 23cm is still deaf even with a replacement pre-amp. I could not hear much on the alternative receiver either so there must be a fault up the mast. Only 1 person was raised on 13cm by mid afternoon, so I gave up and watched the last 30 laps of F1 instead. Too many contests I suspect!

Bob Reeves, G8VOI/P, (IO90MX) reports:
It was one of those days! It started badly ...I had a problem with a bent key jamming in the lock to open a gate for access to the site.

I first helped set up a 70cm station for the club to run the Low Power contest, then put my stations together. All went ok, until I tried to run the generator, which was coughing and spluttering, I having kicked it a few times, then gave up. Sod's law, I didn't bother taking the spare generator, as it had run fine during VHF NFD a couple of weeks before. I re-jigged the stations to run off a battery that had been used the previous day for the 144MHz LP contest.

This worked for a couple of hours before the battery died so I attacked the generator again, and finally ended up removing the air filter to get it running. With the re-jigged stations back on to mains, I put the 23cm 2C39 amplifier back inline, and everything continued running for the rest of the day without any problem.

Propagation conditions didn't seem too bad, but it was very quiet, with a severe lack of activity. Beacons on

2/70/23 were audible.

I had several very pleasant contacts, giving Peter G3RQZ his first contact on 9cm, a long natter to Tony G3KTU on 23/13cm, and a good contact on 9cm with George, G8AIM who was running 200mW from IO92, a 153km path. It was a bit of a struggle but we completed a 2 way.

Final results: 11 on 23cm, 8 on 13cm and 7 on 9cm. Longest distance contacts 250km with G3PHO/P on Merryton Low on 23/9cm, and the 'full set' with Ralf G4ALY, longest on 13cm at 235km.

Peter, G3PHO/P (IO93AD51) went back to "old faithful" Merryton Low Triangle for the August Lowband Contest. The very warm and sunny weather must have been responsible for the poor activity, in spite of good conditions. Only 19 stations were worked on 23cm and 8 on 3.4GHz. I can work more than this on 23cm in the RSGB Tuesday evening two and half hour contests! Best DX of the day were F1PYR/P and F1DBE/P, both in JN19BC, at 530km, with RST519 to 539 signals on aircraft scatter. These two fellows really know how to make QSOs this way! On 23cm, 8 QSOs were achieved by direct calling on the band, while KST liaison provided 5 contacts and the 6 remaining were via 144MHz ssb. On 3.4GHz (I didn't have 2.3GHz gear) the best DX was G4ALY in IO70VL at 333km.

AUGUST 5.7/10GHz CUMULATIVES

Bob Reeves, G8VOI/P (Butser IO90MX):
At least no equipment failures this time (despite my best efforts to destroy my 10G transverter by transmitting up the RX output, at least I know the protection works! The generator ran well with it's new air filter, but I took the precaution of having a spare available.

Propagation seemed very poor, particularly to the west, but did have two really good contacts to the south. Generally activity seemed low but maybe this is the norm now? Several on the activity list were not heard on 144.175MHz, possibly not active or KST only? In addition of course, a number of 'regulars' who were certain contacts are now sadly SK.

Results for the day:

5.7GHz: worked 8, best DX was Jean-Noel F6APE in IN97QI at 403km, a new square for me and Eric F1GHB/P IN88IN at 316km, both on SSB.

10GHz: worked 16, best DX again the same two stations as 5.7GHz, my first contact over 400km this year. Good to work Bob G3GNR/P after a long while, and a new one Alun, G4WGE/P. Tried, but failed with Andy, M0GAV/P.

Finally, the laugh of the day was listening to a conversation on 144.175MHz between a station trying to set a sked up for someone else via KST. Well if the time taken was typical of the system to get a reply, I will definitely stick to 'real time' amateur radio means!

Gripes for the day (got to be some hi!) ... stations not bothering to allow you to hear any response to your CQ calls on 144.175MHz before calling CQ themselves (a few second would not hurt, would it!) and using FM for contacts around .100 on 5.7/10GHz. It's amazing how far signals travel and annoying to have weak signals drowned out .. why not move up the band a few 100kHz if your are going to use anti-social modes!!

73 from Bob, G8VOI

Peter, G3PHO/P (Merryton Low Triangle IO93AD51) worked 19 stations on 10GHz, a very disappointing result, and 11 on 5.7GHz. Unusually, the contacts with France failed to materialise this time with just faint dots being heard at both ends of the path between F6DKW and Merryton Low. It was very nice to have a first 2 way QSO with John, MW1FGQ, one of our newer UKuG members and a recent convert to 10GHz. George, G8AIM made the grade on ssb using just 200mW to a small horn antenna. Of these 19 QSOs, 16 were set up using 144MHz ssb talkback, while just two needed KST and the one remaining was done directly on the band (thanks Andy G4MAP!).

The 5.7GHz band was also a struggle in that conditions seemed as poor as 10GHz. A weak G3PHO/P carrier only was heard at ON4IY but then Christophe was using an SDR receiver! Best DX on both bands was G4ALY in IO70VL at 333km

Alun, G4WGE/P (IO90WV Ditchling beacon) sent in some super photos of the G4ZXO/P setup. There's only room in this issue for one of them but we'll try to include a couple more next time. Alun was very pleased to work G3PHO/P on 10GHz over the 279km path to Merryton as his system was just a couple of hundred milliwatts to a small horn antenna **(see photo page 14).**

SEPTEMBER 24GHz/47GHz CUMULATIVE CONTEST

The activity was once again polarised with all the 47GHz activity being in the South, well away from the two Northern stations who could have come on had there been someone to talk to! The 24GHz activity followed 47GHz of course so that, for the second mm bands contest in a row, we have seen two groups of activity in the country rather than one. We desperately need more 24GHz stations on the band, especially in the JO02 and IO92 region! Already three Northern stations have recently disposed of their 47GHz gear because of lack of stations to work. We don't want this to happened to their 24GHz equipment!

Martyn, G3ZME (AKA G3UKV) did a solo "rover" job for this contest, activating three different locations and thus gaining valuable "rover" QSO multipliers: His report reads:

Starting on Brown Clee (IO82QL) I particularly called southwards as the best chance from this elevated QTH. Humidity was low, despite a misty outlook, around 45-55%. Wkd G3PHO/P (Alport), Dave & Martin G8VZT/G7MRF on Merryton, plus Gordon G0EWN on Bradwell Moor, which is an obscured path behind Merryton at 108Km. (sigs 549/529). Also pleased to QSO with Mike G0MJW/P on Walbury, despite him being screened towards me. In fact signals were about the strongest (539) I've heard on this marginal path of 147Km. Conditions seemed good.

I then moved to Sedgley Beacon near Wolverhampton (IO82WN61), which, as far as I know, has never been used for a microwave activity or contest session, although ATVer G1GST and the GB3BG 10GHz ATV repeater are located nearby. Vandals had helpfully (!) flattened some of the boundary fencing but access is still only on foot, about 75 yards from nearest vehicle parking. So I set up the tripod etc on top of an old grassed blockhouse, mid-way between

two currently used masts. There was some PMR noise on 2m, but not too bad. Fantastic take-off all directions from this site, other than an odd shrub. From here I worked PHO, VZT, MRF, EWN and MAP again and also Harold G3UYM/P in Leicestershire (IO92NP) which was very satisfying.

Finally I went to the "dead centre" of Telford. Actually it's a crematorium (!) on Redhill, just outside Telford (IO82TQ16), for a handful of semi-local QSOs with PHO, MRF, VZT, EWN. I would particularly like to thank those guys who waited around whilst I traipsed from site to site with as much haste as I could; it made it all worthwhile, and I hope to do something similar on October 8th. I will also try to remember to turn on my mobile phone, (07932 927887) as requested by Chris G8BKE !

Gordon, G0EWN/P reports: Thanks to Harold, G3UYM/P and Martyn, G3ZME/P for activating some interesting new sites, and to Martin and Dave G7MRF, G8VZT/P for the company and chat at Merryton.
From Bradwell Moor(IO93CH) during the morning:
G3ZME/P 529/549 108kms obstructed path (by Merryton Low!!)
G3PHO/P 59/59 33km obstructed path
G3UYM/P 55/55 96km heavily obstructed path
G8VZT/P 59/59 22km
G7MRF/P 59/59 22km

Afternoon from **Merryton Low--IO93AD**
G4MAP/P 59/59 98km LOS
G3ZME/P 59/59 66km--LOS
G3PHO/P 59/59 29km near LOS
G3ZME/P 59/59 61km LOS

My 47GHz system is nearing completion--I hope to test it out soon. 73 and best wishes to all from Gordon, G0EWN

GENERAL REPORTS

From Eddie, G0EHV (Co Durham): I'm hoping to get back on narrowband microwaves soon as I've just bought an FT790 off EBay to use as an i.f. My equipment uses 432MHz as the i.f. I will only be operating /P, so I'll need to find a reasonable site near home such as Trimdon where I did a lot of 3cm ATV, but it generates a lot of interest from the local police - Tony Blair just lives down the hill at Sedgefield!

My only recent activity on microwave is via the local 13cms ATV repeater - you would not believe my antenna set up! The system ran for several months with a single dish in the loft space, about 30-45 degrees of elevation required to get any usable signal through the roof tiles. I'm now using a WiFi panel antenna outside for the RX path and the 2ft prime focus dish for TX in the loft. The TX runs out about 6 watts or so from my Spectrian amplifier. The amp is a bit sick however, it used to run out about 20 odd watts but I think I may have overcooked it without proper cooling.

I also have 23cm in the loft, pointing South, but have only worked a couple of locals. You may have gathered I've no external aerials at home (apart from the small panel). It makes radio a little more difficult!

From the annals of John, G3XDY (JO02OB):
25th July: A good opening to SM, with SM6EAN (JO57) worked with 59 signals on 2.3, 5.7 and 10GHz
10th August: Christophe, ON4IY, activated a wet and windy JO23 square. QSOs were made with him on 2.3, 5.7 and 10GHz, with the latter two as new squares.
20th August: The French F8TD Microwave contest did not have very good conditions. F5HRY (JN18) and F1PYR/P (JN19) were worked on 4 bands from 1.3 - 10GHz, F9OE(IN78) and F6APE (IN87) provided the only DX on 1.3GHz.
9 -11th September: This was a good autumnal tropo opening, starting with F8ALX in JN06 on 1.3GHz with good signals, and G8AIM (IO92) for a new station on 3.4GHz. On the 10th the bands were open from GM in the north to HB in the south via SM and OE, best QSOs were with SM7LCB (JO86), SM7GEP (JO77), HB9AMH/P (JN37), GM4CXM (IO75) and GM3SBC (IO85) on 1.3GHz. SM7GEP was also worked on 2.3GHz. The 11th started out with repeat contacts with SM7GEP and SM7LCB on 1.3GHz, but signals from SM7LCB were much stronger than the previous night so we went to 10GHz and exchanged 519 reports with signals popping in and out of the noise in QSB. Distance was just over 1100km (JO86GH to JO02OB). Later on Ulf's signals came up further to a solid 529. SM6ESG (JO67) was also worked with good signals right up to 10GHz.

As I write things are largely back to normal now, so its time to get on with all the other things I should be doing!

David, G6GXK (Rochdale) sends in a rare report! : Tom, G4TWJ in Bury and myself in Rochdale have been communicating over a non-line of sight path on 10GHz - both running 1W. Tom has a roof mounted dish and I was using just a horn antenna.

Initially we used to point the antennas at each other or at least at the hill between us. We made contact fairly easily using SSB. I then moved the horn around and wherever I pointed it, it received a signal - sometimes noisy and distorted but almost always there. We then tried FM and to our surprise the signal was much improved with less noise and no distortion. I then went to the other side of the house pointing it in entirely the wrong direction and to my surprise received a clear signal of FM, but an unreadable signal on SSB.
We came to the conclusion that due to multi-path reception the signal was too confusing on SSB with signals coming in at differing times, but on FM
this would be no problem since the demodulated FM would be the same whatever the path. I don't often do much operating :-) and wondered if others had
had the same experience?

We all regard SSB as the modulating system for DX — it was interesting to me that for a local chat mode FM can be so effective.

That's all we have space for this month.. many thanks to all contributors. Deadline for October Scatterpoint articles and news items is Friday 6th October. 73 from Peter, G3PHO, Editor

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SURPLUS SAT TV ANTENNA FOR SALE

Over the last few months, we've been helping a friend dispose of her late husband's effects . One remaining bit of kit is a **satellite TV dish, feed and set-top box**. The dish is the offset feed type, almost a metre along the major axis and is complete with wall-mounting hardware. I understand that the LNB and set-top box contain a few usable bits. Will any members of the group offer us **£10** for it? The **buyer collects** from Petersfield (in the shadow of Butser!).

Pete Weedon, G8ZKZ,
Pete.weedon@ntlworld.com

FOR SALE

ICOM IC-1271E 23cms multimode.
A1 working order.
Cosmetically 9/10 - Photograph(s) available. Boxed, manual + service manual. HM36 hand microphone.

Reason for sale: Purchased an ICOM 910HX

Buyer collects or pays delivery & insurance from Portland. Dorset.
Bids/offers to dave@g1ocn.com

Wanted:

Working AG1200 23cms mast head preamp.

Contact: Dave G1OCN
<dave@g1ocn.com>

LOOKING FOR FEEDTHOUGH CAPS? .... look for further!

These people do solder in ones:

http://www.cricklewoodelectronics.com/Cricklewood/customer/home.php?cat=158

73 from Chris **G8BKE**

FOR SALE

1.7 metre fibreglass ex C band dish, with polar mount and f/D of approximately 0.45.
Price: **£20**

Approximately **15metres** of **Andrews EW90 elliptical 10GHz waveguide** with separate transitions to rectangular, with pressure feed.
£20 or free if used for a beacon project.

Contact number: 01255 425965 or email:
Gus G3ZEZ <**gus@kestrel84.freeserve.co.uk**>

On line Source of High Efficiency Dish Feed Data

My papers for EME2006 and Microwave Update 2006 on high-efficiency feeds for both prime-focus and offset dishes are now on my web page:

http://www.w1ghz.org

Look in the Antenna Book table of contents or in the Conference Papers page.

73 from Paul Wade, W1GHZ

W1GHZ Dual Band Feedhorns

The latest version of the 10 & 24 GHz dual-band feedhorns, including integral low-pass filter to keep 24 GHz out of the 10 GHz, is now available. This is best for offset dishes. Pictures and details are on my web page:

http://www.w1ghz.org

For those that already have the horns, low-pass filter upgrade kits are also available.

Email to **w1ghz@arrl.net** for details. replies to this address may be delayed.

if you are operational on both bands and will actually be using the feedhorn, please indicate and I will make every effort to get one out in time. **73 from Paul, W1GHZ**