An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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

2005 APRIL

See page 4 for an explanation of these happy faces!

In this issue ...

Latest News ...

- First NA-EU 47GHz EME contacts!
- First OZ-PA 24GHz qso
- RAL meeting a great success

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

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From the Editor's Desk

Don't the weeks seem to fly by these days! RAL has just ended and the summer contest season begins just before you receive this issue. Not one of the winter microwave construction projects has been done at this QTH as a very busy period of UKuG radio politics has had to take priority. So it looks like the same gear as last year will be taken out on the hills at the weekend! Meanwhile "her indoors" keeps dropping hints about the rapidly growing list of domestic jobs that need attention... who said retirement was dull!

This great hobby of ours is still being threatened as I write this column. Keep up the submissions to Ofcom folks... they do read them and it appears they might even be listening to us!

RAL was great .. and many thanks to all who came along to make it so.

Now to dust off the portable gear ... see you on the microwave bands very soon!

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ERRATA

A few errors crept into last month's Scatterpoint...

- On p3 the URL shown as www.ofcom.org.gov should read **www.ofcom.org.uk**

- Page 13 "Useful cable catalog"... The URL given doesn't work, but this one does:-
http://www.timesmicrowave.com/tl14_catalog/

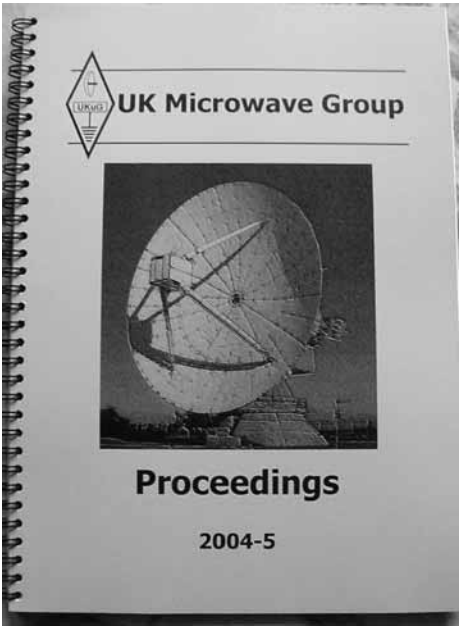
Many thanks to G6JYB and G6GXK for bringing these errors to the editor's attention.

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

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

OUT AT LAST!

The UK Microwave Group is very pleased to announce the publication of its book, "Proceedings 2004-5"



A limited print run of 100 copies was available at the recent Microwave Round Table meeting at RAL and there was a brisk sale to those attending. There are still a few copies available so if you didn't make the meeting you can still obtain one by post. Full details of how to do this can be found on the back page of this issue of Scatterpoint. We are sorry that the postal charges make the overall cost of the Proceedings significantly higher than the RAL price. Nevertheless this book is on sale at production cost price.

The book is a collection of presentations given both RAL and Martlesham last year, plus a couple of extra 'stocking fillers' as a bonus! All these are present in the "wiro bound" 102 page volume 21cm x 29cm A4 page size.

The List of Contents is as follows:

- **Foreward by G3PHO**
- **UK Microwave activity in 2004 by Peter, G3PHO**
- **An Integrated Transverter System for 2.3GHz by Dave, G0RRJ**
- **Making and Tuning an SMA to WG16 / WR90 Transition by Brian, G4NNS**
- **Laser Communications by Allan, G8LSD**
- **Multi-Mode Laser Transmitter, and other papers by Barrie, G8AGN**
- **Laser Receiver by Peter, G3PHO**
- **47GHz Schiphol Beacon by John, G8ACE**
- **First steps of Amsat-DL towards Interplanetory missions by Freddie, ON6UG**
- **Azimuth & Elevation Mount by Brian, G4NNS**
- **Martlesham 2004 Receiver NF Results by John, G3XDY**
- **Martlesham 2004 Antenna Measurements by Sam, G4DDK**
- **A Hotplate for Microwave PCB Assembly by Dave, G4HUP**
- **SSETI Express satellite mode S data & voice transmitter by Sam, G4DDK**
- **2.4GHz WLAN in Amateur Radio by Paul, M0EYT**
- **Frequency Standards by David, G6GXK**
- **Potential Interference to Galileo from 23cm Operations by Peter, G3LTF**
- **Buying & Selling Microwave Bits on eBay by Steve, G4KNZ**
- **Building a DB6NT 3.4GHz Transverter System by Peter, G3PHO**

By the way.. Due to a printing error there are two pages 2s !! All this for the price of one!

SSETI Express Update – March 2005

Graham Shirville G3VZV

Background

SSETI Express is the first of a series of satellites being developed by the Education Office of ESA – The European Space Agency as part of the "Student Space Exploration & Technology Initiative"

The satellite is quite large – 600x600x700mm and will weigh in at more than 50kg.

It is being built by university students from a number of teams from all across Europe and being assembled at the ESA ESTEC facility in the Netherlands.

The satellite is set for launch on a Cosmos rocket later this year with a number of other satellites into a sun synchronous 98° 680km orbit from Plesetsk in Russia.

The payloads

There is an OBC, an attitude control system, a colour camera and cold gas thrusters on board as well as three cubesats which Express will "launch" soon after it separates from the launcher itself. All of these systems need to communicate with the ground both for telecommand uplink and for telemetry downlink purposes.

The Communications Suite

The main data transceiver is a UHF unit built by Holger Eckardt DF2FQ. It is based on his existing TF7 packet transceiver but the unit includes a 9k6 TNC and has it's own switch mode power supply.

Originally this was going to be the only communications device being flown but there is also a set of experiment S band patch antennas being flown and they needed a transmitter to power them. To start with this was also going be a full data transceiver but the costs for a commercial unit made this option "non viable".

This gave AMSAT-UK the opportunity to offer a 3 watt S band transmitter free of charge to the project - on the basis that it could be linked to the UHF receiver for operation as a single channel FM voice transponder when all the experiments have been completed. The unit also incorporates its own switch mode power supply and a 38k4 TNC to allow the rapid downlinking of data – especially necessary for the camera experiment.

We were also fortunate that Jean Louis F6AGR from AMSAT-F was able to facilitate the frequency notification ITU process for the mission. Without his help I believe it would have been very difficult.

The S band transmitter progress

The transmitter unit is built into a beautifully machined and finished aluminium box provided by the University of Wroclaw who have also developed the three way power splitter and the experimental patch antennas.

Except for the TNC, which is a commercial TNC 7, the whole unit has been designed and built from scratch by the team. There are five boards. The exciter from Sam G4DDK, the PSU from David G0MRF, the command & control board and the sensor board from Jason G7OCD and the 3W PA from Charlie G3WDG (an identical unit to that flying in AO51).

The unit was first "delivered" to ESTEC early in November 2004 but further work on the wiring was needed and it was then returned to them again at the end of the month. At this stage the first actual amateur call was put through the satellite in the clean-room from the "control room" next door.

The unit then remained at ESTEC and was regularly exercised to download data via the temporary ground station that had been provided to them by Howard, G6LVB.

During February it became clear that the data rate from the OBC to the TNC needed to be changed to accommodate other mission requirements. An AMSAT team went over to rewire and reconfigure the unit and success was quickly achieved.

We then went on to apply the conformal coating to all the PCBs (except around the RF parts). At this stage disaster struck as the somehow some of the coating found its way right inside one of the filter assemblies – result

no RF output!

The unit was then brought back to the UK for "repair" but quickly returned again during the first week of March by Sam and David.

They were able to demonstrate the unit working again and also helped the SSETI team solve a power limiting problem which caused the unit to be switched off for 150ms every time it was commanded on – not helpful when trying to transmit short packets.

Here is an extract from part of the SSETI Express Integration logbook for 2nd March 2005: ESA_Neil, AMS_David and AMS_Sam power up the OBC, UHF and S-BAND for the purposes of testing.

The initial power consumption of S-Band FM seems good
The carrier is brought up successfully with the usual command
The DTMF telemetry is turned on and received without issue
The unit is switched to data config and data is transmitted without issue
The carrier is brought back down
The DTMF telemetry is turned on and received without issue
The unit is switched to data config and data is transmitted without issue
Transponding is tested without issue

MILESTONE 25: The S-Band sub-system is declared flight-ready.

Actually the S band transmitter is the FIRST sub-system to be declared flight-ready!

It has been a great experience for the AMSAT-UK team to be working with both the ESA experts and also the enthusiastic students – a number of whom have expressed the intention to get an amateur licence for themselves! It is a steep learning curve for them and for us - although we have been flattered in one presentation recently given by Neil Melville – the Project manager, which includes the text *"Radio amateurs know what they are talking about"*

What happens next?

A total of 150 solar cells, in ten strings of 15, are currently being laid onto the external panels of the satellite and we anticipate that these should be sufficient to enable the U/S transponder to work with the carrier up on a near 24/7 basis.

The flight model of the satellite will be completed over the next few weeks and will be subjected to the usual vibration tests and also thermal vacuum tests. Hopefully these tests will be completed without incident or problem.

The launch date is still not confirmed but should be late this summer.

The SSETI team will be providing full telemetry decoding information and will be encouraging us to provide downlinked telemetry data for them from around the world. They only have two ground stations of their own available and the software does not provide the "whole orbit data" that we are used to. Our worldwide network is certainly a unique facility and this data collection exercise will be good PR for the amateur satellite movement. ESA will be providing a prize for the amateur who provides them with the most. Full details will be available on the sseti website well before launch.

It is expected that the on board experiments should be completed within a matter of a couple of months from launch and after that the transponder can be placed into service. There is still a long way to go before that happy state becomes a reality and we have to remember that this is a high risk project – but, if we don't try .....

References:

Full information about the project is available at the regularly updated **www.sseti.net** website. This includes the complete integration logbook mentioned above. It is a big file but makes very good reading for satellite enthusiasts!

The webcam:
http://sseti.gte.tuwien.ac.at/WSW4/express4.htm

Downloads:
http://sseti.gte.tuwien.ac.at/WSW4/express_downloads.htm

Space Colloquium

Members of the AMSAT-UK team who produced the S Band transmitter will be giving a presentation on SSETI Express at the AMSAT-UK Space Colloquium. This will be held at the University of Surrey in Guildford from 29 – 31st July. All Radio Amateurs and SWL's are welcome to attend the event. For further details contact the secretary Jim Heck G3WGM, Tel: 01258 453959
Email: g3wgm@amsat.org
Website: http://www.uk.amsat.org/

Oh how wrong they were!

"Computers in the future may weigh no more than 1.5 tons." --Popular Mechanics, forecasting the relentless march of science, 1949

"I think there is a world market for maybe five computers." --Thomas Watson, chairman of IBM, 1943

"I have travelled the length and breadth of this country and talked with the best people, and I can assure you that data processing is a fad that won't last out the year." --The editor in charge of business books for Prentice Hall, 1957

"But what ... is it good for?" --Engineer at the Advanced Computing Systems Division of IBM, 1968, commenting on the microchip.

"There is no reason anyone would want a computer in their home." --Ken Olson, president, chairman and founder of Digital Equipment Corp., 1977

"This 'telephone' has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." --Western Union internal memo, 1876.

"The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?" --David Sarnoff's associates in response to his urgings for investment in the radio in the 1920s.

"The concept is interesting and well-formed, but in order to earn better than a 'C,' the idea must be feasible." --A Yale University management professor in response to Fred Smith's paper proposing reliable overnight delivery service. (Smith went on to found Federal Express Corp.)

UK explores rural wireless broadband...

(or, so you think you'll be free of QRM on Walbury Hill? !)

A project which will investigate the possibility of providing wireless broadband access (WBA) to rural communities by using higher power signals than are currently allowed in licence-exempt spectrum has kicked off.

"The purpose of this project is to look at how those higher powers could be used," said Andy Rhodes, principal consultant at Scientific Generics which is leading the project. "It may be of benefit, but there are other issues as well."

The project aims to see if WBA can be provided to rural communities where other broadband technologies are not economic.

Rhodes said it would primarily be a research project but experiments could be required. "For example, you have to consider the effects of high power on other users, so it may be necessary to conduct experiments to better understand that."

The second part of the project will look at which spectrum band could be used. "There are choices to be made," said Rhodes, "so the study will look at what those choices might be and identify which ones might be suitable."

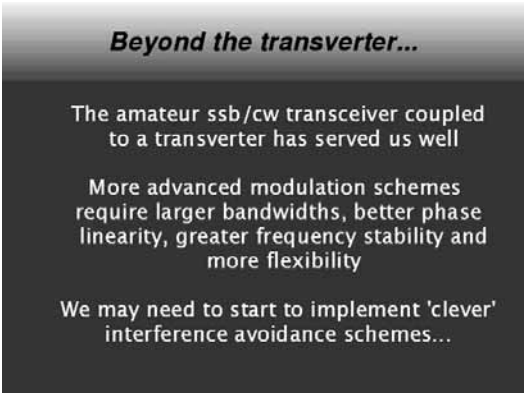
The required data rates and what can actually be achieved will also be determined.

Other companies involved in this project are: Lucent Technologies; DotEcon and the South East Regional Research Laboratory (SERRL) at Birkbeck; and University of London.

The project is part of Ofcom's Spectrum Efficiency Scheme (SES) - a research grant programme looking at technical innovation in the efficient use of the radio spectrum.

Other SES research includes evaluation of fixed and mobile mesh networks, development of smart antennas, evaluation of software defined radio, and systems at 60GHz and above.

BEYOND THE TRANSVERTER
..Chris Bartram, GW4DGU

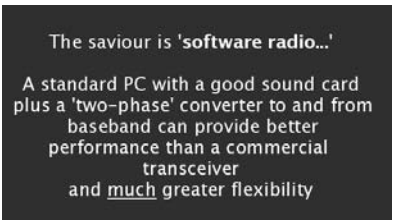


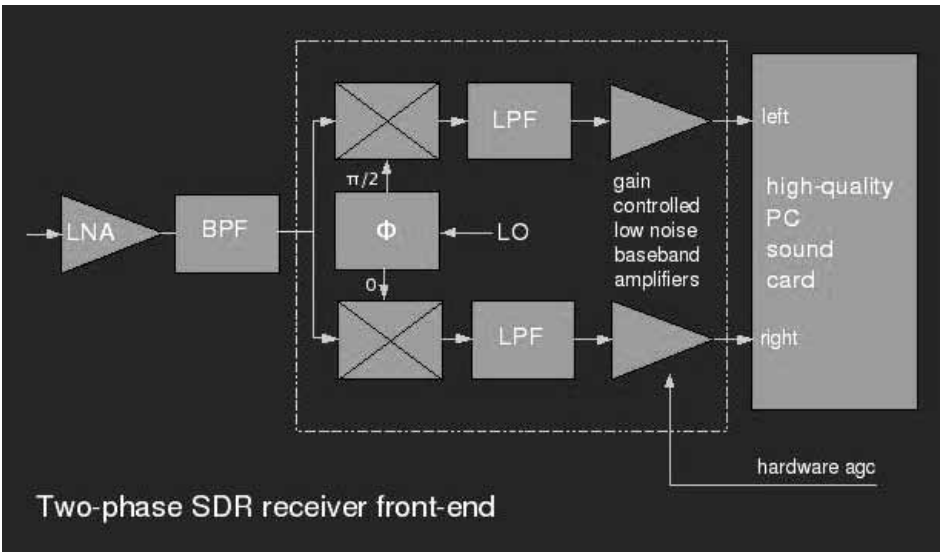
This article, presented here in an unusual graphic format, formed the basis of a short talk that Chris would have given at the Microwave Roundtable at RAL in mid April this year. Unfortunately Chris was not able to attend after all but he has very kindly given us permission to publish the slides he had prepared for the talk. More detailed information on this interesting approach to microwaves will be published as soon as it becomes available.

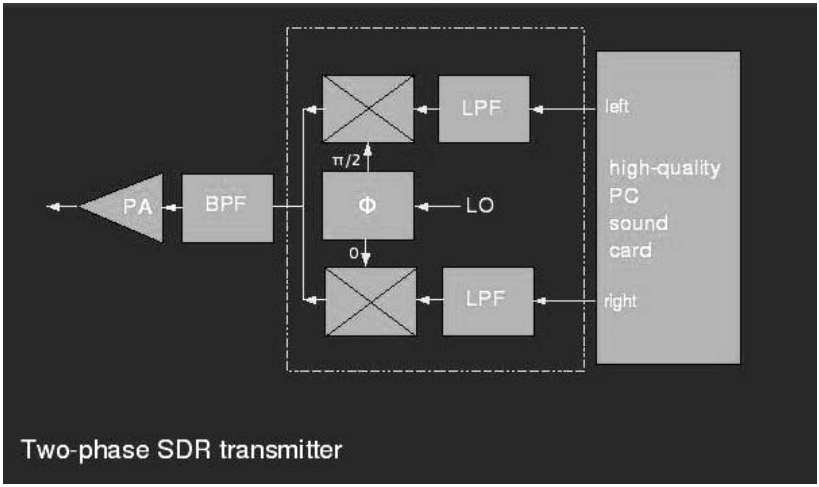
If you would rather see these in glorious Technicolour then visit Chris's website at:

http://www.christopherbartramrfdesign.com/blaenffos/RAL2005_Slides/RAL2005.html

As with all GW4DGU material published in this newsletter, **Chris Bartram's permission must be obtained** before it may be reproduced elsewhere.







Two-phase SDR transmitter

This approach is valid to at least 24GHz!

And it isn't 'blue sky' technology – suitable open market chips are available now!

Commercial ICs are available now to implement the quadrature modulator and demodulator functions...

Modulators:

LT5528	1.5 – 2.5GHz
AD8346	800MHz – 2.7GHz
AD8349	700MHz – 2.7GHz
AD8341	1.5 – 2.5GHz

Demodulators:

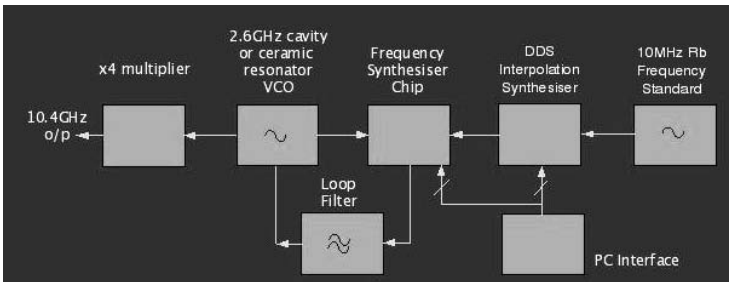
LT5517	40 – 900MHz
LT5516	0.8 – 1.5GHz
LT5515	1.5 – 2.5GHz
AD8348	50 – 1000MHz (with AGC)
AD8347	800MHz – 2.7GHz (with AGC)

Passive mixers with integrated 90° hybrid:

HMC520LC4	6 - 11GHz

What about the LO?

- A simple multiplier strip to the final output frequency would be adequate for much microwave operation. SDR doesn't require a continuously tuning LO for fine frequency resolution.
- Low-cost PLL frequency synthesiser chips are now available to ~3GHz. They have disadvantages, but these are not necessarily show-stoppers.
- DDS synthesisers allow simple interpolation between PLL frequency steps. This makes it reasonably easy to make a LO tuning in steps of a kHz or two at a few Ghz.



Proposed simple 10GHz synthesiser

Some Available Software...

▪ Linrad	SM5BSZ (RX only) (Linux)
▪ GNU Radio	Open Source software – HDTV anyone? (Linux)
▪ SDRadio	I2PHD (Rx only) (Windows)
▪ SDR1000	KA5OG et al Several open source s/w suites suitable for SDR-1000 HF SD transceiver – these could be relatively easily adapted for microwave use (Windows/Linux)

Welcome to the AMSAT-UK Colloquium 2005

The dates of the AMSAT-UK Colloquium for 2005 are Friday 29 July to Sunday 31 July. The venue is as previous years at the University of Surrey, Guildford, UK.

This will be our 20th Colloquium and, as usual, we hope to have an interesting and fun programme for all our visitors.

Special for this year will be the **ARISS-Internation** meeting which will be held on the 2 days after the Colloquium, ie Mon and Tue 1 and 2 Aug. Although primarily for ARISS delegates, this meeting is open for anyone to attend as an observer. Its an excellent opportunity to get more aquainted with the movers and shakers behind the ARISS programme. More information on ARISS can be found at: www.rac.ca/ariss/

As in previous years, you DO NOT have to be a member of AMSAT to attend, and you can either stay over night in the Universities student accomodation, or attend as a "Day Visitor" for one or more days. We hope to keep the day visitor fee below £12.50 per day (depends on cost of hiring the lecture theatre etc.

A booking form, and registration details will be posted at: **www.uk.amsat.org/Colloquium/** when available, meanwhile these photos from last year's event will hopefully give you an idea of what to expect — it's an excellent weekend for any one interested in amateur satellites!

Photos: Above right shows Trevor M5AKA with the well known Prof.Pillinger. The photograph below shows just some of the 2004 colloquium's attendees

RAL 2005 REPORT

The UKuG Microwave Round Table was held at the Rutherford Appleton Laboratory, Oxfordshire, over the weekend of 16th and 17th April. While not all of the 90 microwave enthusiasts who initially registered for the event actually attended, a rough head count suggested some 75-80 people were there on the Sunday to enjoy socialising, four lectures, a wide variety of surplus parts on the Bring 'n Buy tables and the excellent cuisine of the RAL restaurant. Saturday saw an Antenna test Range set up at G4NNS near Andover followed by an enjoyable dinner evening, arranged by Geoff Grayer, G3NAQ, at nearby Wantage. RAL attendees included Steve Krull, WB0DBS (Kansas, USA) and Rainer, DF6NA from Germany. Some very encouraging emails were received afterwards and it was obvious that the day had been a great success.

Old Friends meet at last ... after many hundreds of daily 6 and 3cm contacts over the 400 kilometres that separate them, Peter G3LRP (left) and Ralph (G4ALY) finally get to meet each other in the flesh!

The lecture programme started with a most informative explanation, by Peter Blair, G3LTF, of the impact of the Galileo system on the 23cm amateur band. Peter has researched the problem in great detail and has submitted, on the UKuG's behalf, a similar paper to IARU. Sam Jewell, G4DDK, then described his beautifully constructed and designed 23cm transverter.Using very modern components, it shows what can be done to bring down not only size but cost and yet have an impressive performance. Sam's transverter can be switched to a lower receive sensitivity in the presence of very strong, local signals that would otherwise completely block the average system. You'll be seeing more of Sam's latest creation in Radcom. Just after lunch came the presentation of certificates and trophies to last year's contest winners and runners up. Our new certificates look quite handsome! Trophy winners included John Wood, G4EAT, (G3RPE Cup for the leading station in the 10GHz Cumulatives) and Peter Day, G3PHO, who received the G3KEU Trophy for his leading entry in the 5.7GHz Cumulatives. A special presentation was made to John Hazell, G8ACE. He was awarded the handsome G3BNL Trophy (see photo above) for his outstanding development work in the field of stable oscillators. The impact that his OCXO designs and multipliers have had on both stability and spectral purity of

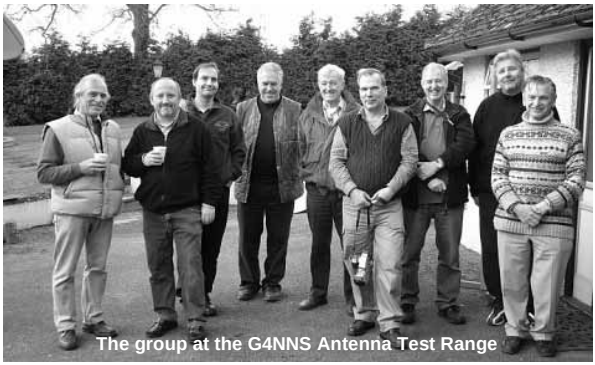
G8ACE(left) receives the G3BNL Trophy from the UKuG Chairman, G3PHO

Martyn, G3UKV (left) receives his 24GHz Cumulatives Runner Up certificate from Contest Manager Steve, G4KNZ

amateur transceivers the world over must rank as one of the milestones in the history of amateur microwaves.

The afternoon then saw another talk by Peter, G3LTF, a leading UK and world EME exponent. He described how to build large dish antennas from aluminium section and wire mesh. His own antennas certainly have been very effective for him. Most of the audience could only look, listen and envy!

The final lecture was given by Grant, G8UBN who runs G.H. Engineering. He gave a fascinating account of how state-of-the-art devices, especially Hittite mixers could be used to building highly efficient microwave transverters with very low image and local oscillator products. His systems also employ double conversion techniques that allow very simple filtering where and if needed.



The group at the G4NNS Antenna Test Range

Grant's talk was followed by a description of the previous day's Antenna Test Range and its results. Held at the QTH of Brian Coleman, G4NNS, it was attended by thirteen microwave operators who brought a wide range of antennas to be tested on Brian's own test range(1.3GHz—5.7GHz) and that of Sam, G4DDK who brought his own 10GHz/24GHz Test Range to the G4NNS location.

The final item of the day was the Open Forum. Here Murray, G6JYB, reviewed the various Ofcom consultation documents and the submissions from not only UKuG but several other groups and individual amateurs. Murray has been putting in a fantastic amount of work on our behalf and the audience were quick to show their appreciation of his efforts.

While all the talks were in progress, the Test Equipment bench was being used to good effect measuring power outputs, frequency and noise figures. Steve, G4KNZ, was doing a brisk trade selling the "hot off the press" Proceedings of UKuG. Some are still available if you were not able to be at RAL (see page 3).

Our thanks go to everyone who made the day such a success....

to **Mike Willis, G0MJW**, and the staff at RAL who set up the excellent venue, website registration and the test gear facilities. **The RAL kitchen staff** also deserve an accolade for yet another excellent day of catering. Thanks also to **Peter Blakeborough, G3PYB**, who was on "sentry duty" at the security gate to hand out ID badges to attendees. The Antenna Test Range was held at the home QTH of **Brian, G4NNS** .... many thanks Brian and also to **John, G8ACE,** who helped with the equipment. Thanks also go to **Geoff, G3NAQ**, who set up the Saturday night dinner at The Bear in Wantage. Finally we must thank our speakers and presenters... **G3LTF, G4DDK, G8UBN, G3PHO, G4KNZ and G6JYB.**

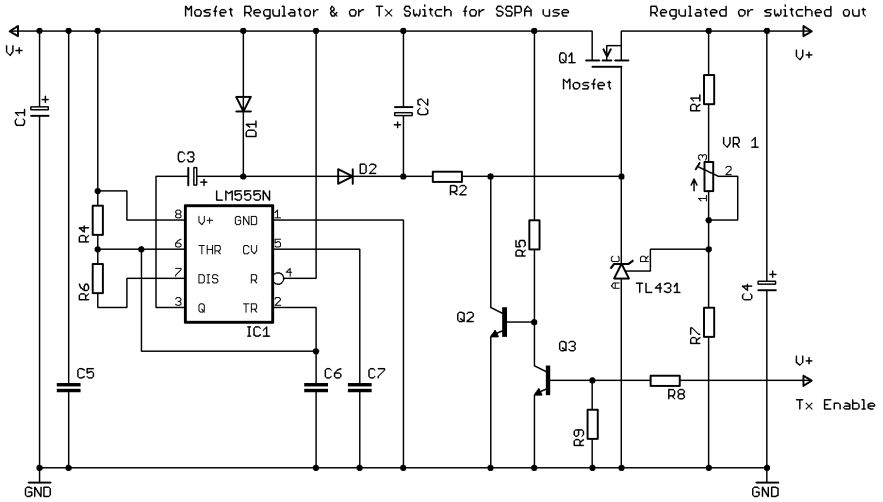
Here's to next year's RAL!

The photographs in this review are courtesy of G4HUP, G4ALY and G3PHO

A Mosfet Regulator and/or Switch

By John Hazell, G8ACE

Circuits for Mosfet regulators seem rather sparse and so this circuit was built up referring to a just a few circuit suggestions found during a web trawl. The need for the regulator arose as a low voltage drop, high current regulator was required to drive an HP 9cm 15w SSPA unit. Tests showed the SSPA gave full power from a supply of 11.7v upwards. However the upper safe voltage operating voltage was unknown so it seemed a good idea to utilise a low drop regulator to provide +12v even when running from a +13.6v supply or fully charged batteries to ensure a long PA life. The circuit below also serves for the high current part of the Tx sequencer.



An N type Mosfet is employed. These are fairly inexpensive and the criteria for selection is: Cost, Current handling, On resistance, preferably less than 0.01W, plus adequate voltage rating. The STP70NF3LL from Farnell was used but typically for Mosfets its already no longer available. Device availability lasts just for a short span of time so refer to its data as a guide for other suitable selections. A low on resistance device will drop only tens of millivolts at several amps in the switch arrangement. Of course the package needs to be at least TO220 to handle the dissipation especially when used as a 9.6v regulator for a module such as the Ionica SSPA.

The down side of the N Mosfet regulator is it needs a gate supply higher than the incoming supply, a minimum of 16v is a good target for an incoming nominal 12v battery voltage. The 555 IC is used with a voltage doubler for the gate supply. Download the 555 data and refer to the 50:50 square wave oscillator. Note R6 should be less than one half the value of R4 to achieve the square wave for efficient rectification. Values used were R4 47K, R6 18K and C6 C7, 0.01nF. These values produce a low frequency so that there will be minimal interference produced onto the dc supply. C2,C3 need to be adequately sized according to the frequency used. The gate supply can also be derived from your +24v antenna relay supply of course.

The regulated output from the Mosfet is achieved by using the inexpensive TL431 shunt regulator. Again download the pdf for reference. The device current should be not less than 1mA so R2 must be selected accordingly depending how the gate supply is derived. 3K3 was used from a 26v relay supply. The reference voltage for the TL431 is 2.5v between reference input and anode (ground). R7 is non critical so using say 1K then the value of VR1 say 500W the value needed for R1 can be calculated according to the output voltage needed. Two transistors are added such that the regulator can be keyed on for Tx with a +ve supply connected to R8. By sourcing the +ve voltage to R8 and Q3 from a sequencer the regulator eliminates the need for a separate Mosfet switch in the PA supply. R9 can be around 100K. If the regulating aspects are not required then the TL431 can be omitted so the Mosfet device simply acts as a low voltage drop switch. Powering an SSPA using the Mosfet in the switch arrangement the supply voltage drop was typically 60mV.

MY 10GHz BEACON ..

By John Jaminet, W3HMS

Here is my beacon in pictures. The frequency is 10368.900MHz in F1 CW. It runs 250mW from the DB6NT beacon. The antennna is an 8 slot in WR-90. The beacon uses one vent fan blowing in and one blowing out, controlled by a thermostatic switch set to about 75F/23 C. The IDer / telemetry sender is made by WW2R and details can be found on his Web site found under WW2R in Google. It sends a 4 part data stream in CW in this series:

1. 50% of temp in F per thermometer on beacon.
2. Bus voltage count...converts via a formula
3. Vent fans.....000=off or numbers=ON
4. 50% of outside temperature in F.

The box was made for the electrical trade and the beacon has spent about 30 months in all seasons on high places with NO interior or exterior deteoration.

It came down for repairs as ice fell on the radome and broke it. The box cost about $25 at Home Depot or similiar.

The new radome is a $1.50 plastic bottle made to hold cold water in a refrigerator. It does not attenuate the signal per a simple wavemeter test I made.

Good luck in building your beacon!

73, John 7 Apr 05.

ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

It's been yet another month of little reported UK activity,so many thanks indeed to the "band of few" that have sent in reports of their 2005 microwave activities so far.

The Millimetre Bands

have had an airing in at least one area of the country this year as **Mike, G0JMI (IO90)** reports: Just a brief note to mention that Chris, G8BKE, and myself have been active on 47GHz as follows on Easter Monday 28th March 2005:

At IO90DW, Junction of B3078 & B3080, Godshill, New Forest, we both received the 47GHz Bell Hill Beacon at a distance of about 45Km. I then moved 3km to Godshill as "/P" and worked Chris, G8BKE/P, with reports in both directions of 5/9 using SSB/FM on 47088.9GHz.

At IO91JA, Lane End, Winchester, Hants: Following the successful 3km test at Godshill, I moved to IO91JA as "/P" and Chris moved to IO90EV (Ocknell, Stoney Cross, New Forest). We then successfully worked each other over 32.3Km using CW with reports of 5/1/9 from me and 2/1/9 received from Chris, G8BKE/P, on 47088.15GHz.

We were both using DB6NT based 47GHz mixer systems using 144MHz IF. Both my and Chris's O/P powers at 47GHz being somewhere around 20 to 50uW.

My system uses an 83MHz xtal multiplied 288 types using a "G1JRU" based intermediate multiplier with a final stage to 23.5GHz based on the two stage GaAsFET circuit cut from a Blue Cap LNB. The output at 23.5GHz then goes to a DB6NT based mixer.

Band Reports up to 10GHz

Activity report from **Dave, G0RRJ (IO91FE)** from 15th Feb 2005 - 21st March 2005:

23cm: I worked Tony GW8ASD in IO83 for a new one. I also worked ON4IY, ON4SH (JO20), PA0WMX, PA6NL (JO21) PI4Z (JO11), PA0EZ (JO22), G3UKV (IO82), G0UHY (IO80) and G4ALY (IO70).
13cm: Only a few qsos on this band with G4ALY (IO70), PI4Z (JO11), PA6NL (JO21) and PA0EZ (JO22).
9cm: I worked my fist PA station in the March contest, PI4Z 419/529 (JO11). I also worked Martyn G3UKV for a new station (IO82) using meteor scatter style operation.
6cm: On the 18th March I finally worked Christophe, ON4IY (JO20), after several failed attempts to give me a new country on 6cm. We exchanged 529/519 using meteor scatter style operating. I also worked F6APE (IN97) a few minutes earlier.
3cm: I worked Graham G8HAJ (JO01) in SSB for a new station, G3WIE/P (IO91), G4LDR (IO91), G4NNS (IO91) & G4ALY (IO70).

From: MODTS, Rob (IO94IL68) <rswinbank@customnet.co.uk>

Date: Thu, 31 Mar 2005
I have finally got my 10GHz Qualcom amp working. There was a problem with the second stage so I have bypassed the first two stages and fed the output from my transverter through an attenuator and then onto the board where the second stage was.

It seems to work ok now. I can measure powers up to 1 watt with my detector and attenuators and I can measure somewhere around 900mW output from the Qualcom now, which is good enough for me! I did spend quite a few hours probing the board to get the most out and that seemed to be the best I could get so I'm happy!

I've now boxed it all up and put it up on the mast and then tested it out with Don, G1GEY. He reports me 53 on ssb now where is was borderline for ssb working between us with the bare transverter power. I just need some heavier supply lead to go up the

mast now as the voltage drops a little too much after 50m of cable! The mast is 50m from the house and all my feeders have to be that long .... nearly all has been replaced with LDF4-50 now so thats much improved on 23cm!

The Qualcom board had supposedly been tuned up for 3cm before I got it but I had to do some major mods to get the power up so I suppose thats down to how it was housed previously. **73 from Rob M0DTS** - IO94IL68

NEWS FROM 'DOWN UNDER'

From Lyle, VK6ALU (formerly VK2ALU) <lypat@msvillage.com.au>who has recently moved 3000 miles across the continent from NSW to Western Australia. Many readers may remember that Lyle made the first 10GHz EME contact between VK and G back in the mid 1990s by working Charlie, G3WDG. Times have changed for Lyle as you can read here ...

This is my first email sent from our new home in West Australia!) We are still in the "settling in" phase, but consider ourselves very lucky in our choice of Mandurah and of the Meadow Springs Retirement Estate as they have both proven to be very much suited to our needs. I guess that a city of 55,000 population does not have quite the range of medical etc facilities as does Perth, but there are compensations in the quieter lifestyle, lesser traffic congestion etc. We are only about 10 minutes in the car from the nearest beaches, downtown eating places, large shopping centre, etc. A high speed rail line (electric) is currently being constructed from Perth and will get us there in 45 minutes (75 km) and the motorway from Perth is being extended to Mandurah.

On a more important subject - I am not sure that I will be able to put up an Amateur Radio station here in the Retirement Estate - it depends on the attitude of our immediate neighbours I believe - and we are just getting to know them. One of the three Amateurs on the estate is on 40m with low power and a fairly low "invisible" wire antenna, and said this is so because he happens to have sympathetic "ex-technical" type neighbours, but the other two are off the air, except for a little bit of low power 2 metre operation with a vertical antenna in one case. There is a local 2 meter repeater so I may be able to get into it from here.

I have therefore concentrated in getting my computer and EchoLink operational. I have been successful in obtaining my VK6 callsign as VK6ALU, so can be reminded of my "past exploits" as VK2ALU!

Editor's comment: *EME and homestationmicrowaves are out of the questionof course but Lyle has hung onto his prtable 3cm transverter so hopefully he will be able to get out and work other VK6s from time to time. I now he would very much appreciate hearing from old friends... his email address is shown above.*

FIRST TWO WAY QSOs ON 47GHz EME FROM RUSSIA TO NORTH AMERICA!

The following post appeared on the Moon Net reflector**:**

April 16, 2005 - Announcement of the first QSOs via the moon on 47GHz.

The team of RW3BP, AD6FP, W5LUA, and VE4MA would like to announce that The first 47GHz contacts via the moon have been completed. As you may recall, RW3BP heard the first lunar echoes on 47GHz back in August of 2004. At that time he was heard by AD6FP, W5LUA, VE4MA and VE7CLD. Since the receipt of the first 47GHz echoes via the moon, numerous tests between RW3BP and AD6FP led to improvements by RW3BP, allowing him to copy calls from the lower power signal of AD6FP in January of 2005.

As of April 16, 2005 the team of AD6FP, W5LUA and VE4MA have each completed a CW QSO via the moon with RW3BP.

The station at RW3BP consists of a 2.4m offset fed dish and **100 plus watts** while the station at AD6FP consists of a 1.8M offset fed dish and **30 watts**. At W5LUA and VE4MA 2.4M offset fed dishes and **30 watt TWTs** were used. Noise figures of all stations are in the 3.5 to 4.7dB range.

Since the doppler shift can be as much as 100 + kHz at 47GHz, one must continuously adjust the receive frequency to keep the station centered in the passband. Precision frequency control was obtained by using GPS controlled, Rubidium locked, or TV sync controlled phase locked local oscillators. Various techniques were in use to keep the Doppler shifted frequency in the passband of the receivers.

[Submitted by RW3BP, AD6FP, W5LUA and VE4MA]

Editor's note: A fantastic achievement! Our congratulations go to everyone involved in this historic series of contacts.

All this puts my meagre 22 milliwatts of 47GHz into perspective!

FIRST OZ to PA on 24GHz

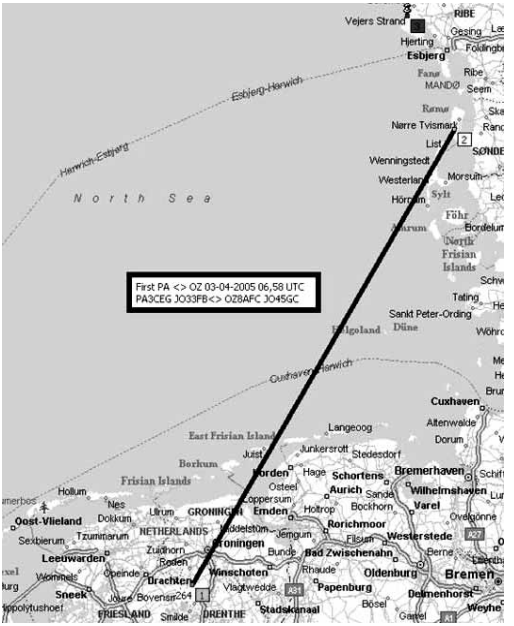
In the early morning of Sunday, 3rd April 2005, **OZ8AFC/P and OZ1CTZ/P** succeeded in working **PA3CEG** on **24 GHz** from Roemoe Island (JO45GC <> JO33FB (see map opposite). The path length is 265km. Further info can be found at:
http://www.xs4all.nl/~pa0nzh/firsts/First_OZ_24GHz.html

Equipment used was as follows:

OZ8AFC (JO45GC)
Pre-amp : DB6NT NF 1.5 dB
PA: MM-Tech 3 Watt (from W2PED), with wave guide in/out
Dish: 40cm Andrews surplus with standard "Hook WR42 type feed"
RTX: SMA switch, system in semi rigid
NF (system) : 3.1 dB

PA3CEG (JO33FB)
Pre-amp: Home made preamp NF ~2,1dB
PA: Milli Wave 600 mW
Dish: 90 cm prime focus RTX box with scalar ring feed
RTX: Wave guide switch, system in WG
NF (system): ~2.3 dB?

Many thanks to Kjeld, OZ1FF, for this excellent news. UKuG congratulates all involved in the fine contact. OZ1FF is located in JO45BO, directly looking over the North Sea with excellent takeoff from S to NW. He's looking forward to skeds on 24GHz.



FRENCH EXPEDITION TO IN78 SQUARE

On May 14 , F4CKM/P and F6DRO/P will be activating IN78 (the rare French department 29) on both 6 and 3cm and maybe on 13cm if F6DRO can repair his 13m transverter!

They will be located in MENEZ HOM. Talkback wil be on 144.390 MHz ssbwith qsy to 144.229 . Didier F4CKM and Dom,F6DRO will be on holday in IN78 for a week but we plan to be active only on May 14. However, if there are rainscatter conditions, they will also be active at other times, but from another place, closer to their holiday location. **Best 73 from Dom, F6DRO**

That's all we have space for this month so 73 until May ...

Peter, G3PHO, Editor

MICROWAVE BEACON NEWS...

From: DF6NA <df6na@df6na.de> 23 Mar 2005

DB0AJA 24GHz beacon is now transmitting with 0,5 W(from a Toshiba module) into a slotted waveguide.

Frequency: 24048.945 MHz (+-)

The 10GHz beacon at 10368.945MHz is still at 1W and antenna also slotted waveguide.

We hope the mast for the antennas will be upgraded soon (as long promised) so we can also mount the antennas for 3.4GHz. The beacon is ready to go. QRG 3400.945 MHz and power amp is a Toshiba module.

Reports please to Rainer, **DF6NA**

GB3SEE

From: **G0OLX, Denis Stanton** <denis@procompescot.co.uk> Sent: Monday, April 04, 2005
GB3SEE is still on but PA gone.

A new beacon, hopefully with better frequency stability, is to be installed soon. TX PA output power will be 1 watt, 6dB up on old unit so it should be better signal. I have just got the Fiberglass Radome and just some environmental temp control to finish. New beacon antenna will be higher than the cellular antennas, hopefully giving us back 360 deg outlook. The 24GHz beacon has come to a stop until site can be formalized.

Regards, Denis G0OLX

LIGHT WAVE NEWS

From: Chris<vocalion1928@hotmail.com>
We now have two web pages up, with a steadily increasing amount of data, urls and pics on both. They are: "MODULATED LIGHT DX: THE LUXEON WAY" on: **http://www.bluehaze.com.au/modlight**
also an entirely new page:
"MODULATED LIGHT DX RECEIVER CIRCUITRY and THEORY AND APPLICATION OF PHOTODIODES:
http://www.bluehaze.com.au/modlight/modlightrx.htm
Mike, VK7MJ, and I would really appreciate some comment, criticism or addition to our content. All comments welcomed!
Very best wishes to all,
Chris Long and Mike Groth VK7MJ.

From: F5PNP<f5pnp@free.fr>
Hello, dear friends.... Here is a new laser link from FRANCE...from my radio club, with some pages in English: **http://f6kaw.free.fr**
Another one from our best laser, light and hyper supporter, Yves, F1AVY...: **http://pageperso.aol.fr/yvesf1avy/index.html**
This is mostly in French for the moment but has very useful, technical, photos about experiments with infrared sources.

During the weekend of 18 and 19 JUNE 2005, F4DTL and friends organise: " ASTRORADIO 2005 " near PARIS...another edition of this super week end with fine “demos astro” (listening to Jupiter, observing stars during the night and the Sun during day, ccd capture, etc....), and radio (normal and digital traffic, satellite, weather, 137kHz and VLF, laser and hyper transmission, (guess who will make the demos etc!).... a wonderful field day activity with camping, barbecue and so on! So, take note on this week end on your agenda.
link : **http://www.f8kgl.com/reunions/astroradio/astroradio.htm**
73 from the French laser and light crew.

From: "Andrew T. Flowers, K0SM" <aflowers@frontiernet.net>
Date: Thu, 31 Mar 2005
For those who may be interested, I just received word that F8DO and F1AVY completed a contact on a 40km path using a "bounce" off of a hill near F1AVY. The actual path length seems to be more in the neighborhood of 50km. Hopefully Yves will put the pictures online sometime soon:

http://pageperso.aol.fr/yvesf1avy/index.html

The contact was made using I2PHD's "JASON" mode (at ~75Hz) and K3PGP receivers at 9cm lens. The path made use of the very high reflectivity of vegetation at 780nm--if you've ever seen pictures of trees with IR film you have some idea of how this works. It's a very cool idea. I imagine anyone in view of snow-capped mountain peak could accomplish the same thing with much stronger signals due to the increased reflectivity. Such paths also don't have the same aiming problems that LOS paths do since it is just a matter of getting the receivers to find the "dot" on the mountain.

Neat Stuff...I'll keep you updated.
Andy, K0SM/2

From: Alvaro de Leon, XE2AT, Mexico Romo"<xe2at@hotmail.com>
Date: 19 Mar 2005
I’m pleased to give some info about my new record on Laser. The old was 44.5km and today we can complete 2 way QSO on CW with XE2ZB at 70.325km.

The conditions were good , cold and clear and in 10 minutes both transmitters were aligned. Now we are experts!

On both sides, we had 3mW lasers and 4 inch magnifiers on the Ramsey receivers, modified to take the OPT101. We cannot hear any difference in level between 44.5km and 70km.

On my side I build a G0MRF receiver, first one , with a OPT101 and the volume was great but may be because the TL071 the noise was high and I can hear almost the same between both receivers..

I know that the OPT301 is better than the 101 so if someone have 2 for sale please send me an email!

Now all is ready to work the 5th grid. I hope soon we can do the next test..and we’rethinking of using a 10mw laser... **73 from Al XE2AT**

TWO FLASHES FROM THE PAST...

Last month’s Scatterpoint contained two photos on page 17 for which we asked the names of those appearing on them. We’ve had several readers email the answers and we thank them very much for clearing up the puzzle!

In the **top picture**, (the one with the Mini car), Derek Atter, G3GRO can positively identify the young chap just behind the dish, holding the microphone. It is David Skinner who had a G8?SV callsign. He was a colleague of Derek at Philips MEL in Crawley in the mid-1970s through to the end of 1990.

Both Peter Ebsworth (now LB0K in Norway) and Dave, G8GKQ, recognise some in the same photo. It was one of several regular meetings of the Wimbledon and the Purley Radio Clubs. Dave’s father, G3VGC was a member (Dave was only 10 then,and 4 years away from his own callsign). The figure at far right is Don Pike, G3WDY (possibly still living in Crystal Palace). Far left, sitting on the front wing is Frank G3ZMF (a.k.a G8CAX). The location would probably have been Kenley or Tatsfield.

In the **lower photo**, the young lad in the foreground is no other than our very own Paul Marsh, M0EYT! Paul had supplied Scatterpoint with the photo in the first place. He comments, “ I guess being radiated by those 2 dishes fixed my interest in uWaves for life!” The late G3KEU, Tim Leighfield is pictured operating the equipment at the car.

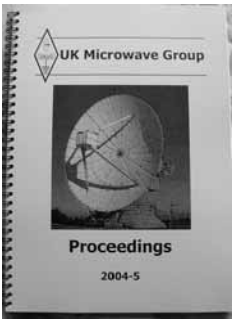
The impressive Japanese EME station at JR4ZZS with 9m dish and 23cm feed. The operator pictured here is JR4AEP

Pictured below is Ralph, G4ALY (left) with French microwavers at the excellent microwave gathering at Seigy in the Loire region. The meeting took place over the first weekend of April this year ... Photo is courtesy of Rainer, DF6NA

NOW ON SALE!

UK Microwave Group Proceedings 2004-5

A limited number is now available for postal applicants



ORDER YOURS NOW BEFORE THEY ARE ALL GONE!

After the sale of this book at RAL there are a small number left over for those who were not able to be at that microwave meeting. If you still want a copy please do the following:

(All prices below include padded bag packaging and First Class or Airmail postage)

PLEASE INCLUDE PAYMENT AND YOUR FULL POSTAL ADDRESS WITH YOUR ORDER.

UK residents: Send a cheque for **£6.20** to **G3PHO** (address is on page 2)
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If overseas, please allow at least 14 days for delivery after your order has been placed. For details of the book's contents please read page 3 of this issue.

FOR SALE

PTFE SHEET

Andrew Peters, G4MAP has some 0.25mm ptfe sheet available.

0.25 mm PTFE sheet is used for anode decoupling in 2C39 PAs, etc.

Cost is 70p per 100cm sq.cm plus post & packing

Email:
andrewpeters@postmaster.co.uk

Simon, G8ATB has the following item for sale:

40dB Peripheral Mode Isolator
1.7 - 4.5 GHz removed from Ailtech spectrum analyser. Made by Western Microwave Model No PMI-5074.
Offers?

Contact G8ATB via email at: G3AT@AOL.Com

Prime Focus MESH Dishes for 23, 13, 9 and 6cm.
Dimensions: 1.0 / 1.2 / 1.5 / 1.9m
Delivered as KIT or READY to use.
The KIT MESH DISH can shipped world-wide.

More info at: **www.rfhamdesign.com**

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