An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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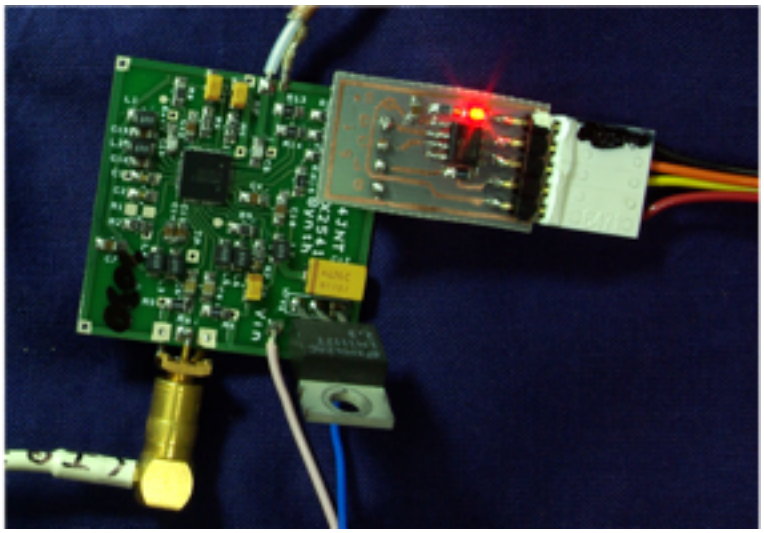
LMX2541 Fractional-N Synthesizer Development PCB

Andy Talbot G4JNT



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Editor's corner

Hope you enjoyed MMRT, those of you who attended. Those of you who were unable to attend can try to spot those who did in some of the pictures.

The BIG PLEA from the Membership Secretary is

PLEASE QUOTE YOUR CALLSIGN in all correspondence and membership renewal.

Your email address doesn't always give a clue as to who you are.

73 de Martin G8BHC

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome.

Please send them to

editor@microwavers.org

The CLOSING date is the FIRST day of the month

if you want your material to be published in the next issue.

Please submit your articles in any of the following formats:–

Text: txt, rtf, rtfd, doc, docx, odt, Pages

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

I can extract text and pictures from pdf files but tables can be a bit of a problem so please send these as separate files in one of the above formats.

Thank you for you co-operation.

Martin G8BHC

UK MICROWAVE GROUP

SUBSCRIPTION INFORMATION

The following subscription rates apply.

UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership.** For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via the Yahoo group.

Please make sure that you pay the stated amounts when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

You will have to make a quick check with the membership secretary if you have forgotten the renewal date. Please try to renew in good time so that continuity of newsletter issues is maintained. Put a **renewal date reminder** somewhere prominent in your shack.

Please also note the payment methods and be meticulous with PayPal and cheque details.

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

or

* a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary (or, as a last resort, by cash sent to the Treasurer!)

Colour codes

Editorial & Events

Activity & Contests

Technical

Nanowaves (optical)

Commentary

Reproducing articles from Scatterpoint

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

You may not reproduce articles for profit or other commercial purpose.

UK Microwave Group AGM 2013

AGM 2012 Minutes and matters arising

Minutes approved unanimously.

No Matters arising.

Chairman's Report – Dr John Worsnop G4BAO

Chairman paid particular tribute to the huge amount of work by Murray G6JYB.

Thanks to the Committee:–

Brian Coleman	G4NNS	Education Liaison
Bryan Harber	G8DKK	Membership Secretary
Martin Richmond-Hardy	G8BHC	Secretary and Editor
Graham Murchie	G4FSG	Treasurer
Murray Niman	G6JYB	Webmaster and OFCOM liaison
John Quarmby	G3XDY	Contest & Awards Manager
<u>Corresponding members</u>		
Kent Britain	WA5VJB/G8EMY	- USA Liaison
Gordon Curry	GI6ATZ	Northern Ireland
Ray James	GM4CXM	Scotland
Robin Lucas	G8APZ	Beaconspot
Dave Powis	G4HUP	Trophies coordinator
Tony Pugh	GW8ASD	Wales

Standing down this year are:

John Worsnop	G4BAO	Chairman for 3 years
Graham Murchie	G4FSG	Treasurer for at least 5 years and now an RSGB Board member
Brian Coleman	G4NNS	Committee member

Achievements since AGM 2012

"You are members of a very influential group"

With the election of G4FSG, UK Microwave Group now has representation at RSGB Board level, plus we have amongst our membership:–

- The RSGB Microwave Manager
- The Chairman of BATC
- The Chairman of the RSGB Technical Forum
- Two RadCom columnists
- Three Dubus columnists John Quarmby G3XDY, Kent WA5VJB, Guy F2CT

Plus UKµG representation on

- RSGB Propagation Studies Committee
- Contest Committee
- Spectrum Forum
- IARU Emerging Technology Co-ordination Committee

Achievements sine 2012 AGM

- EME2012 conference was generally accepted to be the best ever.
- UKuG continues to work with RSGB, IARU and Ofcom at high level
- 2320 MHz beacon NoVs finally starting to happen – GB3ZME finally granted
- The Chipbank project, under the supervision of Mike G3LYP is up and running, but has got off to a slow start. Should we continue? **YES**
- The UKµG is still in very good financial shape. The £6000 loan to EME20132 has been returned (see Treasurer's Report).
- •Scatterpoint e-magazine continues to contain top-class technical articles from around the world.

What didn't happen?

Despite the committee's best efforts, we have not managed to spend a single penny of projects. This is solely due to the lack of volunteers to make projects happen!

The idea of a *Web access Microwave SDR network* seems to have died a death, despite a promising start.

The very recent idea of awarding a G3EEZ prize, a one-off bursary to fund large projects in the microwave field has had no takers.

He raised the recent idea on an X-Prize of say £1000 for recorded and verified QSOs on all bands above 1GHz.

The following comments were noted:

- GW4DGU: Too much. Goes against ethos of amateur radio.
- G3XDY: Minimum distance?
- G7OCD: How does this align with the mission of the UKuG?
- G4FSG: Bands are under serious threat. Important to make Ofcom aware of band usage, especially higher band. *Use or lose* even more important these days due to commercial pressure.
- WA5VJB: Brian ??? is operating on 600 GHz
- G4DDK: Give bands a premium in contests to attract users to higher bands.
- G8CUL: Award rather than cash prize?
- Guy F2CT: Not that much activity in France.

Suggestions to Committee for means of attracting people to the higher bands are invited.

The Committee is still discussing funding of "soft" aspects of beacons such as electricity, site fees

Finally, the Chairman drew attention of the operation of the Centenary callsign G100RSGB by G4NNS and encourage members to work the station (including EME).

Reports by Officers

Membership Secretary's Report – Bryan Harber G4DKK

2012 402 members (04/2012) including 21 new members
343 members subscribed to Yahoo Scatterpoint, 46 pending.

2013 406 members,(04/2013) including 48 new members (21 during 2013)
372 members subscribed to Yahoo Scatterpoint, 34 pending

Please add your call sign to all correspondence, back of subscription cheques and, most of all, PayPal payments. In PayPal, use the Instructions to Merchant to add your callsign.

Please tell the Membership Secretary when you change your email address.

Treasurer's Report– Graham Murchie G4FSG

UK Microwave Group

Summary of Accounts 2012
Covering period 01/Jan/2012 to 31/Dec/2012

Item	Income	Expenditure	Balance	Notes
Opening balance 01/Jan/12			6667.77	
Subscriptions	2202.74			
EME2012	6954.32			Includes £6k loan repayment
Beacons	0			
Interest	1.68			
Other income	9.00			
websites		339.43		
Exhibition materials		525.93		TV monitor, pull-up displays
Beacons		97.56		
Trophies		50.13		
Other expenses		148.44		RSGB subs, Flossie support, QSLs
Subtotals	9167.74	1161.49		
Closing balance 31/Dec/2012			14674.02	
P G Murchie G4FSG, Treasurer				

£950 additional return from EME2012 = ~1% of turnover

No questions. Approved.

Contest and Awards Report – John Quarmby G3XDY

Changes to be reviewed.

Entries were up in the 5.7GHz Cumulatives, similar in the 10GHz event and down in the 24GHz Cumulatives in 2012. The poor summer weather may have discouraged portable operation.

The Low Band events (1.3/2.3/3.4GHz) had lower support than in 2011, but recovered for the last session in November.

Changes to the contest programme were proposed at last year's forum and are implemented this year. These include changing the timing of the 5.7/10/24GHz events and instituting Championships for the Low Band and 5.7/10/24GHz events.

Further feedback would be sought at the Contest Forum later that day.

No Firsts Certificates have been issued since the last AGM.

One Microwave Squares Awards has been issued, 1.3/70 to Gordon Emmerson G8PNN

The Distance Award relaunch awaits a redesign of the certificate (to be done by G8BHC)

Award Presentations 2013

Achievement/Contribution Awards

The Fraser Shepherd Award was presented to James Miller, G3RUH in recognition of his lifetime contribution to Microwaves.

The G3BNL Les Sharrock Memorial Trophy was presented, in absentia, to Murray Niman G6JYB for his work on Spectrum management and defence

The G3EEZ Alan Wakeman Memorial Trophy was presented, in absentia, to Alan Dimmick GM0USI/P for 'being there' for so many operators, and for the current UK 3cm record

Received on his behalf by Guy F2CT

Guy F2CT receives the G3EEZ Trophy from G4BAO on behalf of Alan Dimmick GM0USI/P

James Miller G3RUH receives the Fraser Shepherd Award from G4FSG who had collected it on his behalf from the RSGB.

Contest Trophies

G3KEU Trophy – For the leading entry in the 5.7GHz Cumulatives, in honour of Tim Leighfield G3KEU	G3ZME/P – Telford & DARS
G3JMB (Winner of the 10GHz Cumulatives Restricted Section (1 Watt max), in honour of Jack Brooker G3JMB, MBE	G4WYJ/P – Jim Gale
G3RPE Memorial Cup – Winner of the 10GHz Cumulatives Open Section, in honour of Dain S. Evans G3RPE, BSc, PhD, FIM - RSGB President 1978	G8CUB/P – Roger Ray
G0RRJ Memorial Trophy (24GHz section of the 5.7/10/24GHz cumulatives)	G4WYJ/P – Jim Gale
24GHz Award	G3PHO/P – Peter Day
47GHz Award	G8CUB/P – Roger Ray and G4EAT John Wood

G8CUB/P – Roger Ray receives the G3RPE 10GHz Cup

Election of Committee and Officers for 2013/2014

The Committee for 2013 are:

Officers & Membership Secretary

Role	Nominee		Proposers
Chairman	To be chosen by the incoming committee		
Treasurer	John Worsnop	G4BAO	Outgoing Committee
Secretary and Editor	Martin Richmond-Hardy	G8BHC	G4DDK & G4FSG
Membership Secretary	Bryan Harber	G8DKK	Outgoing Committee
Members			
	Bob Price	G8DTF	Outgoing Committee
Beacon Coordinator	Tony Pugh	GW8ASD	Outgoing Committee
	Chris Bartram	GW4DGU	Outgoing Committee
	Murray Niman	G6JYB	Outgoing Committee
	John Quarmby	G3XDY	Outgoing Committee
Corresponding members			
Kent Britain	WA5VJB/G8EMY	USA Liaison	
Gordon Curry	GI6ATZ	Northern Ireland	
Ray James	GM4CXM	Scotland	
Tony Pugh	GW8ASD	Wales	
Robin Lucas	G8APZ	Beaconspot	
Dave Powis	G4HUP	Trophies coordinator	

Approved unanimously.

AOB

None.

Martin Richmond-Hardy G8BHC, Secretary UKµG

Graham G4FSG welcomes delegates to MMRT 2013

Over 100 delegates attended the Martlesham Round Table at the end of April of whom 41 attended the excellent dinner at the Cameo Hotel. Pictures on pages 10 &11.

Stuart Wisher G8CYW was forced to cancel at the last minute due to ill health and we wish him a speedy recovery.

We were educated and entertained by a wide range of interesting speakers

WA5VJB:	Propagation in the USA
G3XDY:	Air Scout, a new aircraft reflection programme
G4NNS:	A bit more Hydrogen Line Astronomy.
G4BAO:	Optimising a REALLY small Microwave EME system
GW4DGU:	10GHz Transverter System Components for Commercial Production
G4JNT:	Modern Synthesisers
G3VZV:	An AMSAT Update

and the weekend closed with the UKuG Contest Forum, chaired by John G3XDY.

Live video streaming was provided by BATC member, Jason Flynn G7OCD.

Refreshments were provided and served by Jen (Mrs G8BHC) and her helpers – Jo-Ann and Isobel.

The top prize in the raffle (a 4.2GHz Signal Generator) was won by Mike Stevens G8CUL.

A number of stalls provided a supply of kit and essential bits ‘n pieces that one needs at such gatherings, and the UKµG Chip Bank was (at last!) raided by those with projects in mind. There’s plenty left, so contact Mike G3LYP (see p15)

I think the only down side was the hotel having run out of draught beer before we arrived on Saturday evening! ‘NNS has probably been “advising” them for next time...

73 Martin G8BHC

Kevin G3AAF misses a sales opportunity

"A shack is where you keep all your stuff whilst you are out collecting more stuff"

John G4EAT, Guy F2CT and Sam G4DDK

Chief Photographer, Robin Gape G8DQX snapping the winner of the FunCube Dongle Pro+, kindly donated by Howard Long G6LVB

John G3XDY in the Test & Measurement Centre

Video streamers Jason G7OCD and Mark M5BOP

US–Europe relations cemented over a bottle or three.
G8EMY/WA5VJB
F2CT + Corinne
G4NNS, G4FSG,
???, G4JNT?

Yes, the FunCube satellite really is that small.

The jet lag hits...

LMX2541 Fractional-N Synthesizer
Development PCB

Andy Talbot G4JNT, February 2013

The LMX2541 Fractional N synthesizer is a convenient tool to use as a building block at microwaves. It has an internal VCO making construction of a complete synthesizer a lot easier than if a separate VCO had to be included. With the addition of a suitable controller and reference frequency input this PCB allows a complete Fractional-N Synthesizer operating within the frequency range of 32MHz to 4000MHz to be built. The PCB has provision for the Synthesizer chip, 3.3 volt regulator, all decoupling components, loop filter and interfacing to 5V SPI control signals for a standard PIC based or other type of controller. A complete description with all supporting files and software can be found at www.g4jnt.com/lmx2541Support.zip

PCBs can be obtained from www.g4jnt.com/The_JNT_Shop.htm

The LMX2541 comes in six variants with the internal VCO covering sub-bands in the overall range 1.99 to 4.00GHz When the output divider is used, the frequencies available from each version after division begin to merge, until around 400MHz where all versions of the chip can be used for any arbitrary frequency. The table below lists the six chip variants identified by type number suffix, with the final frequency ranges possible for output divider settings from 1 to 8, and with the highest possible divider setting of 63. Figures highlighted in red show AM-band coverage for 430MHz and higher, those underlined are for 5.76 and 10GHz with additional RF multiplication.

Version	VCO / 1	2	3	4	5	6	7	8	63
Q2060	1990	995.0	663.3	497.5	398.0	331.7	284.3	248.8	31.6
	2240	1120.0	746.7	560.0	448.0	373.3	320.0	280.0	35.6
Q2380	2200	1100.0	733.3	550.0	440.0	366.7	314.3	275.0	34.9
	2530	1265.0	843.3	632.5	506.0	421.7	361.4	316.3	40.2
Q2690	2490	1245.0	830.0	622.5	498.0	415.0	355.7	311.3	39.5
	2865	1432.5	955.0	716.3	573.0	477.5	409.3	358.1	45.5
Q3030	2810	1405.0	936.7	702.5	562.0	468.3	401.4	351.3	44.6
	3230	1615.0	1076.7	807.5	646.0	538.3	461.4	403.8	51.3
Q3320	3130	1565.0	1043.3	782.5	626.0	521.7	447.1	391.3	49.7
	3600	1800.0	1200.0	900.0	720.0	600.0	514.3	450.0	57.1
Q3740	3480	1740.0	1160.0	870.0	696.0	580.0	497.1	435.0	55.2
	4000	2000.0	1333.3	1000.0	800.0	666.7	571.4	500.0	63.5

Power Supplies

The Synthesizer chip needs 3.3 VDD supplied by the on-board regulator; current consumption is approximately 100mA. Input voltage, VIN, can range from 4.5 to 20V. A heatsink is not necessary on the regulator for input voltages in the lower range.

Resistors allow the chip to be controlled with 5V logic levels. This allows a PIC to be used with a VDD suitable for allowing in-circuit programming. Vin to the regulator can be conveniently made equal to this 5V, which is then supplied as one from a second external regulator.

Programming and Getting it Going

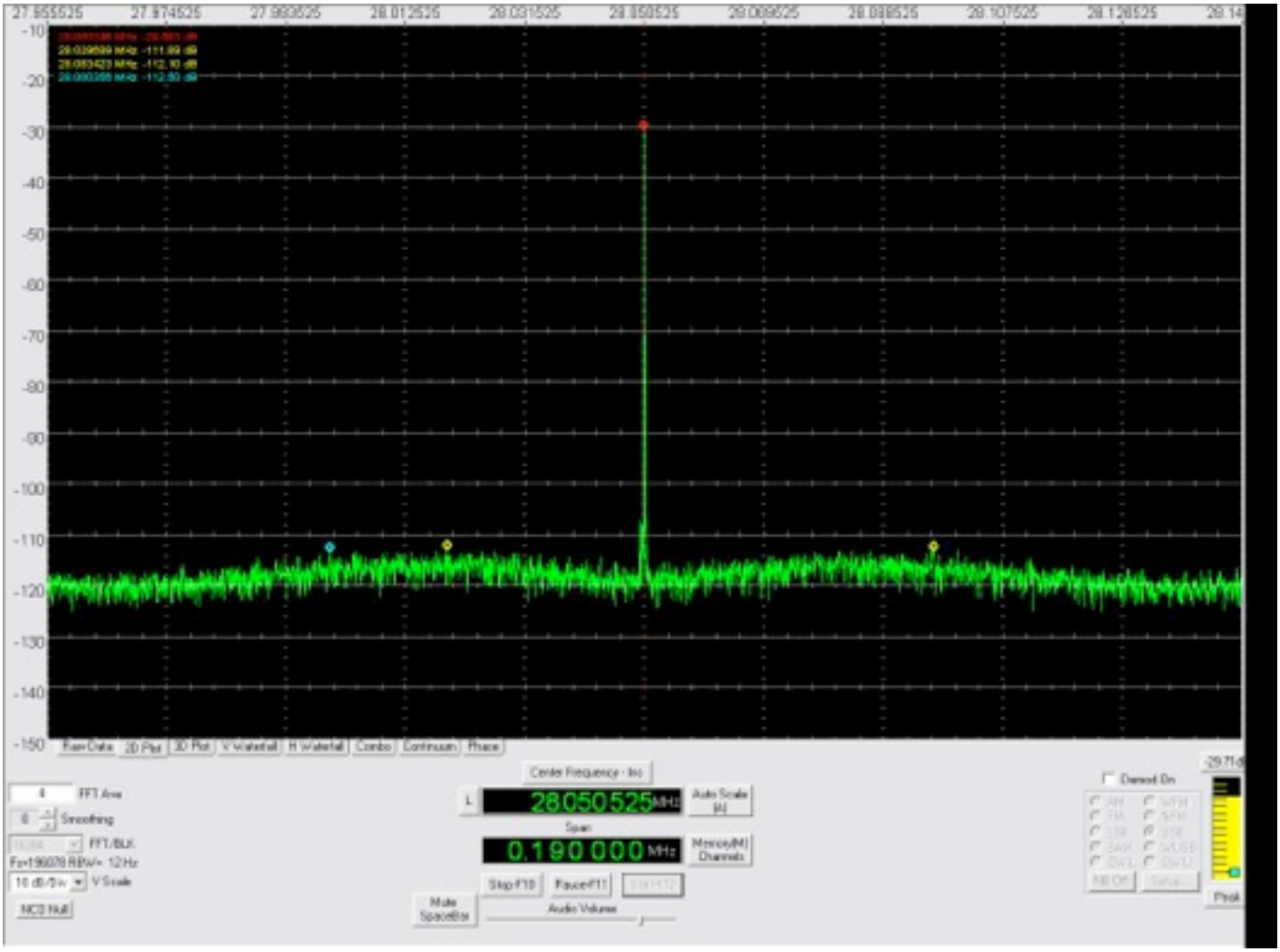
The chip's internal registers have to be programmed to the correct values for your desired frequency and fractional grid, and the loop gain set, and etc. The data sheet and an understanding of Fractional-N

synthesizers is essential here, but the easiest way to start off is to use National's CodeLoader software to work out the values for you. This can be downloaded from www.ti.com/product/lmx2541 The TI website also has loop filter design utilities www.ti.com/tool/clockdesigntool

CodeLoader shows a graphical representation of the RF PLL where you can interactively set frequencies and division ratios, as well as all the other PLL settings.

The LMX2541_PROG.EXE programme included in LMX2541Support.zip allows quick calculation of the registers for specified values of F_{osc}, F_{out} and frequency tuning grid. It can be used in conjunction with a PIC containing the LMX2541CTL operating system.

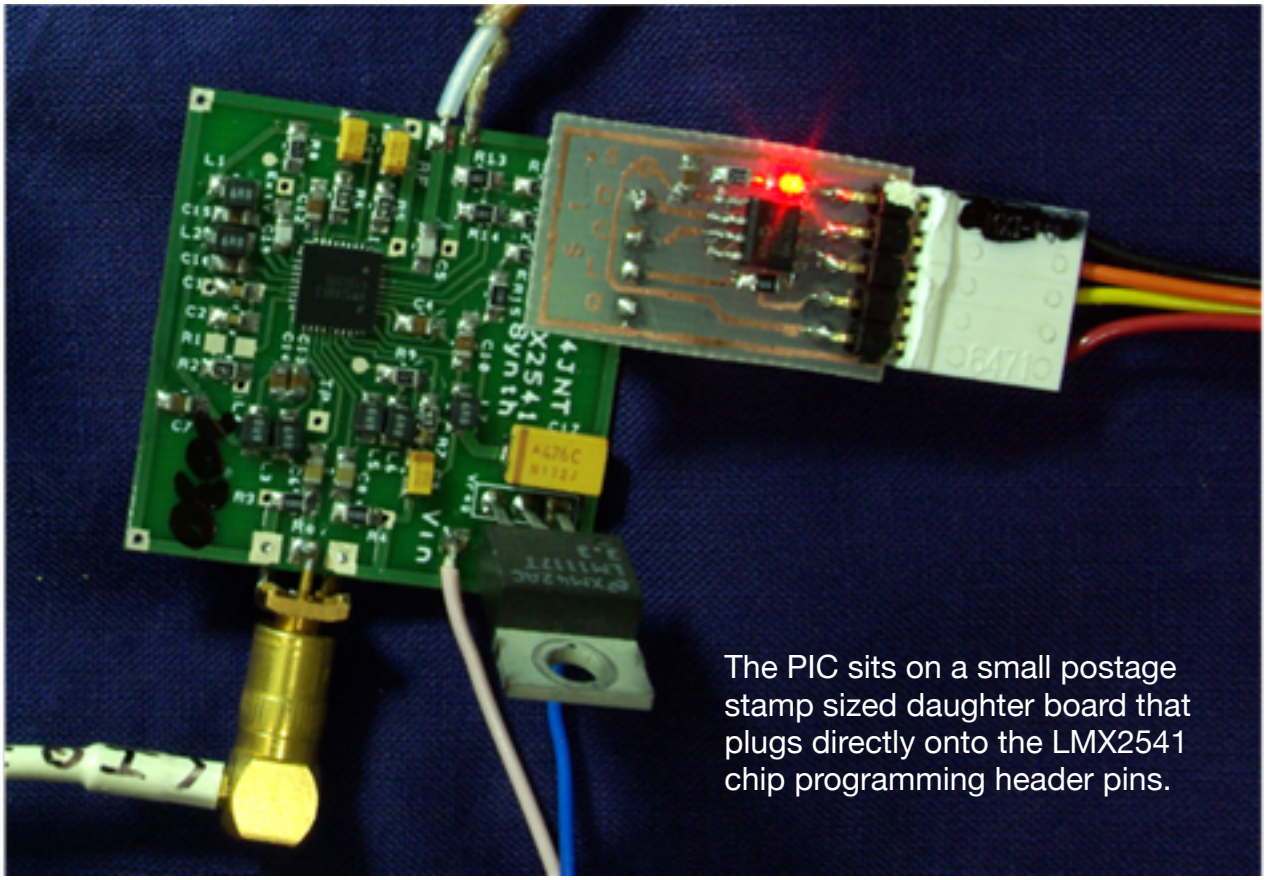
The plot below shown the phase noise spectrum at 432MHz (using the Q2690 version)



More phase noise plots at different frequencies and PLL settings can be see in the slides from my talk given at MMRT 2013 www.g4jnt.com/Synths_MMRT_2013_G4JNT.pdf

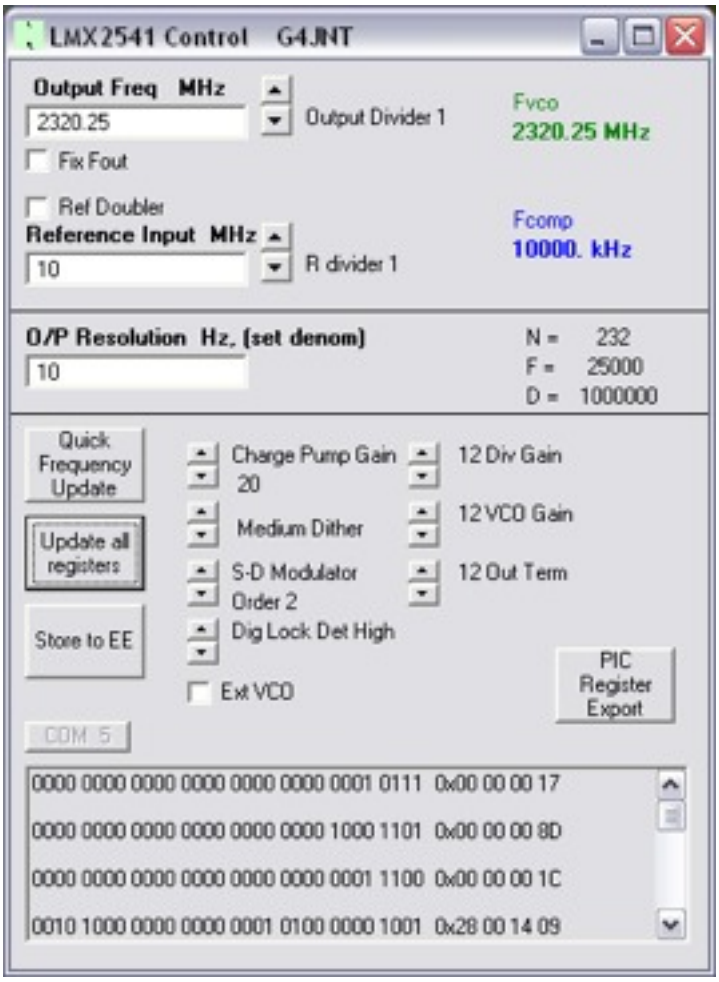
LMX2541CTL PIC Operating System

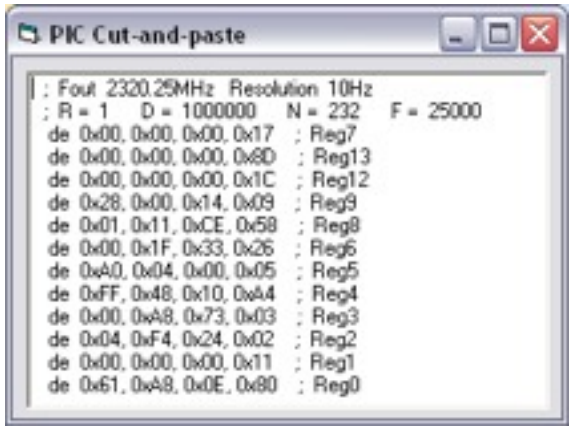
A 12F629 PIC containing the LMX2541CTL code generates SPI data to allow the registers in the synthesizer chip to be set directly to the wanted values using a serial RS232, or COM Port interface with simple ASCII text commands from any terminal emulator programme such as Hyperterm. The register values can be programmed into non-volatile EEPROM memory in the PIC. At turn on, these stored values are recalled and sent to the synthesizer for immediate start up.



The PIC sits on a small postage stamp sized daughter board that plugs directly onto the LMX2541 chip programming header pins.

The LMX2541_Prog Software shown below can send the ASCII text automatically to the controller.





LMX2541_Prog **User Screen**

Control using a rotary encoder and LCD

www.g4jnt.com/LMX2470_2541-Controller.zip contains full details of a PIC based controller for use with an IQ rotary encoder and LCD. The PCB sits directly on the back of the LCD and communicates with the synthesizer via a 4-way ribbon cable. The output frequency can be set in decimal steps from 10Hz to 1MHz

UKµG Chip Bank

A free service for members

The catalogue is now on the UKµG web site See www.microwavers.org/?chipbank.htm

Non members can join the UKuG by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of a component on the site will not be a guarantee of availability of that component.

The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage, that is, Jiffy bags, small plastic bags for individual component values, and Large letter 2nd class postage, currently 69p.

Minimum quantity of small components supplied is 10. Some people have ordered a single smd resistor!

The service may be withdrawn at the discretion of the committee if abuse such as reselling of components is suspected. We have asked Mike to check with the Chairman (or designated officer) if any individual is making excessive requests, and we will ensure that the service is only available to members.

There is an order form on the website with an address label which will slightly reduce what I have to do in dealing with orders so please could you use it.

Also, as many of the components are from unknown sources, if you have the facility to check the value, particularly unmarked items such as capacitors, do so, and let me know if any items have been miss labelled. G4HUP's Inductance/capacitance meter with SM probes is ideal for this (Unsolicited testimonial!!)

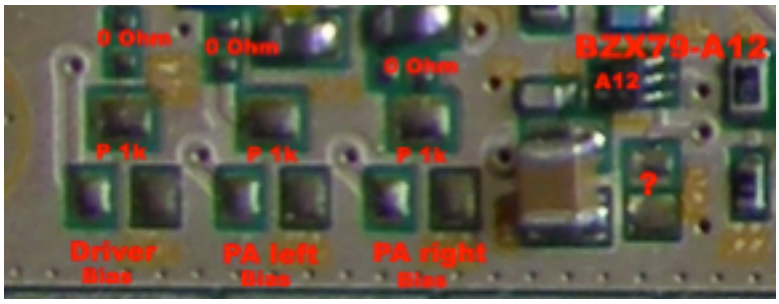
73, Mike, G3LYP

Modifying Andrews 13cms Amplifiers: 2

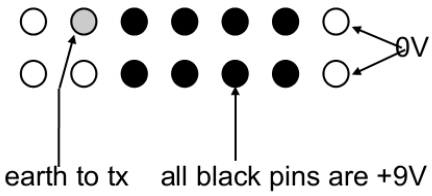
By Mike WIllis G0MJW

I rather jumped the gun with last month's article , so here's an update. [Ed.]

Pre-distort and control PCBs are removed leaving main board and PSU. Bias pots have been fitted on main board so it just needs 9V. For best linearity, bias is set at 1100mA for the finals and 500mA for the driver. The bias changes with temperature so this level was set at 40C. At 18C these drop to 700mA and 300mA. Temperature compensation might be a good idea.



Main board bias POTs



PSU connector

Main board connector pin out

1 – RF Switch FWD	5 – Temperature	9 – Driver current	13 – 9V
2 – RF Switch REV	6 – Driver bias	10 – Left final bias	14– 9V
3 – RF level	7 – Left final current	11 – Right final current	15– 9V
4 – Ground	8 – Right final bias	12 – Ground	16 – Bias enable

Inputs	RF level	Driver current	L final current	R final current	Temperature	PSU voltage	PTT
Type	ADC	ADC	ADC	ADC	ADC	ADC	Interrupt
Allocation	A0	A1	A2	A3	A6	A7	D2

Arduino control

The Arduino nano is powered from the 9V supply. The 9v supply to the drivers and bias and the 28V supply are switched using TTL signals. The 28V is active low, the bias is active high. With no bias, no current is taken by the finals or drivers. TX/RX control is via PTT line. Signals are:

Logic:

Sit in loop: (~10ms)

1. Monitor PTT status to see if changed
2. Measure forward and reverse power, device currents, temperature and trip if necessary
3. Drive LED power meter
4. Drive LCD every 100 iterations (~ 1/ Second)

Falling edge on PTT generates an interrupt:

1. RF relay to TX
2. Enable 28V
3. Delay 40mS
4. Enable bias (this enables driver stages)
5. Unit now in TX mode

If tripped:

1. Disable bias
2. Disable 28V supply
3. Exert PTT release
4. Set alarm
5. Loop checking for reset

Release of PTT:

1. Remove 28V
2. Remove bias
3. Delay 20mS
4. Relay to RX
5. Unit now in RX mode

Note – to prevent bounce PTT signal is de-bounced in software. Reset goes back to start

Temp sensor is nominally 20mV/C with a +50C offset, Current sensor measurements indicate 178mV/A sensitivity.

RF power is detected by an AD8314 log amp (-50dBm to 0dBm) followed by op-amp. The circuit on the right doesn't appear to be correct, probably it has 40k and 8k in the feedback loop giving a gain of 6. At 2.3 GHz the detector is 19.3mv/dB but it all depends on the device, as the standard deviation is 0.4mV. This sensor is switched between forward and reverse by an RF switch IC. The directional coupler measures as about -26dB. This is followed by 46dB of attenuation (40dB in the original amp) giving 72dB of loss. At 1W (+30dBm), the level at the detector should be -42dBm . To convert to dBm at the output we add 72dB and to dBW we need to add 42dB. The output voltage increases by 19.3mV per dB above -50dBm so the output voltage should be 0.0193 x [-42 – (-50)] = 0.15V. This is then multiplied by the op-amp and measured.

In practice, the calculated value of the detector slope was a bit off and a measurement approach was needed and a value of 122mV per dB (expected 116mV) with a threshold of -50dBm and an offset of -43.6 dB was found to give reasonable accuracy at 10-100W. Below about 1W the detector runs out of dynamic range and reads 120mW with no input at all. The power measurement now more or less agrees within 10% of an HP435 between 10W and 90W. The reverse power sensor does not appear to work very well. It is high with a good match but does increase with a bad match.

Tests show 100W CW output is almost possible with the internal 50V-20V PSU, probably OK for SSB but not CW. More power would need a bigger 28V supply. The devices are rated to 90W each but the inline circulator is only 125W. Each final device takes 7.8A at 100W, that is 230W input for 50W output.

In my amplifier, the bias enable pin didn't work. This circuit is based on a MAX840 charge pump to generate the -1.2V negative gate supply to the pre-driver stages. Pin 4 on this device is grounded to shutdown. The circuit uses a series resistor which in my amplifier was slightly too high in value. If the negative supply fails, the 9V supply to the drivers which also provides the 5V bias to the power FETS bias is disabled via an IRF7413 power switch. This effectively turns off the PA.

I modified the front panel of my amplifier – the photo shows a rough first attempt. I have improved that now. I get 100W out before the PSU starts to shut

down. As I had some spare pins on the nano I added a 5 led bar graph to show the output power. Power is also displayed on the LCD but that is too slow for SSB modes. I have also milled off the dicast cover over the lineariser. That is not necessary as there is space for the arduino next to the PSU. However, I intend to build a transverter inside eventually so the space is useful. Cooling airflow is needed, I currenly use a large fan to blow air over all the transverter heatsinks but it would be easy to fit a few 120mm axial fans to the heatsink.

Code listing

Note the software needs the SoftwareSerial and serLCD libraries.

As this would run to nearly 6 pages, please apply to the author for details. Ed.

Mike Willis G0MJW

EME2014

at Pleumeur-Bodou, France

The Board of the French National Society (REF) met in January, their minutes are online and Google's translation gives:-

Conference EME2014:

EME2012 conference held in Cambridge (UK). A group of French OM present proposed for the next conference site Pleumeur-Bodou, a symbolic place in the history of space telecommunications. This proposal has received a majority of votes of the speakers facing the Italian proposal for Venice.

The Board approved the principle of logistical support and participation at this conference became prestigious and brings together experts from around the world. Other decisions will be taken based on the project's progress and specific requests made by the organizers.

Meeting adjourned at 15 h 30.

Lucien Serrano, F1TE
Secretary of REF-Union.

Jean-Paul Louis, F6BYJ
President of REF-Union

The latest EME calendar is available from DL7APV's website

RAL – 9 June 2013

Harwell Amateur Radio Society are organising this years RAL Microwave Round Table. The date is the **9 June** at the RAL Recreational Society (the same place as last year).
Details here www.g3pia.org.uk/.

Call for Speakers

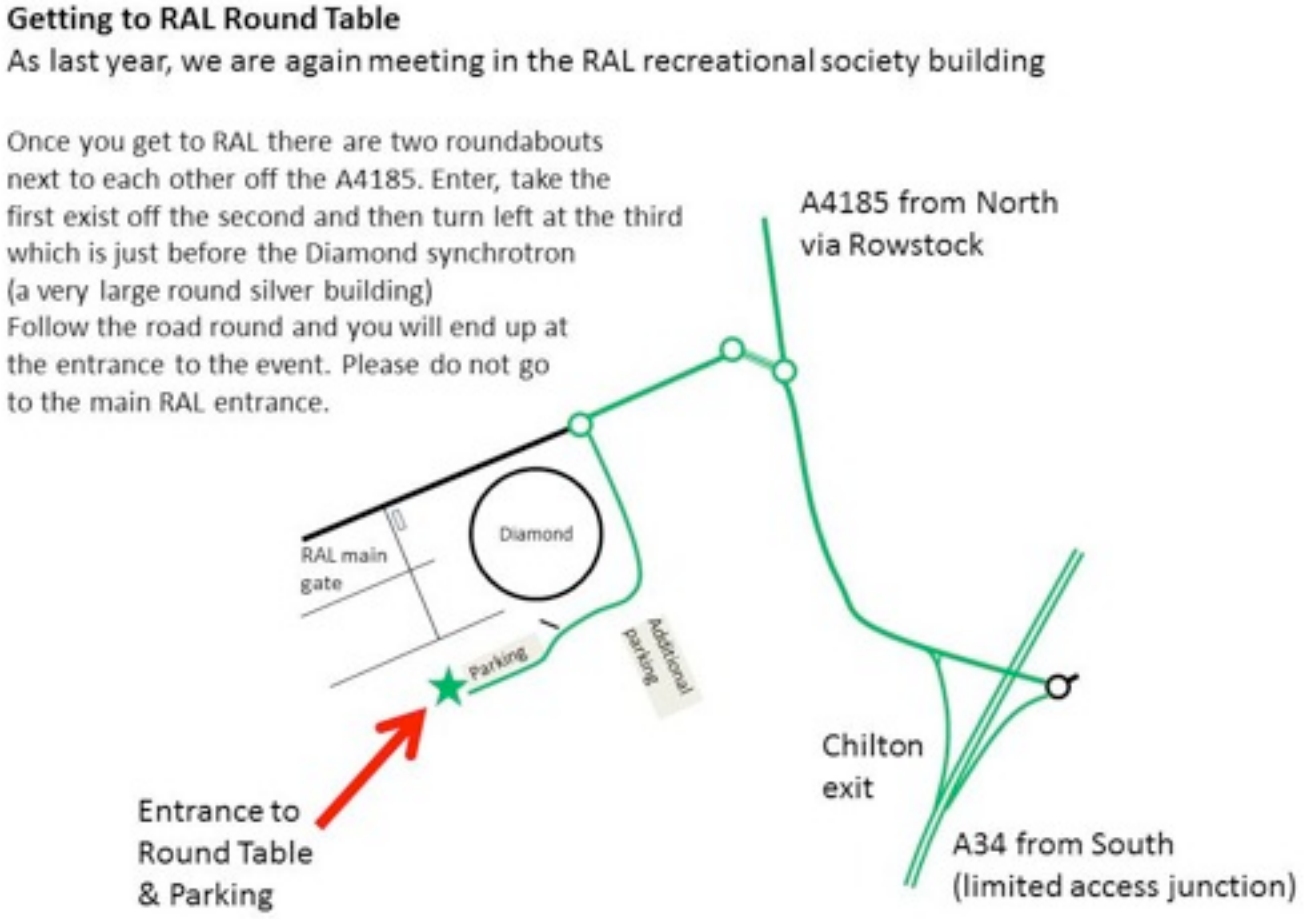
If you would like to give a talk at this event, please send details to info@g3pia.org.uk.

Registration

There is a registration email rt@g3pia.org.uk - please indicate if attending to this address. We would like the names and callsigns for those attending so we can make up badges and plan the catering. If you want to do any testing it is a good idea to let us know beforehand so we can bring the right equipment. The list of registrants so far is available here

Arrival

The map below shows where the event will be held. Please do not try and enter via the front gate. The event opens at 1000.



Seigy 2013 VHF-microwave event

By Jeff Easdown G4HIZ

A couple of pics from the Seigy 2013 VHF-microwave event.

Although chilly, the event excited a lot of interest from the French amateur community. The main sale day occurred on Saturday 6th April with an excellent meal the night before on Friday 5th, with over a hundred attendees. Also present at the meal was Ralph G4ALY and a number of prominent French micro-wavers including Guy, F2CT and Jean-Claude F5BUU who entered his mobile 10GHz station into the construction contest (see picture). I was accompanied by Joan my wife, 2E0HIZ and son William, M0HIZ, who also enjoyed a visit to the nearby zoo at Beauval. An event well worth the visit, with reasonably priced hotel accommodation nearby.

73 Jeff G4HIZ

UKµG Technical support

Another free service for members!

While many of you will have taken advantage of the "test equipment rooms" that we run at the Round Tables, sometimes that project just cannot wait for the few occasions per year when we hold them. One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, more importantly, test equipment. Our friends in America refer to such amateurs as "Elmers" but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let's call them Tech Support volunteers.

While this is described as a "service to members" it is not a "right of membership!"

Please understand that you, as a user of this service, must expect to fit in with the timetable and lives of the volunteers. Without a doubt, the best way to make people withdraw the service is to hassle them and complain if they cannot fit in with YOUR timetable!

Please remember that a service like our support people can provide would cost lots of money per hour professionally and it's costing you nothing and will probably include tea and biscuits!

If anyone would like to step forward and volunteer, especially in the regions where we have no representative, please email john@g4bao.com

Region	Tech support volunteer	Facilities
NW England, N Wales Wales	David Wrigley G6GXK 07811776432 Chris Bartram GW4DGU	Spectrum Analysis to 24GHz Power measurement to 76GHz Freq Measurement to 26GHz Freq sources to 47GHz NF Measurement to 10GHz Antenna Test range to 24GHz
NE England Yorks and Humberside	Peter Day G3PHO microwaves@blueyonder.co.uk	Available from Spring 2013 Spec Analyser to 24GHz Power measurement to 24GHz (up to 5W on 24GHz), RF sources to 24GHz, direct freq measurement to 3GHz. Setting up/tuning up transverters, etc + general advice.
S and SW England	Brian Coleman G4NNS Paul Marsh M0EYT pjmarsh@uhf-satcom.com	Spectrum analyser to 24GHz Power measurement to 26 GHz Scalar Network analyser and sweeper 2 to 15GHz Antenna test range 2.3, 3.4, 5.7, 10 and 24GHz Wavegide directional couplers for 10GHz and 24GHz Coax couplers 1.3 – 26GHz. Power measurement to 12GHz High power dummy load @ 10GHz (500W) Frequency measurement to 22GHz Spectrum analysers to 6 and 18GHz Frequency generation to 18GHz.
SE England and London	Allan Wyatt G8LSD allan@virtual-museums.org	not known
East Anglia, Essex & Suffolk Herts.	Sam Jewell G4DDK sam@g4ddk.com Bryan Harber G8DKK Letchworth, Herts	Spectrum analysis to 24GHz Power measurement to 24GHz Direct frequency measurement up to 3GHz VNA to 3GHz RF sources to 24GHz
West Anglia East Midlands	John Worsnop G4BAO john@g4bao.com	Spectrum analysis to 24GHz Power measurement to 24GHz Direct frequency measurement up to 18GHz VNA to 1.3GHz RF sources to 24GHz High current PSUs at 12, 28 and 48V
W Midlands	Vacancy	
N Scotland	Vacancy	
S Scotland	Vacancy	
N Ireland	Gordon Curry GI6ATZ	

The current list of technical support volunteers is available at www.microwavers.org/tech-support.htm

Activity News

By Bob Price G8DTF

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

We have a good variety of activity reported this month including, 76GHz activity from Roger G8CUB, Monday night activity, GM0USI visit to Mull of Galloway, April Low Bands Contest, April 23cm UKAC and April SHF UKAC.

Millimeter Bands

From Roger G8CUB

I had a contact today on 76GHz as G8CUB/P at Wrotham, with John G4EAT at Danbury. Signals were 59 / 59 SSB over this 48.1km path. The dew point was -2 deg.C. We had worked this path on CW before, but not SSB. I was trying out a new transverter, with 5dB NF (pre-amp) and 100mW O/P. John had 5mW SSB and around 7.5dB NF (mixer). Both were using '60GHz' horns with around 37dBi gain.

GM0USI Trip to Mull

From GM0USI

Here a few pictures of my holiday to the Mull of Galloway lighthouse during the second week in April. Our house was one of the keepers' cottages you can see in the background.

The weather was really mixed with bright sunshine on arrival with little too much wind and rain toward

the end of the week... cold throughout with still some drifts of snow here and there.

I got on 3 and 9cm on two or three occasions, operating from the old helipad I was trying out the same dish on both bands for the first time… the tin can feed for 9cm appeared a good match especially with the brass flare.

I managed to change bands in about 10mins which is what I was after… the 9cm box is at the rear of the dish with just a metre of cable.

For the first time I had a local beacon – my own – GM4CXM! which was always audible – normally just about the noise but with a variation on tropo up to s2 at times – on one day with RS it was s4 – it really made a difference being able to calibrate the dish to 1 deg. The Rochdale beacon was also always just on noise or above - one day being s7 on RS.

Two of the skeds I had were with John G[M]8OTI/P who was operating from the Blackpool foreshore IO83LU after the rally, using QRP 35mW and a 40cm dish, he was peaking 57 with QSB – total sea path.

Another day John went to Hartside Cafe IO84RS maybe 600m ASL – again an easy 57, but less QSB this time – slightly obstructed path.

The other contacts were as usual Tony G4CBW - who was peaking 59 on both 9 and 3cm, on one day stronger on 9cm, on another better on 3cm!

I heard Neil G4BRK briefly on AS on 9cm, he heard me on a few periods. Likewise David M0GHZ heard me, but nil from him. GB3CSB on 9cm was just on noise.

From Bob G8DTF

I had a phone call from Alan to say he was at IO74NP and did I want to try on 3cm. So I put the gear on to warm up. Northwest is a very poor direction from here with rising ground and houses within 100m, so I was not expecting to hear Alan. I did find him, but signals were not very strong. There was very strong A/S at one point with lots of Doppler shift when Alan was sending CW. We did make an SSB QSO eventually though. This is my first 3cm QSO with GM from home.

From G(M)8OTI - April 2012 - Blackpool - Hartside

My initial forays into 10GHz operation were reported in Scatterpoint November 2012. I then had about 0.7mW from my home brew transverter, and have recently improved it by adding another pipe cap filter and building a little PA from two more NE32584 devices off the Franco Rota surplus boards. Measurements suggest I now have about 30-35mW output - I didn't want to be too greedy by driving them harder!

I had looked out a couple of promising paths for tests with Alan GM0USI whilst he was at the Mull of Galloway (IO74NP). The first was from the sea front at Blackpool (IO83LU) during the Norbreck Rally. That is an entirely sea path, about 150km, with the profile on "Hey What's That?" (heywhatsthat.com) showing a lump of sea about 400m high in the way!

My antenna is a 40cm offset dish fed using a home brew horn (photo). Alan's signal was a good 59 of course, and he was able to give me a report of 56 to 58 for my SSB. There was occasional attenuation due to passing trams (!) but these were not completely opaque to 10GHz.

A few days later we tried the second path - from the Hartside Cafe (IO84RS), about 570m ASL, on the A686 above Penrith. The view is good but the take-off pretty useless except towards the West. This path to the Mull of Galloway is obstructed by about 200m of N Lake District hills, as well as about 200m of sea. Again there were no problems - Alan came in at 59 on his usual frequency, and he heard me initially at 54 (SSB again) and later 56 or better once the dish was aligned. Alan was using his 0.8m dish (I think) for this contact, which again was about 150km.

These tests have left me happy that I can now take the existing setup to some hilltops to try some SOTA (Summits on the Air) at 10GHz - it will be interesting to see how well I can do.

For the future, I have a 1W device on the stocks which will be incorporated into the transverter in due course. I also have a 60cm dish though that's a bit big to hang on the rucksack.

I'm also on the lookout for further skeds both from near my home in Edinburgh, and from South West Scotland in the summer months.

You can find more details about my transverter on my website at

http://www.marwynandjohn.org.uk/GM8OTI/proj3cmstartup/proj3cmstartup.html

Low Bands Microwave Contest

From Phil G3TCU

We (Dave G1EHF on 9cm, Barry G4SJH on 13cm and Phil G3TCU on 23cm with help from Roger M0RJA, Graham G3TCT & Trevor G3WBQ) took part in the Low Bands Microwave contest on 21-Apr from our Guildford site IO91RF. It was an enjoyable day and thankfully not bitterly cold, like the previous session on 3-Mar. We were disappointed at the activity, particularly on 23cm. I had significantly more QSOs in the 2.5 hour 23cm UKAC on the previous Tuesday evening from home (a much inferior QTH) with an inferior station compared to the 6 hour Sunday contest. There has been a significant increase in 23cm (and 13cm) activity in the UKACs recently but many of the newcomers to these bands seem unaware of the uW group contests. We have already pointed out the need to make these contests more visible. For the 21-Apr session, I moved my (W6PQL design) 5 pole filter from its previous position at the input to the transverter to the mast-head, before the pre-amp and this seems to have cured wide band noise previously encountered at this site. We presume this is due to high levels of UHF TV. This problem is surprising, as the pre-amp should tolerate more than 0dBm at its input. We also noted that 2m talk-back seems to have become redundant. No microwave contest related traffic was heard at all despite much calling. It was also disappointing that many stations logged on to 'KST all day, particularly in France, seemed unresponsive to being 'meeped'.

From Ray GM4CXM

In the 23cm Low Bands contest I worked G4BRK (IO91), GM3WIL (IO75), M0RJA/P (IO91), G4NBS (JO02), G3UKV (IO82), 2E0NEY (IO81), G7LRQ (IO91), G4KCT (IO93), G8AIM (IO83), G4LDR (IO91), G3NEO (IO93), M0SDA (IO83), G6UW (JO02), G4KIY (IO92). There was one got-away, M1MHZ (IO81)

In the 13cm Low Bands contest I worked G4NBS (JO02) and G3UKV (IO82). There were three got-aways G3XDY, M0RJA/P and G4LDR.

April 23cm UKAC

From Eddie G0EHV

Once again the weather was not favourable for /P but the gales subsided to allow a small window which suited the contest period exactly!

An uneventful session – nothing broke and an all time high for these events of 35 QSO's for me. Best DX was G3TCT at 418Km.

It's well worth the effort to get out for these contests especially now the lighter nights are here.

Equipment used – TS2000, 100W LDMOS amplifier and 35 element Tonna. Next month I'll get the 55 element back into use.

From Ray GM4CXM

In the 23cm UKAC I worked GM7OIN (IO75), GM3WIL (IO75), G0EHV/P (IO94), GM7GDE (IO75), M0LME (JO01), M0GHZ (IO81), G8CUL (IO91), G3TCU (IO91), G1SWH (IO83), G4KCT (IO93), G0CDA (IO83), GW8ASD (IO83), G4CBW (IO83), G4JLG (IO83), OZ1FF (JO45), G8CYW (IO94), G8PNN (IO95), GM0USI (IO75), G4EAT (JO01), G8XIR (JO01), G4NBS (JO02), G3UVR (IO83), G3WBB (IO83), G0MJW (IO91), G3NNG (IO91), G4BRK (IO91), G8REQ (IO83), M0SDA (IO83), GI6ATZ (IO74), G8OHM (IO92), G7LRQ (IO91)

From Dave G4FRE

After over 20 years GW4FRE/P returned to a microwave RSGB contest. Participated in 16th April 23cm UKAC from Blorenge IO81LS, Gear Elecraft K3(with internal 2m xverter) + Demi 1296/144 transverter + 23 ele at 15' fed by around 30' of UR67 (low ERP!) . Worked 32 stations, best DX being PA0EHG at 527km. Worked only one station appreciably to my West, summit blocked stations to the North, only escapee was G4CBW who peaked NE.

Also heard 5 beacons GB3MHL, GB3DUN, GB3USK, GB3MCB and GB3CLE all at reasonable strength.

April SHF UKAC

From Eddie G0EHV

Fine weather promised a pleasant night out /P. However another near disaster as my sequencer/ voice keyer box conspired to fall across the +50V supply during set up.

Spectacular smoke and sparks before the 35 amp fuse blew. This made transmit switching a little difficult!

However I managed a total of 14 QSO's with best DX being G3XDY at 359Km. Interesting first was G4KUX who was running 0.5W into an indoor aerial at 25Km.

Equipment was the usual FT-817, Scatter transverter and 60W Remek amplifier into the 25 element Tonna.

From Ray GM4CXM

In the SHF UKAC on 13cm I worked G8PNN (IO95), G0EHV/P (IO94), G0MJW (IO91), OZ1FF (JO45), G8CUL (IO91), G4BRK (IO91), G4NBS (JO02), G3UKV (IO82), G8OHM (IO92).

Don't forget that

Every Monday evening is Microwave Activity Evening

Monday Night Activity

From Neil G4LDR

Monday night activity has continued in recent months but unfortunately without Ralph G4ALY. Most Monday's it's just Brian G4NNS, Dell G1JRU and I. Contacts on 3cm and 6cms usually take place as a three way using a common scatter point and usually we use FM as the signals are very strong. Brian and Dell also carry out test on 24 GHz with variable success (depending on height of masts). I have not been active on 24 GHz since I took my temporary pump up mast down before I applied for planning permission for my 60 foot Versatower in January 2012. Although I installed 23cms to 3cms on the new tower last year I never got round to putting the 24 GHz back up. About a month ago I thought I would try with G1JUR with the 24 GHz transverter in the ground floor shack pointing out of the open window (I find modern double glazing attenuates the higher microwave frequencies whereas the old windows we had didn't). I was using just open waveguide and we managed to exchange 55 reports, the path length is 35 km. I have now upgraded to a 10 dB horn and we have managed contacts using FM. I plan to have the 24 GHz transverter on the mast soon so I will be able to resume contacts with G4NNS over a shorter but much more obstructed path.

...and finally

I want to encourage you all to report your activity to clearly document use of the amateur microwave bands. This means not just DX, but also local activity with low power or WB equipment.

Please send your reports to Scatterpoint@ukmicrowaves.org , remember the deadline is the 1st of the month.

73

Bob G8DTF

RSGB & UKµG Contests 2013

Month	Contest name	Certificates	Date 2013	Time GMT	Notes
Mar	Low band 1.3/2.3/3.4GHz	F, P,U,R,L	3-Mar	1000 - 1600	First 4 hours coincide with IARU event
Mar	1.3GHz Activity Contest	*Arranged by RSGB*	19-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Mar	2000 - 2230	RSGB Contest
Apr	10GHz & Up EME	*Arranged by DUBUS*	*13–14-Apr*	0000-2359	DUBUS EME Contest
Apr	1.3GHz Activity Contest	*Arranged by RSGB*	16-Apr	1900 - 2130	RSGB Contest
Apr	Low band 1.3/2.3/3.4GHz 2	F, P,U,R,L	21-Apr	1000 - 1600	
Apr	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Apr	1900 - 2100	RSGB Contest
May	*10GHz Trophy*	*Arranged by RSGB*	*4-May*	*1400 - 2200*	Saturday, to coincide with IARU
May	*432MHz & up*	*Arranged by RSGB*	*4–5-May*	*1400 -1400*	RSGB Contest
May	1.3GHz EME	*Arranged by DUBUS*	*11–12-May*	0000-2359	DUBUS EME Contest
May	5.7GHz EME	*Arranged by DUBUS*	*18–19-May*	0000-2359	DUBUS EME Contest
May	1.3GHz Activity Contest	*Arranged by RSGB*	21-May	1900 - 2130	RSGB Contest
May	5.7GHz/10GHz/24GHz	F, P,U,R,L	26-May	0600-1800	
May	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-May	1900 - 2130	RSGB Contest
Jun	Low band 1.3/2.3/3.4GHz 3	F, P,U,R,L	2-Jun	1000 - 1600	Aligned with some Eu events
Jun	2.3GHz EME	*Arranged by DUBUS*	*15–16-Jun*	0000-2359	DUBUS EME Contest
Jun	1.3GHz Activity Contest	*Arranged by RSGB*	18-Jun	1900 - 2130	RSGB Contest
Jun	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Jun	1900 - 2130	RSGB Contest
Jun	3.4GHz EME	*Arranged by DUBUS*	*29–30-Jun*	0000-2359	DUBUS EME Contest
Jun	5.7GHz/10GHz/24GHz	F, P,U,R,L	30-Jun	0600-1800	
Jul	VHF NFD (1.3GHz)	*Arranged by RSGB*	6– 7-Jul	1400 - 1400	RSGB Contest
Jul	1.3GHz Activity Contest	*Arranged by RSGB*	16-Jul	1900 - 2130	RSGB Contest
Jul	24GHz - 1THz Contest	O	21-Jul	0900 - 1700	New Format
Jul	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Jul	1900 - 2130	RSGB Contest
Jul	5.7GHz/10GHz/24GHz	F, P,U,R,L	28-Jul	0600-1800	
Aug	Microwave Field Day	O,L	4-Aug	0900 - 1700	
Aug	1.3GHz Activity Contest	*Arranged by RSGB*	20-Aug	1900 - 2130	RSGB Contest
Aug	5.7GHz/10GHz/24GHz	F, P,U,R,L	25-Aug	0600-1800	
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Aug	1900 - 2130	RSGB Contest
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	17-Sep	1900 - 2130	RSGB Contest
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Sep	1900 - 2130	RSGB Contest
Sep	ARRL Microwave EME	*Arranged by ARRL*	28–29-Sep	0000 - 2359	
Sep	5.7GHz/10GHz/24GHz	F, P,U,R,L	29-Sep	0600-1800	
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	*5-Oct*	*1400 - 2200*	RSGB Contest
Oct	*432MHz & up*	*Arranged by RSGB*	*5–6-Oct*	*1400 - 1400*	IARU/RSGB Contest
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	15-Oct	1900 - 2130	RSGB Contest
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	22-Oct	1900 - 2130	RSGB Contest
Oct	ARRL EME 50-1296MHz	*Arranged by ARRL*	26–27-Oct	0000 - 2359	
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	16–17-Nov	0000 - 2359	
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	19-Nov	2000 - 2230	RSGB Contest
Nov	Low band 1.3/2.3/3.4GHz 4	F, P,U,R,L	24-Nov	1000 - 1400	
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Nov	2000 - 2230	RSGB Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	17-Dec	2000 - 2230	RSGB Contest

Sections	**F**	Fixed / home station
	P	Portable
	L	Low-power <10W 1.3/2.3/3.4GHz, <1W 5.7/10GHz)
	R	Radio talkback
	U	Unlimited Talkback

Main changes from 2012 calendar	
1	ARRL/DUBUS EME updated
2	Lightwave event deleted
3	5.7/10/24GHz Cumulatives replaced with individual events

73 John G3XDY, UKUG Contest Adjudicator

UKµG Contest Portal

Journées d'Activité Dates in 2013

From Robin Lucas G8APZ

There will be nine fixed JA in 2013:

First JA – 24 GHz and above in March,

Seven JA – 1296 MHz and above in April, May, June, July, August, September and October, and a JA mid-July for reflection via Mt Blanc 1296 MHz and above.

JA March:	W/E 30 and March 31
JA April:	W/E 27 and 28
JA May:	W/E 25 and 26 (UKMG contest)
JA June:	W/E 22 and 23 (Activity "Big Blue")
JA July:	W/E 27 and 28 (UKMG contest)
JA of August:	W/E 24 and 25 (UKMG contest)
JA September:	W/E 28 and 29 (UKMG contest)
October JA:	W/E 26 and 27.

F6BSJ memorial JA: QSOs by reflection via Mt Blanc will take place on Sunday morning July 14.

Duration of JAs: Saturday 5:00 p.m. Sunday 5:00 p.m.

Events calendar 2013/14

2013

May 17-19	Hamvention, Dayton	www.hamvention.org/
June 9	**RAL Roundtable**	http://www.g3pia.org.uk/ I
June 28-30	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
July 13–14	**Finningley Roundtable**	detail tbc
July 19–21	Amsat-UK Colloquium, Holiday Inn, Guildford, Surrey	www.uk.amsat.org/Colloquium/
Sept 9	**Crawley Roundtable**	detail tbc
Sep 13-15	58.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 27-28	National Hamfest	www.nationalhamfest.org.uk/
Oct 6-11	European Microwave Week, Nuremberg	www.eumweek.com/
Oct 11-13	**RSGB Convention**	www.rsgb.org/rsgbconvention/
Oct 18–19	Microwave Update, Morehead, Kentucky	www.microwaveupdate.org/
Nov 2	**Scottish Roundtable**	www.rayjames.biz/microwavert/

2014

July 1	Scatterpoint 10th Anniversary
August	EME2014, Pleumeur-Bodou near Lannion
October 6-9	European Microwave Week, Rome