

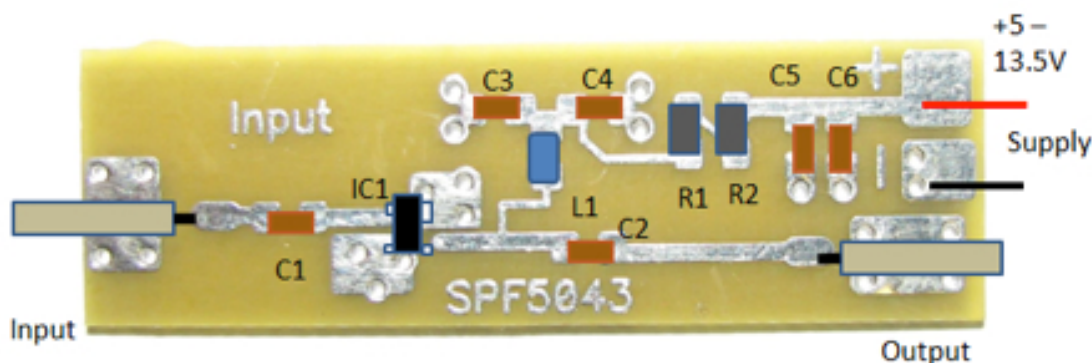


scatterpoint

July 2011

Published by the UK Microwave Group

A wideband,
low noise,
high dynamic
range amplifier
covering
50MHz to 4GHz
by
Sam Jewell,
G4DDK/W5DDK
and
Kent Britain,
WA5VJB/2E0VAA
See page 8



Latest News

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- I'm pleased to announce that the UKuG club licence, with the callsign **G3EEZ**, arrived 14 July. I hope you'll all join me in thanking Kate Wakeman and her sister Lynn England for agreeing to allow us to take over her late father's historic callsign. 73 John G4BAO
- **Yet another world record?** Further to the **Stop Press** on p21:
"This lunch-time [6 July], Gordon G0EWN/P and I managed to work over a 32.6km (20 mile) path using our standard light-wave Tx-Rx rigs. Signals exchanged were 5/1 and 5/2 but at times I was hearing Gordon up to 5/4. When we recce'd this path last week, visibility was excellent, but today conditions were warm, humid and very hazy. The contact took nearly 2 hours to achieve and most of that time was spent trying to see each other's red pinprick of light even though we had carefully set things up using compasses and visual clues gained during the initial recce. Once we could see each other, the actual exchange of contact details was achieved the first time round without any need for repeats. G8AGN/P was located at Edgemount on the NW side of Sheffield, SK278933. G0EWN/P was located near East Hardwick, SE472195. Dx was 32.6km as calculated using Mike Willis' software." **Barry, G8AGN**
- Free AMSAT newsletter available [here](#)

Many thanks to all our contributors this month, without whom there would be no Scatterpoint!

UK Microwave Group Contact Information

<p>Chairman: G4BAO Dr. John C. Worsnop</p> <p>Email: chairman @microwavers.org</p> <p>Located: Cambridgeshire JO02CG</p> <p>Address: 20 Lode Avenue Waterbeach Cambs CB25 9PX</p> <p>Home Tel: +44 (0)1223 862480</p>	<p>General Secretary: G8BHC Martin Richmond-Hardy</p> <p>Email: secretary @microwavers.org</p> <p>Located: Suffolk JO02PA</p> <p>Address: 45 Burnt House Lane Kirton Ipswich Suffolk IP10 0PZ</p> <p>Home Tel: +44 (0)1394 448213</p>	<p>Membership Secretary: G8DKK Bryan Harber</p> <p>Email: membership @microwavers.org</p> <p>Located: Hertfordshire IO91VX</p> <p>Address: 45 Brandles Road Letchworth Hertfordshire SG6 2JA</p> <p>Home Tel: n/a</p>	<p>Treasurer: G4FSG Graham Murchie</p> <p>Email: treasurer @microwavers.org</p> <p>Located: Suffolk JO02PC</p> <p>Address: 42 Catherine Road Woodbridge Suffolk IP12 4JP</p> <p>Home Tel: +44 (0)7860 356775</p>
<p>Scatterpoint</p> <p>Editor: G8BHC Martin Richmond-Hardy</p> <p>Email: editor @microwavers.org</p> <p>See above for other contact details</p> <p>NB editor & scatterpoint email addresses go to both Robin and myself</p>	<p>Scatterpoint</p> <p>Activity News: G8APZ Robin Lucas</p> <p>Email: scatterpoint @microwavers.org</p> <p>Located: Essex (JO01DO)</p> <p>Address: 84 Woodman Road Brentwood Essex CM14 5AZ</p> <p>Home Tel: +44 (0)1277 211126</p>	<p>Contest & Awards</p> <p>Manager: G3XDY John Quarmby</p> <p>Email: g3xdy @btinternet.com</p> <p>Located: Suffolk (JO02OB)</p> <p>Address: 12 Chestnut Close Rushmere St. Andrew Ipswich Suffolk IP5 1ED</p> <p>Home Tel: +44 (0)1473 717 830</p>	<p>RSGB Microwave</p> <p>Manager: G6JYB Murray Niman</p> <p>Email: g6jyb @microwavers.org</p> <p>Located: Essex (JO01)</p> <p>Address: 55 Harrow Way Great Baddow Chelmsford Essex CM2 7AU</p> <p>Home Tel: +44 (0)1245 474969</p>

Editor's bit

I hope to produce an August edition, so please provide me with news and articles. Perhaps you went out /P on your holidays?

Some [Codgers](#) (pic opposite) went on a day trip to Orford Ness on 11 July to visit the BBC World Service transmitter (pic below). Yes, I know it's not microwaves but it is >>400W. See p12.

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, rtf, doc, docx, odt,
Pages

Spreadsheets: Excel, OpenOffice,
Numbers

Images: tiff, png, jpg

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 your co-operation.

Martin G8BHC

UK MICROWAVE GROUP SUBSCRIPTION INFORMATION

The following subscription rates now 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). You will only be able to receive Scatterpoint electronically 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. From now 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 (the previous editor suggested having it tattooed on your forearm!).

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

QUOTE YOUR CALLSIGN PLEASE!

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!)

Codgers outing to Orford Ness

L-R

Dave Cutts G4FAW, John Regnault G4SWX, John Sager G8ONH, Roy Smith G0RRC, Sam Jewell G4DDK, Robin Gape G8DQX, Graham Murchie G4FSG, Bob Barrett G3YCY, Keith Gaunt G7CIY, Anne Keen G7DWN

Picture by G6JYB



SILENT KEYS

Palle Nielsen OZ8AFC

It is my sad duty to relay this message from Verner OZ5TG

"I am sorry to tell you all that [Palle Nielsen OZ8AFC](#) is SK. He died in a car accident on Monday evening 13 June. Palle was known by many, as a source of "hard to get parts" for microwave and well known from many fleamarkets throughout Europe. RIP (OZ5TG)"

Russ G4PBP

I had met Palle many times in Europe at Weinheim and Ham Radio. Palle was a fun guy with a great humour and very friendly always trying to help others. Very sorry to hear this news.

Simon ZL4PLM

I first met Palle in Weinheim more than 10 years ago. I recall we discussed making 24GHz antennas. Shortly afterwards he produced a slotted waveguide antenna for GB3MHK. We discussed 24GHz antenna designs and adapters and other parts on several occasions after that. He was always enthusiastic about what he could do with his access to high quality machine tools.

Sam G4DDK

I didn't know him well, apart from by reputation. I met him at Friedrichshafen a few years back and shared a beer and a



chat about microwaves with him. He will be sorely missed in the microwave fraternity.

In some ways it's easier to cope with the death of an Amateur who's in his 80s or 90s, that's the way of things, but I doubt Palle was even my age. So sad for those he left behind.

"O, untimely death!

I know thee well:

a serviceable villain;

As duteous to the vices of thy mistress

As badness would desire".

(King Lear Act 4, Scene 6)

John G4BAO

Pierre Pasteur HB9QQ

From [UK 6 Metre Group](#)

It is with great sadness that we announce the passing of Pierre Pasteur, HB9QQ who passed away on 11th June early in the morning at the age of 80 years.

More details and pictures [here](#) and [here](#).



Frequencies for the Olympics

Just in case you haven't seen GB2RS or other sources, RSGB have introduced a more permanent web presence for Olympics matters at www.rsgb.org/olympics. It is also linked from the Operating section of the RSGB website.

The first temporary use of amateur bands has already occurred in 70cms; for a sailing test event off Weymouth/Portland in June. Firmer data is due shortly for further July/August-2011 sailing test events.

As firm information becomes available it will be added to that web address. In the meantime the first provisional indication that a microwave band (9cms) is needed has also been received from Ofcom.

Murray Niman G6JYB



The UK Microwave Group are proud to be hosting the 15th International EME conference in Cambridge in August 2012. That may sound a long way off but, under the Chairmanship of Graham G4FSG, the organising committee is already working hard to make this a highly successful conference (see the conference web site at eme2012.com for more details). For those of you who have not had the pleasure of attending an EME conference, the format includes two days of high quality presentations encompassing every aspect of this challenging mode of operation and the conference provides an opportunity to meet and mix with some of the leading lights within amateur radio from all over the world. Of

course, many of the techniques on SSPAs, LNAs, filters, etc., are equally applicable to terrestrial operation.

One departure from previous conferences is that we will be printing a larger run of the conference proceedings, which are a very useful work of reference for both moonbouncers and non-moonbouncers. After the conference these will be marketed and this will help keep the costs of the conference, at this prestigious location, within reasonable bounds.

There will be a call for papers shortly so it's time for all UkuG members to put their thinking caps on and come up with interesting material that can be presented to the conference, either as a short lecture as content in the printed proceedings or on the conference DVD. Keep a watch on the 'ukmicrowaves' reflector and Scatterpoint for the dates for submitting papers.

Also, pencil in your diary the dates of **16th –19th August 2012** and consider volunteering to be a host. We want to make all delegates to the conference, especially our overseas visitors, feel very welcome and give them the best possible experience of our country and our hospitality.

73 Brian G4NNS

Powering a 28V Coaxial Relay from 12V

John Sager, G8ONH

Introduction

I have been repairing a spectrum analyser, in which the 10dB attenuator section and the first mixer were both damaged. I repaired the mixer (a saga all on its own!), but the attenuator section is part of a small potted module which is unrepairable and pretty much unobtainable. The 20dB and 30dB sections are OK so I decided to replace the 10dB section with an external 10dB attenuator and a couple of relays to switch it in and out. 28V coaxial relays are fairly readily available, and the analyser had +15V and -15V supplies.

However, having measured the relays and done the sums I realised that both relays would add nearly 0.5A extra load if I did it the simple way. When testing the relays, I discovered that, although the relays appear to switch with 15V (they click), in fact they don't switch reliably, so a straight series connection solution was out. I also found that, once switched, the relays will hold in with a much lower voltage, drawing only about 60mA

Consequently I designed a driver circuit to switch two relays in series from a large current pulse initially, and then hold in at the lower current. As my application is a bit specialised, I decided to redesign the circuit for driving one relay from 12V which might have wider application, and this is the result. The relays I used have a coil resistance of about 120 Ohms, and an inductance of about 90mH, but the circuit could easily be designed for other values.

W6PQL has published a relay driver circuit [1] but that is designed for latching relays. It would be possible to build a driver circuit around a switching regulator such as the MC34063, but with a relay drive voltage of, say, 24v, the current taken will be around 200mA so, with losses, the current from the 12v supply will approach 0.5A. The circuit

here takes a maximum of around 70mA from a 12V supply, dying away to zero over a couple of seconds or so when the relay is switched off.

Circuit Description

The circuit is basically a voltage doubler inspired by the Marx Generator [2]. Referring to Figure 1, with the switching signal off and the power supply connected, the capacitors C1 and C2 charge through R5 and R7 respectively. When a switching signal of +5V is applied to the input pin, Q1 turns on, turning on Q2 via R4 and D3. Q2 connects the negative end of C1 to the positive end of C2, and the positive end of C1 rises to 24V, applying that voltage to the relay coil. The current builds in the relay, peaking at around 180mA after two milliseconds or so. The current then decays as the capacitors discharge, but stays above 140mA for the 20ms it takes for the relay to switch. When the voltage drops sufficiently, D2 turns on and supplies the relay hold current via R3.

Setting the switching signal to 0v turns Q1 off and its collector voltage rises as the relay decay current flows through D1. Q2 turns off and the voltage across Q2 reverses as the voltage at the junction of the relay, C1 and R3 rises. D4 prevents a damaging reverse voltage across Q2, and allows an initial recharge of both capacitors via D2 and R3. Once the capacitors charge enough such that the voltage across D4 reverses again, the capacitors continue to charge via R5 and R7.

The circuit has been modelled in SPICE to tune the circuit values, and the values have been calculated for transistors with a minimum h_{fe} of 40. I chose BC635 and BC636 for the design but any medium power transistors would do that have a minimum current gain of more than 40 at 150mA collector current and a voltage rating of 30V

or more. The charge resistors R5 and R7 give a recharge time of 2 to 3 seconds. This could be reduced somewhat by reducing their value, at the cost of increasing the supply current when the relay is switched on.

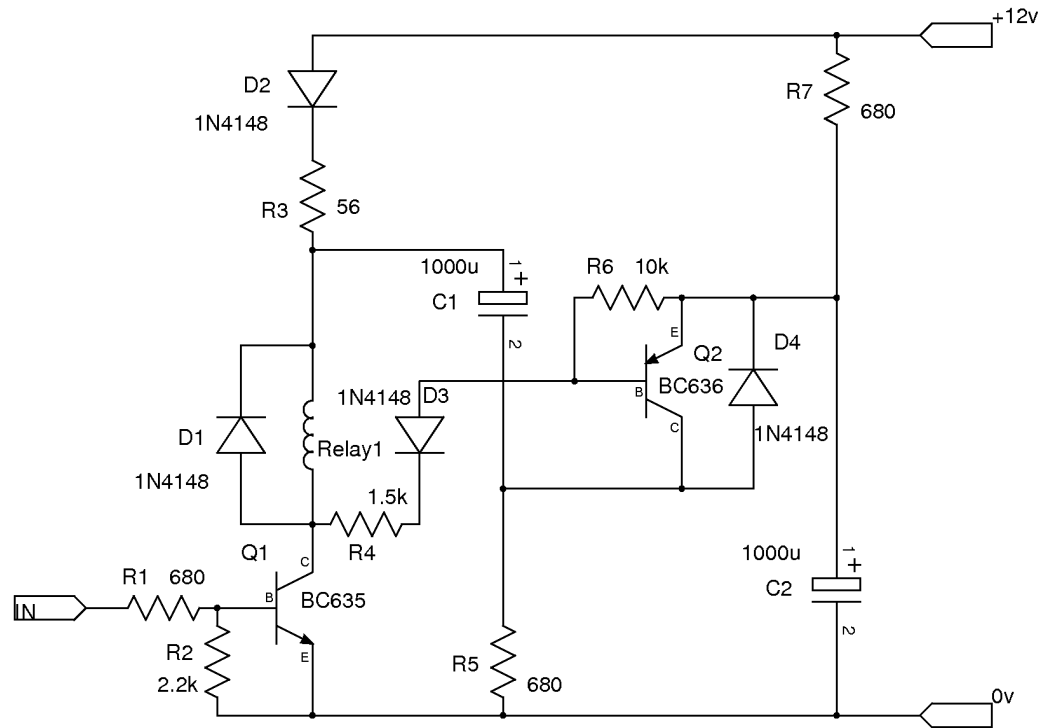


Figure 1: Relay driver circuit diagram

References

- [1] www.w6pql.com/latching_relay_driver.htm
- [2] en.wikipedia.org/wiki/Marx_generator

Spectrum

Murray Niman G6JYB

Responses to the future of radio, including 13cms (or the threats to it) as well as 70cm and 9cm. See [this link](#), top entry.

The first one draws on UKuG material whilst the second one has some interesting views on how the Comms Act and Ofcoms duties/priorities might be changed in a few years time.

Regarding these, GB2RS this week will say about this:

Spectrum Management responses to DCMS

In the past ten days, the Society [RSGB] has responded to the Department of Culture, Media and Sport on a consultation on the release of an additional 500MHz of spectrum below 5GHz by 2020; and an open letter that seeks to review communications for the digital age. Both responses from the Society can be seen [here](#).

Murray Niman G6JYB, Microwave Spectrum Manager

A wideband, low noise, high dynamic range amplifier covering 50MHz to 4GHz

by Sam Jewell, G4DDK/W5DDK and Kent Britain, WA5VJB/2E0VAA

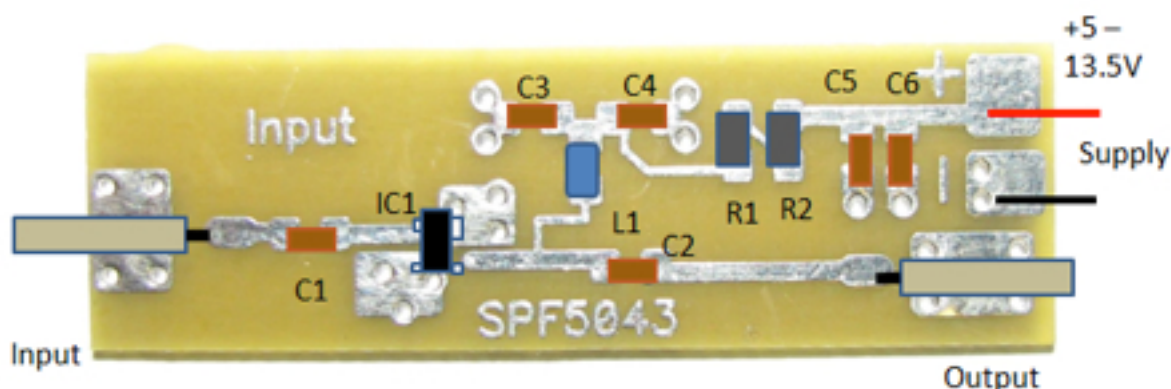


Fig. 1 – Component layout

Introduction

Kent recently produced a series of printed circuit board kits for use with the RFMD GaAs P-HEMT MMIC type SPF5053Z. The amplifiers cover from 50MHz to over 4.0GHz with a high dynamic range, low noise, excellent input and output return loss (match) and moderate gain. Power supply can be as low as 3V and up to about 15V, with suitable (external) bias resistors.

The RFMD SPF5043Z has an inherent noise figure below 1dB up to 2.5GHz with as low as 0.6dB available at 144MHz and a very respectable 0.61dB at 70cm. At 23cm the noise figure is around 0.8dB. Up to 3.8GHz the input return loss is better than 10dB. At 23cm the output P1dB is almost 200mW! The SPF5043Z has usable gain beyond 8GHz, if you really must!

Of course many of these device figures deteriorate when the SPF5043Z is mounted unto a PCB. By using thin (0.79mm) FR4 board the overall performance is kept close to the device performance.

Some possible uses for the amplifier are:

- Moderately low noise preamplifiers to 13cm
- general purpose gain blocks

- Transmitter driver stage (ideal for those Mitsubishi PA blocks)
- Post mixer amplifiers
- Frequency counter input amplifiers
- wideband noise generator source amplifiers

I'm sure you can think of many more uses.

The available PC boards cover three types of termination, SMA through board, SMA edge and cable. Although all three boards are quite small, they are slightly different sizes. The SMA through termination is the largest at 4.1cm x 1.25cm. The SMA edge termination is 3.3cm x 1.0cm and the cable termination board is also 3.3cm x 1.0cm. The SMA edge termination PCB is 0.5mm thick whilst the other two are both 0.8mm thick. In order to avoid fracturing small SMD parts the thinner board should ideally be attached to a stronger back board. All three types of board are currently in stock but the cable termination PCB is likely to be the preferred board for most constructors.

Circuit description

The layout of the amplifier on the WA5VJB5043Z cable terminated PCB is shown in figure 1.

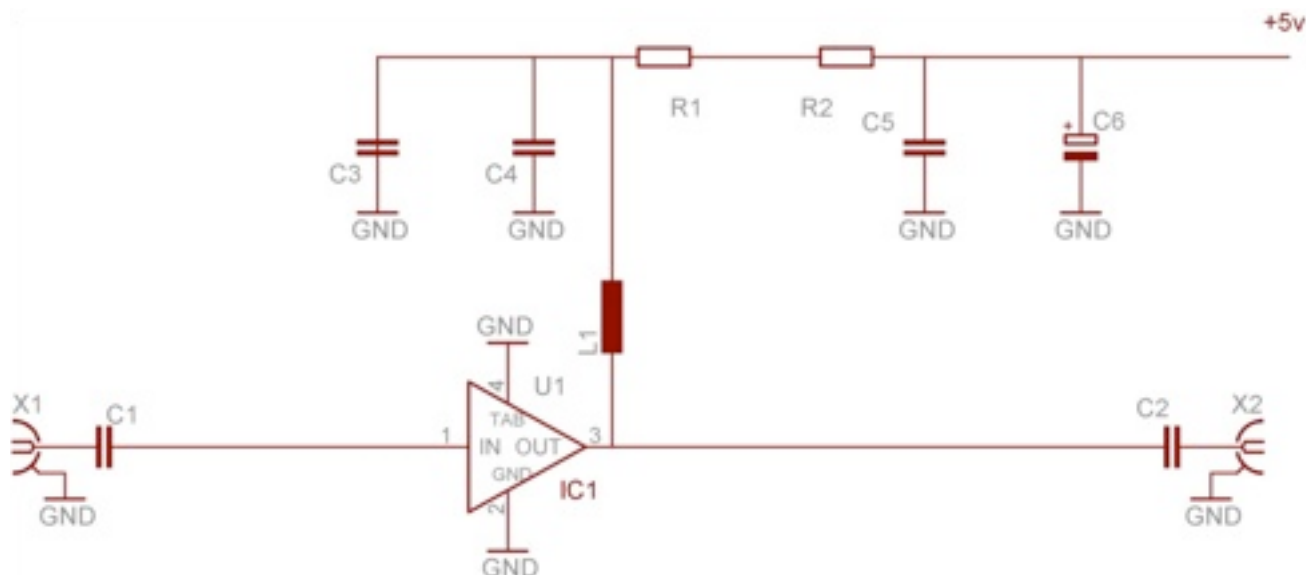


Fig. 2 – Schematic diagram of the wideband, low noise amplifier.

The circuit schematic diagram of the amplifier is shown in figure 2.

The SP5F5043Z is biased from its output (drain lead) via L1 and the resistors R1 and R2. It can be powered at anywhere from 3V to about 9V without using an external, higher dissipation, resistor. The device will self-bias to the required drain current by setting the drain voltage as appropriate by R1 and R2. For most amateur radio purposes the amplifier will be used with 5V drain voltage. There is a space for two drain dropping resistors, R1 and R2. These are not essential when using 5V, but do help with supply noise decoupling. Use 10Ω for each of these with a 5V supply. If the amplifier is to be used with an external 13.5V supply an external 180Ω 0.5W rated resistor should be used to drop the 13.5V down to 5V at 46mA. In this case R1 and R2 can be removed and a shorting link used in their place. For use with 3.0V the total value of the two resistors should be either 0Ω with 3V applied to the supply input, or 80Ω if you choose to use 5V. Higher supply voltage will require larger values of R1+R2 but do watch that the total dissipation should be no more than 200mW, shared equally between the two resistors. In no circumstances allow the voltage on the drain of IC1 to exceed 5.0V

Note that the DC resistance of L1 is ignored and as long as its current capacity is greater than 46mA, it can safely be forgotten.

The decoupling capacitors C3 to C6 are chosen to give good decoupling across the entire frequency range from 50MHz to 4GHz. C6 actually extends the decoupling to even lower frequencies.

C1 and C2 should be chosen to have self resonant frequencies above the maximum intended frequency of operation. Ideally, for lowest noise figure, these should be low ESR types.

Component list

Table 1 Components values for the amplifier (kit version).

R1 and R2 values are chosen for use with 5V supply.

R1	10Ω	0603
R2	0Ω	0603
C1,2,3	100pF	0603
C4	10nF	0603 (0805 supplied in the kit)
C5	0.1μF	0805
C6	1μF 16v	A Size
L1	150nF	0603/0805
IC1	SP5F5043Z	
X1, X2	Cable or connectors	SMA or PTFE cable
PCB	WA5VJB5043Z	

Construction

Figure 3 shows the SPF5043Z amplifier constructed on the cable termination PCB. Surface Mount 0603 size parts are used. Because the parts are well-spaced, construction is easy. You MUST use 0.3mm (28SWG) leaded solder. The boards were produced in the USA and are lead tinned. Larger gauge solder than the recommended size will ensure that you make a mess of the PCB!

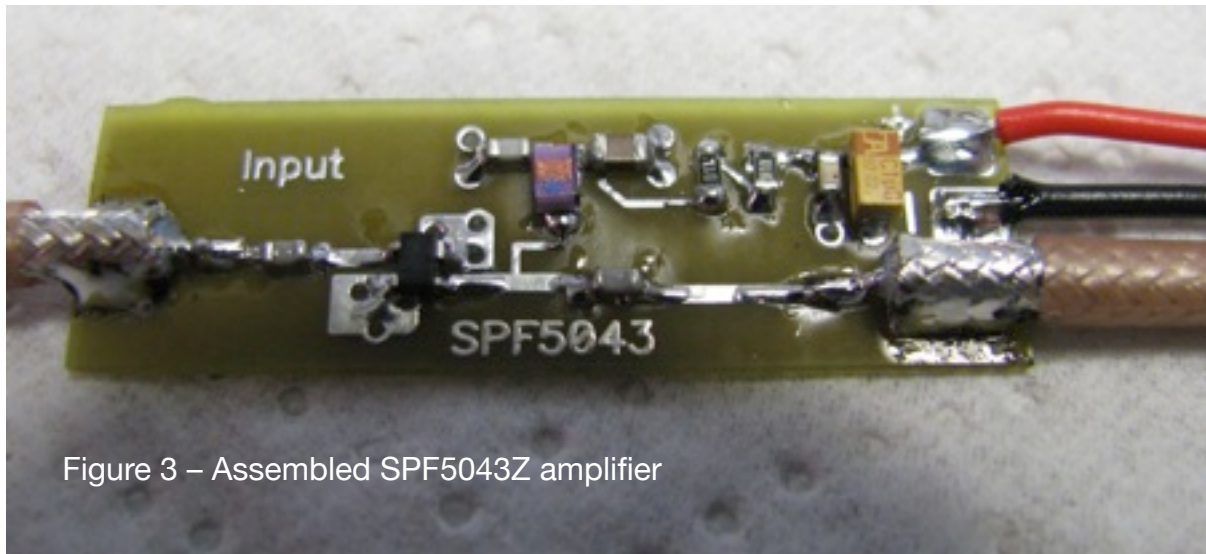


Figure 3 – Assembled SPF5043Z amplifier

Begin by soldering the bias resistors, R1 and R2, followed by the supply decoupling capacitors C5 and C6. Solder C3 and C4 next, followed by L1.

Solder C1 and C2 in place on the input and output lines.

Carefully solder IC1 into position noting that the biggest (widest) lead is soldered to the GROUND pad nearest to L1. It is advisable to use a grounded soldering iron to prevent static damage to the fragile IC. The SPF5043Z uses the well-known four lead '43' package.

Prepare the ends of some UT085 (or flexible equivalent) and solder the outer to the ground pads and the inner to the pad next to C1 or C2, depending on input or output.

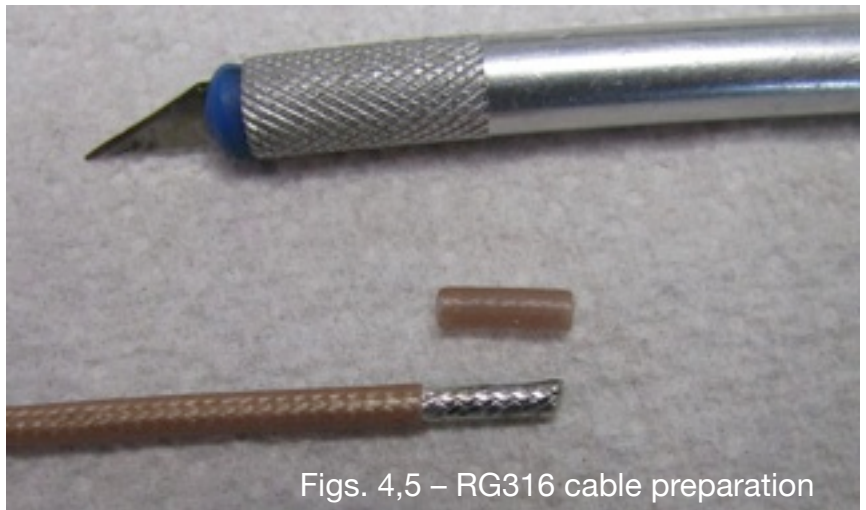
Preparing flexible (PTFE only to be used....) coax should be done in the correct manner as shown in fig 4 & 5. NO PIGTAILS!

Carefully score round the outer jacket 10mm from the end of the cable using a sharp scalpel and slide the jacket off the cable.

Carefully tin the full length of the exposed braiding outer.

Carefully score round the tinned braid 5mm from the end and then carefully 'break' the braid by bending. Slide the braid off the cable to expose the PTFE inner.

Carefully score through the PTFE inner 3MM from the end and slide it off to expose the cable inner. Carefully tin the inner.



Figs. 4,5 – RG316 cable preparation



Solder the tinned outer to the ground pad and the tinned inner to the input or output pad, ensuring that the inner is not shorted to the cable outer.

Solder the two supply leads as shown in figures 1/3.

Results

Figure 6

Insertion gain from 30MHz to 3GHz.

Markers at 40, 144, 432 and 1296MHz.

The gain is 20dB at 40MHz, 22.7dB at 144MHz, 15dB at 1296MHz and 10.6dB at 2.3GHz.

The red line is 0dB gain.

The yellow line indicates the gain at 10dB / division.

The input power level was -20dBm.



Figure 7

Input Return loss (S11) from 30MHz to 3GHz.

Input return loss measures 1dB at 40MHz, 8.5dB at 144MHz, 10dB at 1296MHz and 8.2dB at 2.3GHz

The red line is 0dB return loss.

The yellow line indicates return loss at 10dB / division.



Band	Gain (dB)	Noise figure (dB)
30MHz	20	2.0
50MHz	21.8	1.1
144MHz	22.5	0.68
432MHz	21.1	0.68
1296MHz	15.5	0.86
1420MHz	14.6	0.86
1500MHz	14.0	0.82
1600MHz	13.8	0.88

Table 2 Gain and noise figure measurements for the kit amplifier, at various frequencies. Vdd = 5V and Id = 46mA
13 and 9cm figures will be added later.

It is possible that these numbers could be improved slightly by adjustment of the bias and also by selection of more optimum component values. The noise figure measurement was made through 4cm of RG316 input cable and an SMA3.5 female to female adapter.

Further information

The SPF5043Z data sheet can be viewed [here](#).

The SPF5043Z can be used at even lower dissipation by adding a resistor from the input to ground. This is described in [this pdf](#).

Surprisingly, the P1dB does not degrade as fast as you would expect at these much lower drain currents.

S Parameter etc, for the SPF5043Z can be found [here](#).

Kits

Kits of components as the component list, Table 1 are available from [G4DDK](#) for 10GBP

Postage and packaging is 3GBP in the UK. Please inquire for overseas rates.

Paypal payment can be accepted.

See www.g4ddk.com for more details of the amplifier.

Sam Jewell G4DDK

Watts all this?

The PA of the 600kW O/P transmitter at the BBC World Service transmitter, Orford Ness, Suffolk.

"The 4CM500,000G is a ceramic/metal, multiphase-cooled (water/vapour) power tetrode. This tube has a thoriated tungsten mesh filament and pyrolytic graphite grids which provide high-dissipation combined with low secondary emission characteristics.

Base coaxial contact rings are provided for the filament, grid, and screen terminals, and these terminals are cooled with forced air. The maximum anode dissipation rating is 500 kilowatts steady state, with multiphase cooling."

Photo by John Regnault G4SWX

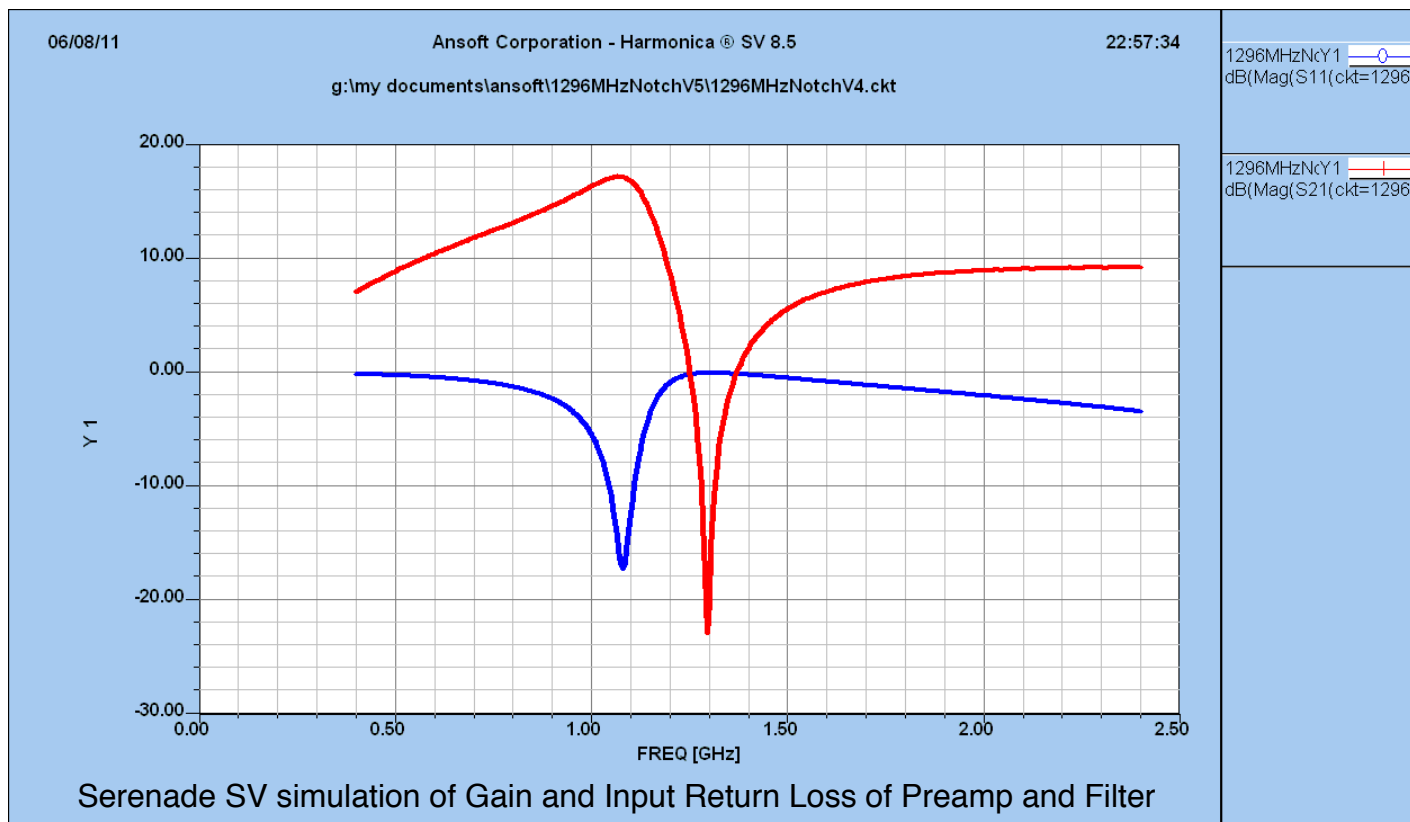


A Simple Preamp for 1090MHz ADS-B with a 1296MHz Notch Filter

John Quarmby G3XDY

The 1090MHz yagi design published last month was tested using my existing 23cm transmit feeder (mostly LDF4). Adding another piece of LDF4 permanently was impractical on the grounds of cost and weight so I decided to use the lightest cable I could get away with and put a preamp up at the antenna to overcome the losses. The cable I used for most of the run was RG316, which has a loss of about 1dB/m at 1.1GHz, plus a shorter piece of RG58 with about 0.5dB/m loss, giving an overall loss of about 14dB. The preamp has to overcome this loss. The RF environment where the yagi is located is quite extreme, with two dishes next to the yagi and a box of four 23cm yagis about 1m above it. Any preamp will have to survive in this environment, and ideally continue to operate without overload even when running full power on 23cm.

After trying a 3 stage helical filter, which had excellent stop band performance but had over 2dB loss and 1dB ripple in the 1090MHz passband, I decided to look at something simpler to keep the 23cm signal out. A single stub notch filter was simulated, and then a shunt line added to produce a peak on 1090MHz. Prototyping showed that a good notch depth could be achieved (although getting it exactly on 1296MHz requires careful pruning), but it was difficult to make a short enough line for the shunt element, so eventually a simple inductive loop was used instead. The final filter consists of an open circuit quarter wave stub made from 40.5mm of UT085 semi-rigid cable, and a 1.8nH shunt inductor realised using a 5mm long piece of silver plated wire (the inner of UT141 cable), about 1mm above the ground plane. The loss at 1090MHz is about 0.5dB, with a 45dB notch on 1296MHz.



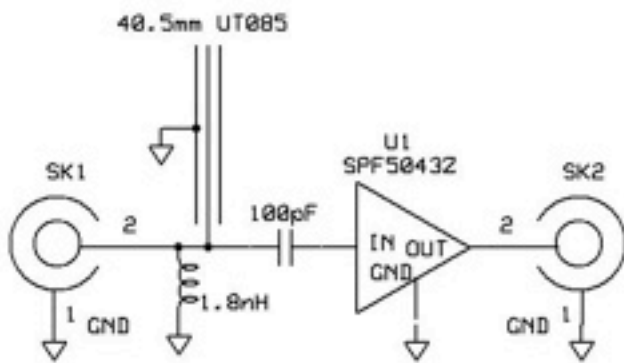


Fig. 2 – Circuit diagram

The preamp following the filter uses an SPF5043Z device from RFMD. This device is a 50 ohm matched LNA with 0.8dB NF and about 17dB gain at 1GHz, and runs from a 5V supply at 46mA. It is capable of an output power of +22.7dBm at 1dB compression, this means that it will not block with signals up to +5dBm at its input. With the 45dB notch filter in front, it would not be overloaded with a 100W 23cm transmitter fed directly into it (I'm not suggesting anyone tries this!). Kent WA5VJB has produced some small PCBs to mount the SPF5043Z device, which makes construction of the preamp very simple. In this application only one other component is needed, a 100pF 0603 or 0805 input capacitor, plus a link across the position provided for the output capacitor. The power is fed directly up the coax to the output pin of the SPF5043Z (see Note 1). The finished preamp and notch filter are shown in figure 3.

At the shack end of the feeder the DL4MEA ADS-B receiver is modified by adding a small RF choke from the +5V rail to the input connector. A piece



Fig. 4 – Measured Gain of Preamp and Filter. Centre Frequency 1090MHz, 0dB gain is at the -20db line, 50MHz/div, 10dB/div.

of 28swg enamelled copper wire 7cm long is wound with a 2.5mm inner diameter and adjusted to a length of about 10mm, and then soldered between the input capacitor on the first stage amplifier and the supply decoupling capacitors for that stage (see figure 5).

The preamp was initially tested using bias components on the PCB rather than using a separate bias tee to provide a DC block. Figure 4 shows the overall frequency response, and Figure 6 is a picture of the HP8970A NF Meter showing the midband

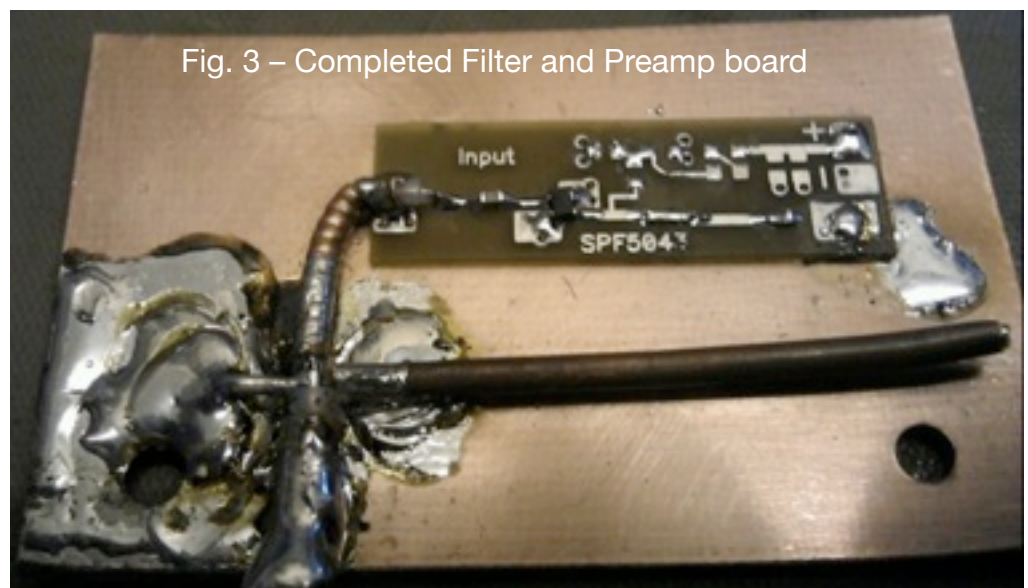


Fig. 3 – Completed Filter and Preamp board

Note 1: The direct method of power feeding may be susceptible to nearby lightning surges. If you can use an external 12V supply instead, include a capacitor in the preamp output and use a 78L05 regulator and a surge diode in the pre-amp box, with the power take off and feed to the SPF5043Z via small inductors as per Figure 5.

gain and noise figure. Figure 7 is the Serenade simulation of the filter and preamp for comparison. With the high feeder losses in my system, the overall gain is close to zero, so the 2dB NF of the ADS-B receiver is degraded to 3.8dB. Using something like RG58 or UR43 cable for the whole run would be a better compromise, a 15m length would have a loss of about 9dB and overall system noise figure would be 2.25dB.

PCBs and the SPF5043Z for the LNA are available from Sam G4DDK (QTHR). The waterproof box shown came from Maplin (Part No. N17GC). The UT085 cable often turns up in surplus connector assemblies (it can also be substituted by UT141 with a slight improvement in performance). If you slightly overcut the filter cable I found that a drop of polystyrene cement on the open end brought it back down a few MHz.

John Quarmby G3XDY

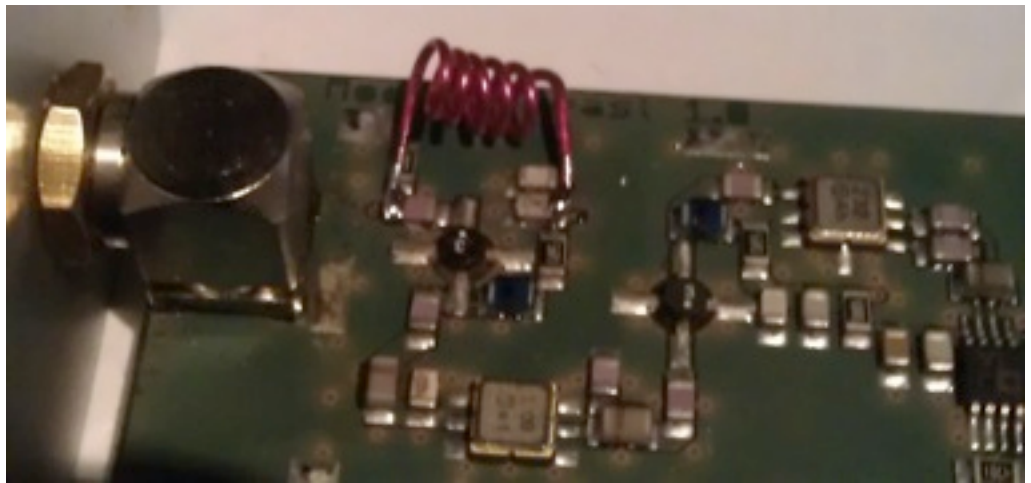


Fig. 5 – Location of power feed choke in ADS-B Receiver



Fig. 6 – Gain and Noise Figure measurement.

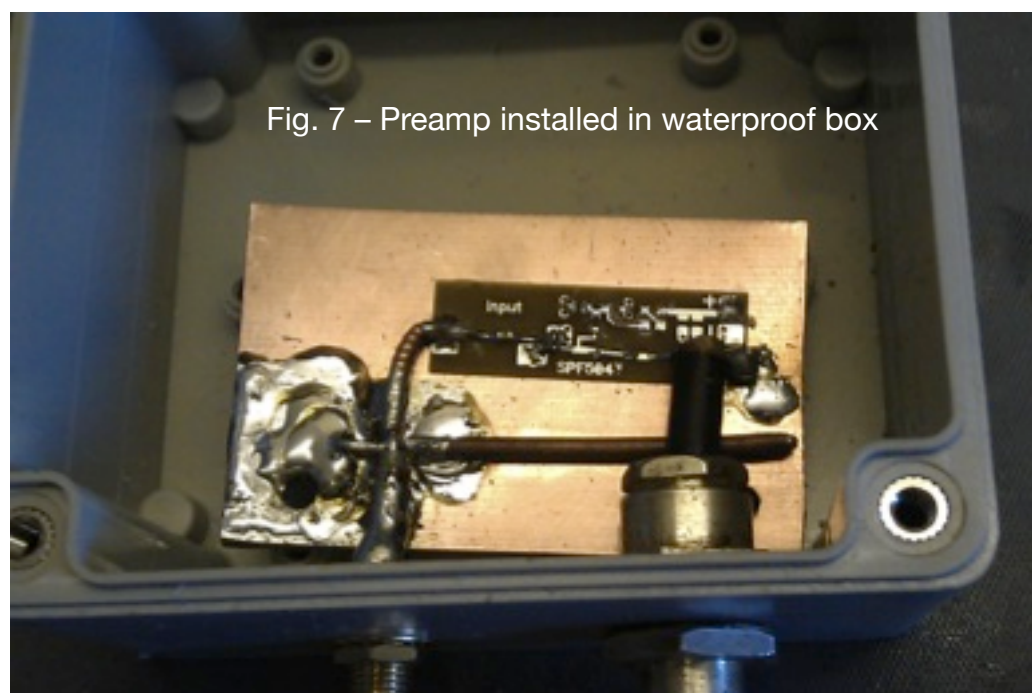


Fig. 7 – Preamp installed in waterproof box

A WR42/WG20 to WR28 transition for 24GHz

By Chris Bartram GW4DGU

Introduction

The wide availability a few years ago of a WR28 waveguide switch, has led to a number of more-or-less satisfactory methods of integrating it into typical WR42/WG20 systems. These have varied from the 'crash' method [1] of simply connecting the switch to WR42 flanges to slightly more sophisticated 'fiddle, and hope for the best' screw tuners.

As I wanted to use the relay for 24GHz EME, a project which has remained stalled for some years due to constraints which it wouldn't be appropriate to discuss here, I wasn't happy with the solutions which I'd seen. I wouldn't try to use, say, a 75Ω coax relay for 144 or 432MHz EME without low-loss matching of some kind. On 24GHz there's even more reason to get things right – even for tropo... The use of screw tuners didn't appeal as there is a greater potential for losses, and for things going wrong, even if sapphire tuning elements (salvaged from DMC 21GHz filters, perhaps...) are used. The transition described here is, hopefully, a thought-through method of matching between WR28 and WR42 at 24GHz.

How it works ...

At 24GHz both WR42 and WR28 support the same TE-10 mode of waveguide propagation, so the problem is essentially one of impedance matching. This design is a compensated 0.25WL transformer: the characteristic impedance of the modified H-plane (broad face) section is the geometric mean of the impedances of the WR28 and WR42 sections at 24GHz. In essence, this is much the same as a quarter-wave matching section made in coax, although the use of waveguide is complicated by the need to take account of the discontinuities introduced by the steps in waveguide dimensions and by the dispersive (frequency dependent) nature of waveguide.

As it simplifies the mechanical design, the impedance transformer is located 0.5WL from the

interface between the waveguides. This will narrow the bandwidth of the transition marginally, and reduce the power handling by perhaps a few percent, but neither of those are terribly significant in our application. The extra loss is small – a few tens of milli-dB in simulation.

Performance

The design has been optimised using two different EM modelling packages, each of which uses different mathematical methods. Although, as would be expected, the results differed very slightly, they gave some confidence that the basic design was sound. Measurements on a hand-made prototype, using a high performance HP directional coupler and tunable WG source, indicated a return-loss for $|s_{11}|$ of >25dB over about ± 150 MHz. $|s_{11}|$ was measured at the WR42 input port with a Flann WR28 load on the output port. The Flann load isn't specified at 24GHz, but the result is felt to be reasonably representative. I don't possess any equipment for return-loss measurement in a WR28 environment so measurement of $|s_{22}|$ wasn't possible.

Proof of the pudding came with three transitions bolted to the WG switch. The good return loss was retained and the insertion loss from the common port to either of the two switched ports was <0.3dB.

More sophisticated, multi-step transformers could result in some small improvements in performance, particularly with regard to bandwidth. I've used multi-step transformers in other projects where the design required machine tools, but the extra complexity isn't justified here.

Realisation.

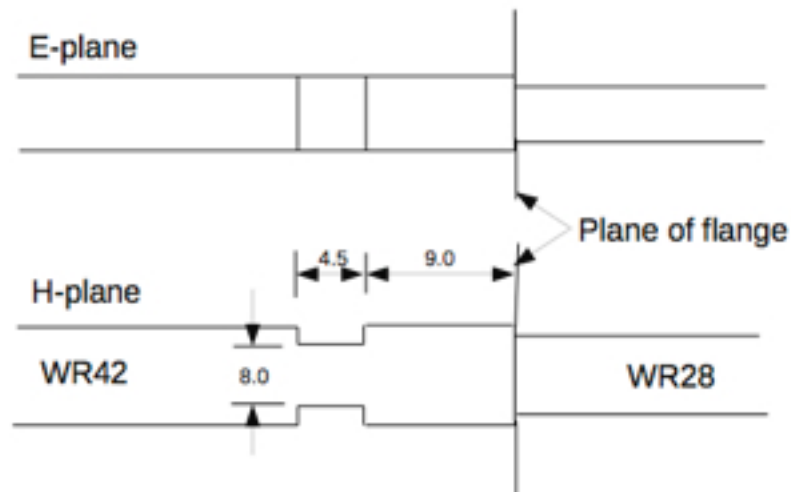
The sketch is a schematic representation of the inside dimensions of the waveguide.

Realising the transformer physically is a matter of personal choice! I did it by hand as I don't have access to a decent workshop. Using a vernier, I set-out to achieve an accuracy of better than

Note

1. In western European art music and its derivatives, an abrupt change of tonality/key is known as a *crash modulation*. Although very occasionally it's appropriate, and may even seem to work in some other circumstances, it's usually a pretty crude way of doing things. Changing waveguide sizes without impedance matching is closely analogous!

Not to scale!



Notes:

This drawing is schematic, and shows the internal dimensions of the waveguides.

Dimensions are in mm. The design frequency is 24.05GHz

Chris Bartram GW4DGU

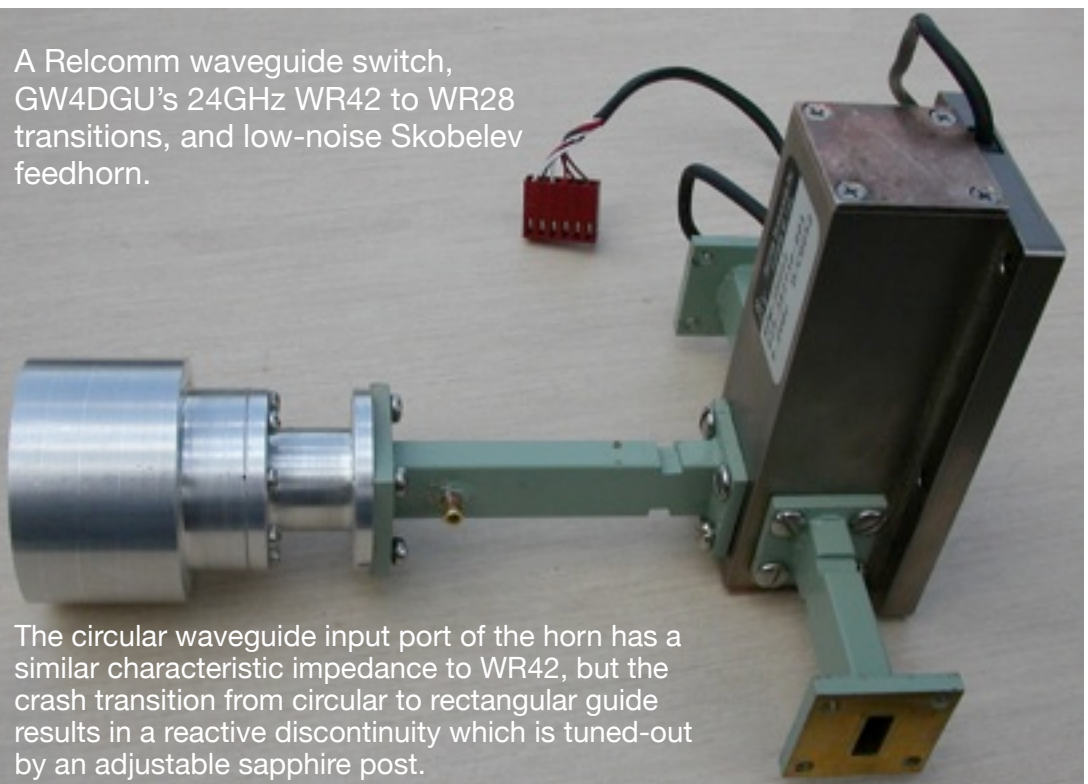
WR28 to WR42 Transition for 24GHz

0.1mm. I very carefully cut notches in the waveguide with a Dremel, heavy-duty side-cutters (but we won't go into that!) and needle files, and made slightly oversized U-sections of 0.25mm copper sheet using small side-cutters and pliers. I then forced the U-sections into the notches, dressed them to fit snugly and soldered them – using a minimum of solder, of course, and a hot-air gun.

If I had easy access to a mill, it would be trivial to machine the notches and copper (or brass, if you really must!) blocks to fit them, but I don't.

**Chris Bartram
GW4DGU**

A Relcomm waveguide switch, GW4DGU's 24GHz WR42 to WR28 transitions, and low-noise Skobelev feedhorn.



The circular waveguide input port of the horn has a similar characteristic impedance to WR42, but the crash transition from circular to rectangular guide results in a reactive discontinuity which is tuned-out by an adjustable sapphire post.

Antenna Test Results – Finningley, July 2011

By David Wrigley G6GXX

				Relative	
Band: 24GHz				Level	Gain
Antenna description	Reading	Range	Level	dB	dBi
Reference Horn	-7.5	50	-57.5	0	13
M1EGI Small plastic horn	-1.5	60	-61.5	-4	9
M1EGI ANDREW 30CM	-1	40	-41	16.5	29.5
				Relative	
Band: 10GHz				Level	Gain
Antenna description	Reading	Range	Level	dB	dBi
Reference Horn	-4.8	40	-44.8	0	17.2
G6YBC -Andrews Dish-Crook Feed	-8.9	20	-28.9	15.9	33.1
M1BWS Small Sky Dish (Original)	-0.4	30	-30.4	14.4	31.6
M1BWS Small Sky Dish (after horn adj)	-9.6	20	-29.6	15.2	32.4
				Relative	
Band: 5.7GHz				Level	Gain
Antenna description	Reading	Range	Level	dB	dBi
Reference Horn	-5.4	50	-55.4	0	12.7
G3WFK- Panel	-4.4	50	-54.4	1	13.7
Reference Horn	-4.6	50	-54.6	0	12.7
GM4BYF - SMALL HORN	-6.7	50	-56.7	-2.1	10.6
G3WFK Ref Horn	-4.6	50	-54.6	0	12.7
				Relative	
Band: 3.4GHz				Level	Gain
Antenna description	Reading	Range	Level	dB	dBi
Reference Horn	-1.5	50	-51.5	0	12.7
G3LYP - Horn	-4	50	-54	-2.5	10.2
GM4BYF - Sec Horn/HORIZONTAL	-8.5	40	-48.5	3	15.7
GM4BYF - Sec Horn/VERTICAL	-9.3	40	-49.3	2.2	14.9
				Relative	
Band: 2.3GHz				Level	Gain
Antenna description	Reading	Range	Level	dB	dBi
Reference Horn	-2.3	40	-42.3	0	12.7
GM4BFY LARGE HORN	-4.9	40	-44.9	-2.6	10.1
G8DTF Bob 62E/VK5DJ long Yagi	-6.5	30	-36.5	5.8	18.5



Dave Wrigley's integrated antenna test range source package



GM4CXM giving his talk on aircraft scatter

G4JNT's presentation at Finningley on PICs can be found [here](#)

June 2011 Low Band Contest Results

By John Quarmby G3XDY

Entries on 23cm were up over last year but did not reach the numbers achieved in the March 2011 event, whereas 9cm entries were well up and 13cm stayed level. One entrant had difficulty with the online log entry system and submitted an email log. Conditions were generally described as average to poor, with fairly low activity. PA/ON7BV/P in JO11 provided many with their only continental DX.

Once again Ray GM4CXM triumphed on 1.3GHz with a 30% margin over G3TCU/P. Best DX of the day was between GW8ASD and DF0MU at 706km. There were noticeably more logging errors in the 23cm entries than on the higher bands for some reason, and scores have had to be adjusted accordingly.

There was a close battle on 2.3GHz between G3ZME/P and G4RFR, with the former just shading it, with both stations submitting perfect logs. No stations from outside the UK appeared in any of the logs, despite concurrent microwave events in France and Germany.

On 3.4GHz we had a rare occurrence – a dead-heat for first place between G3ZME/P and G3TCU/P, again with error free logs from both. It is pleasing to see more stations becoming active on this band and making their first contacts.

This year there was a closely fought battle for the overall winners slot between the Telford & District ARS, G3ZME/P and the “Combe Gibberlets” G3TCU/P. The winners G3ZME/P gained third place on 1.3GHz and firsts on the other two bands, with G3TCU/P achieving second place on 1.3GHz, third on 2.3GHz, and first equal on 3.4GHz. G3ZME/P was operated by G3UKV, G8UGL, G4NKC, M0ECM, and M0EMM. In third place and leading fixed station was Ray GM4CXM.

Congratulations to all the winners and runners up, who will all receive certificates..

73 John G3XDY

UK Microwave Group Contest Manager

June 2011 Low Band Contest Results

Overall

Pos	Callsign	1.3GHz	2.3GHz	3.4GHz	Total
1	G3ZME/P	641	1000	1000	2641
2	G3TCU/P	705	742	1000	2447
3	GM4CXM	1000	604	0	1604
4	G8AIM	276	588	564	1428
5	G4RFR	284	988	0	1272
6	G4LDR	349	234	668	1251
7	GW8ASD	574	609	0	1183
8	G8DTF	220	376	243	839
9	G0JMI/P	92	194	425	711
10	GW3TKH/P	332	0	0	332
11	GM8IEM	141	0	0	141
12	G0BWC/P	46	69	21	136
13	G4HQX/P	51	0	0	51
14	G6GVI	42	0	0	42

June 2011 Low Band Contest Results – by band

1.3GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1	GM4CXM	IO75TW	15	G4LDR 568km	4497
2	G3TCU/P	IO91GI	18	GM4CXM 545km	3170
3	G3ZME/P	IO82QL	18	PA/ON7BV/P 430km	2881
4	GW8ASD	IO83LB	14	DF0MU 706km	2582
5	G4LDR	IO91EC	10	GM4CXM 568km	1568
6	GW3TKH/P	IO81LS	10	PA/ON7BV/P 450km	1491
7	G4RFR	IO90AS	8	G3XDY 263km	1276
8	G8AIM	IO92FH	7	GM4CXM 444km	1242
9	G8DTF	IO83SM	7	GM4CXM 296km	988
10	GM8IEM	IO78HF	2	GM4JR 370km	632
11	G0JMI/P	IO91ME	4	GW3TKH/P 159km	413
12	G4HQX/P	IO81WT	5	G3ZME/P 81km	230
13	G0BWC/P	IO83RO	3	G3ZME/P 126km	206
14	G6GVI	IO83SN	2	G3ZME/P 121km	189

2.3GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1	G3ZME/P	IO82QL	7	GM4CXM 402km	1155
2	G4RFR	IO90AS	7	G3XDY 263km	1141
3	G3TCU/P	IO91GI	8	GW8ASD 219km	857
4	GW8ASD	IO83LB	6	G3TCU/P 219km	703
5	GM4CXM	IO75TW	2	G3ZME/P 402km	698
6	G8AIM	IO92FH	6	G3XDY 190km	679
7	G8DTF	IO83SM	4	GM4CXM 296km	434
8	G4LDR	IO91EC	3	G4ALY 195km	270
9	G0JMI/P	IO91ME	2	G3ZME/P 184km	224
10	G0BWC/P	IO83RO	2	GW8ASD 69km	80

3.4GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1=	G3ZME/P	IO82QL	4	G0JMI/P 184km	527
1=	G3TCU/P	IO91GI	5	G3XDY 200km	527
3	G4LDR	IO91EC	3	G3XDY 223km	352
4	G8AIM	IO92FH	2	G3XDY 190km	297
5	G0JMI/P	IO91ME	2	G3ZME/P 184km	224
6	G8DTF	IO83SM	2	G3ZME/P 117km	128
7	G0BWC/P	IO83RO	1	G8DTF 11km	11

View from the Drey

Reflections on a Reflector

By Secret Squirrel



Midsummer madness!

It's the barbecue season and I'm concerned that posts are going missing due to a large number of Spam fritters. What am I going to run up and down to taunt Faraday the cat if there are no posts to hold the fence up?

To help me out, the old codger's been rigging up strange metal constructions on the lawn, with ropes and wires for me to run up and down. Then, before I've chance to work out the best way to get to the feeder he's connected to his Bird, he takes them down again, packs them in to his car and disappears for the weekend with the camping gear but without the family.

I do wonder what that's all about, especially when, in the Sunday night family "Scrabble" game on the patio, he comes up with words like sota, vhfnd and ukac. (The latter even got a triple word score because of something called the M^CFive rule apparently).

Maybe it's M^CFives who are providing all the Spam Fritters?

Last month's concern about tails continues, in fact there is now concern whether said tail is visible or not, or that it's actually not a tail at all, but a head or a foot....er!

Well I can see my tail, and it's definitely a tail, and a mighty fine one at that!

It's not only the old codger who's got a touch of the madness; only last week, someone called "OT - Charger" tried to teach his radio to swim in the Medway, while another reports that his radio is "crunchy and works when pressed on".

The former would've been much better taking it to the free over-60's swimming sessions at Felixstowe baths, than trying to post it to the RNLI.

Finally, if you're planning to take your tripod out to another place with a name without vowels, remember the old adage –

**"When yon black cloud's o'er yonder peak...
it's pakka macs for 't'rest o' week"**

Wally Green VK6WG

Hi all,

many of you may have heard of Wally Green VK6WG. Down under he is a giant in the field of VHF and above! I am happy to report he is shortly to hit the grand age of 100! He is still active on the bands. I was lucky to see him in his shack 3 years ago. He still has gear for bands up to 10GHz! VK6UU has done a piece on him. Please have a look [VK6WG](#). When I was in his shack he was there at the bench, soldering iron on.

Reg Woolley G8VHI

RAL 2011 Information



Harwell Amateur Radio Society are organising this years RAL microwave round table. The date is the **21st August** at the RAL Recreational Society (the same place as last year).

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. [Here](#) is the list of registrants so far:

Arrival

The map (download from [here](#) as a PDF) shows where the event will be held. Please do not try and enter via the front gate. We aim to open at 10:30. **Event Info**

The event is to be held in the RAL recreational society building. This building has great facilities and it avoids the need to come onto site, which has simplified the event organisation considerably.

Test Facilities

The test facilities are one of the main reasons for holding the RT at RAL. As usual what we can measure will depend on what equipment is actually available on the day.

- Power meter with heads for up to 3W to 18GHz in coax, with WG20 (24GHz) , WG24 (47GHz) **at 100mW max.**
- A 7 GHz Spectrum Analyser - sorry the 30GHz analyser has developed a fault.
- A 26 GHz Signal generator
- A Noise figure meter to 24 GHz and also able to do ENR estimation. If you want a record, bring a floppy disk!
- Various PSUs up to 20A @ 30V

*** Remember to **bring all the power supplies, leads and tools you need!** ***

Refreshments and Lunch

There is a full licensed bar in the building. We also plan to have some cakes. We will arrange for sandwiches if there is sufficient demand – so let us know.

The Round Table - Sunday 21st August 2011

1030	Doors open
1030-1200	Informal socialising/testing/surplus swap tables
1230-1330	Lunch:
1400-1445	Lecture 1: Ron, G7DOE
1445-1530	Lecture 2: Andy Talbot, G4JNT - Using PICs in Amateur Radio
1530-1545	Tea Break
1545-1630	Lecture 3: TBA
1630	Event closes.



Activity News

from the world above 1000MHz

By Robin Lucas G8APZ

The new format of this column has seen the Contests and Activity reminder moved elsewhere in Scatterpoint, so I now have some more space to fill to replace it!

Mind our mast....!

The well known contest site used by M1CRO/p (and on lower bands by G0VHF/p), is at Walton on the Naze in Essex (JO01pu). Very often during a contest weekend, we see a regular visitor in the form of an Air Sea rescue helicopter.

They seem to use the WWII concrete pillboxes (no longer on the cliff top having fallen onto the beach due to coastal erosion) to hover over, and sometimes as a target to land a crew member on for regular practice.

The members of the Colchester group are used to the arrival of the helicopter but we still leave the tent to watch it! The noise of a Sea King's engine and rotor 100m away makes it hard to hear weak signals anyway! We used to worry about our antenna masts being so close to the helicopter, but they are well aware of our presence, and the crew often do a lap of the mast and wave to us from the open door!

My thanks to John, G4ZTR who took the photo. It was taken during the 6m contest, but we also had a visit during the March IARU contest. Unfortunately, I cannot find the memory card with my own photos on it.



Optical Communications

From: Gordon Fiander, G0EWN

A number of people are now experimenting with optical as well as IR frequencies during daylight. Despite references in the literature to 'daylight receivers' no references could be found to distances worked. G8AGN and G0EWN decided to investigate possibilities and have made 3 'daylight' contacts; 600m at 59+, 10km at 59 and a 20.7km path from Emley to Edgemount with signals of 52 both ways in bright summer sun (a UK daylight record?).

At the moment G8AGN and G0EWN have chosen to define a daylight contact as being local noon +/- 2 hours, rather than a much less stringent dawn-

to-dusk definition. (In fact some paths worked in the past would have possibly counted as daylight, under a dawn-dusk definition, as signals were heard just as the sun went down).

As usual, since starting these tests we have now become aware of a daylight 21.5km path having been worked in the USA. This may be the current world record for a daylight contact with visible light/red LED. However this should be capable of being exceeded, and unlike night time contacts, where high mountains and deserts feature in the very long distance records, there should be a much more level playing field with daylight contacts.

STOP PRESS!

This lunchtime [27 June], Gordon and I managed (just!) to work over a 25.2km path using our standard optical rigs with A4 Fresnels. After setting up, Gordon quickly took speech from me at 5 and 4. Then, I struggled for about 45 minutes to see his Luxeon K2, let alone hear it! Eventually I managed to find it using 7x50 binos but it wasn't very bright and hardly visible in the rig spotting scope which has a smaller aperture. We think that this was due to Gordon's batteries being well under voltage (he forgot to charge them). Eventually I managed to copy him 4 and 1 on speech but only because I was wearing headphones to cut down the wind noise and I had KA7OEI's PIC hum filter switched in! The path was definitely LOS but as it's been very hot for the last couple of days, the atmosphere is hazy. Also, there was strong scintillation as the path crossed the Sheffield city centre.

73 Barry, G8AGN

PS we think this MIGHT be [have been? Ed.] a world record.

June 23cm UKAC

Ray, GM4CXM (IO75tw) is a regular participant in the monthly UK Activity Contest

with his 150W and 4x44 ele antennas. The June session took place on 21st June.

At the start of this session, a switching problem lost him some 10 minutes, but with the help of air-checks with Alan, GM0USI, the problem was resolved.

OZ1FF and OZ9KY alerted Ray to the same aircraft for the opportunity of an aircraft scatter contact, but despite switching between both their frequencies rapidly, only Kjeld OZ1FF was audible for a quick and comfortable contact.

A contact followed with a new addition to the Scottish microwave scene with the welcome appearance of John GM7OIN in Ayr, running 10w to a 44el Wimo yagi.

Another aircraft scatter contact was made with Hans PA0EHG, with a very good signal, and Hans was followed by three long range weak troposcatter contacts with John G4EAT, Mike G0MJW and Phil G3TCU.

The final hour was a lot quieter but provided multipliers in IO74, IO84, IO86, IO93 and JO02.

June low bands contest

From: Robert Price, G8DTF, IO83

I started about three hours late, because of the weather, but I did manage to get my antennas up eventually.



On 23cm, I worked G0BWC/p (IO83), GW8ASD (IO83), G3ZME/p (IO82), G3TCU/p

(IO91), GM4CXM (IO75), GM4JR (IO85) and MW1FGQ (IO83).

I later realised that I had sent the wrong serial number to Andy GM4JR as I had logged it on the 13cm page of the log. The antenna was a 44 ele WIMO with a 2.5:1 SWR and power about 3.5W.

On 13cm I worked GW8ASD (IO83), G0BWC/p (IO83), GM4CXM (IO75) and MW1FGQ. This is the first time that Ray, GM4CXM and I have managed to complete a QSO on 13cm. The antenna was a 62 ele yagi and the power about 10W.

On 9cm I worked G0BWC/p (IO83) and G3ZME/p (IO82). The contact with Ross (operating G0BWC/p) was very marginal over an 11km path, because of the low power level at Ross's end (only 5mW) and this using FM as well with a varactor multiplier. The antenna here was an 80cm dish and power about 5W. It was worth the effort of putting the antennas up to be able to work Ray on 13cm and get a couple of QSO's on 9cm.

73, Bob, G8DTF

Microwaves from EA

In the June column, I reported that Ralph G4ALY (IO70vl) had worked EB1RL/p (IN83fd) on both 6cm and 3cm at a distance of 813km.

Guy, F2CT was with the Spanish team, over the weekend of Sat/Sun 4-5th June, providing some equipment, and mentoring. I have based the following on my translation of his report:

...Picon Blanco is an extraordinary site in the proper sense of the term, at 1560m altitude and 40km from the Cantabrian coast (the coast from San Sebastian towards Santander).

The weather conditions were extremely changeable. On the Saturday afternoon, it was cloudy, with a northerly 30 km/h wind, dense fog and the temperature dropped to 6°C and then at about 20:00 it was sunny. On Sunday morning, there was a sunny cloudless sky, no wind, and a temperature of 20°. By

13:00 there was a thunderstorm with torrential rain until 14:00, then dense fog and thunderstorms again! All these changes in weather affected the propagation which changed from excellent to zero!

Saturday afternoon was a real treat on 6cm and 3cm with several QSOs over 800km via tropo and rainscatter. Claude F9OE/p was the first contact, with a superb signal on 6 cm at 580km!

On Sunday morning conditions were excellent up to 23 cm, but significantly worse on 13cm with nothing in excess of 500km, whereas at the end of the contest on 6cm, we contacted another 2 stations at 800km on tropo!

Almost all of the 6cm and 3cm stations in the Paris area have now contacted Spain, and this time we even contacted Ralph G4ALY "officially" on 6cm and 3 cm via tropo (820km) for a first official G/EA on 6cm and 3cm!

The team consisted of Luis EA2BFM, Mari EA2ASB, Paulito Javier EA2TO, and Iñaki EB1RL. Iñaki promised me he would soon be equipped with 10 GHz!

The only downside is that the site is a former NATO military base with ruined buildings which are squatted by cows and wild horses. When the fog lifts, the view of the Cantabrian coast through the Pyrenees to Spain is quite magnificent!

The QSO details for EB1RL/p on each band were:

2.3GHz: Just four QSOs with very disappointing tropospheric conditions, and an incomplete QSO with Jean-Noel F6APE at 521km.

5.7GHz: Eleven QSOs at an average of 634 km! Best DX F5KMB and F6DWG/p in JN19 at 836km and 820km respectively, with G4ALY in IO70 for the first official G/EA.

10GHz: EB1RL/p, 17 QSOs, at an average of 687km! Best DX: F5KMB and F6DWG/p in JN19 at 836km and 820km, with G4ALY (813km) in IO70 for the first official G/EA.

24 GHz: a single negative test with F6KNB at 320km despite an impressive 10GHz signal but we were in fog!

A forthcoming expedition is planned for Pico Tres Mares at 2000m asl, and also IN73ta for the IARU U/SHF in October 2011.

73, Guy F2CT/IN93FL

EME 13cm/23cm

During two recent Dubus contests on 13cm and then 23cm, G0EWN tested the receive side of what will form an EME system using a 2.4m dish with separate square septum feeds. During both contests plenty of CW signals were heard on both bands, which is promising as much more optimising remains to be done. G3LTF was an easy CW copy on 13cm and on 23cm DL0SHF, G4CCH and F2TU were good CW signals. Once some switching and cable run issues are sorted, G0EWN hopes to be active on these two bands for EME.

Beacons

Ralph, G4ALY (IO70vl) has been running some tests with F5EJZ Jean-Paul in IN98BQ to test the coverage of his new 13cm beacon which is on 2320.9350 MHz.

It was beamed towards G4ALY at a distance of 264km since nobody had offered to do any serious monitoring in France other than one station at 79km. Ralph spent fourteen days with his SDR locked onto the beacon during daylight hours, and was only getting aircraft reflections until 3rd June when the conditions lifted it above the noise and it became a good solid trace with audio. The beacon sends "Beacon F5EJZ JN27ur" (the wrong locator) – possibly relating to the previous location.

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

scatterpoint@microwavers.org

The beam has now been directed towards Paris for further testing, but it is not certain what the eventual callsign will be.

...AND FINALLY

I am currently F1VJQ (IN95ol) with 6m, 2m, 70cm, 23cm, and 3cm. Do look out for me! For quite some years now, I have collected items for various 10GHz and 24GHz projects.

I built a 12GHz local oscillator from a DB6NT kit which was to be used to get on 24GHz, but subsequently bought ready built units, making it surplus to requirements.

I had also built a G8ACE OCXO for use with a 10GHz transverter, but along came the DB6NT MkIII transverter with built in PLL, so the OCXO was shelved. I had also hoarded some other items such as sectoral horns, short sections of waveguide, bulkhead waveguide flanges etc. These were often opportunistic purchases on eBay in case they ever came in useful.

When the UKuG Reverse DDS kit became available, I decided to build one. Since the RDDS not only has the ability to control the frequency of an OCXO but can also generate JT4g, my thoughts turned to a 24GHz personal beacon.

Since I had most of the parts I would need for a beacon, I ordered a crystal and, with much assistance from Brian G4NNS, an IDU and ODU have been constructed.

The beacon has been on test for a week at my QTH and has performed well. After the ODU is weatherproofed, my intention is to put it into service at the end of September.

With the change in the production of Scatterpoint, I have to complete this column by 1st of the month, so the deadline for your input is earlier than that. I'd prefer to get emails from readers during the month, rather than waiting until the end of the month!

73, Robin, G8APZ

Events calendar

Jul 29-31	Amsat-UK Colloquium, Holiday Inn, Guildford, Surrey	www.uk.amsat.org/Colloquium/
Aug 13-17	IARU Region-1 Conference, Sun City, South Africa	www.iaru2011.org.za/
Aug-21	RAL Roundtable	10:00 AM Natter and testing; Lectures from 1pm to 4pm
	Rec Soc building as 2010. We will not be using the RAL site so there is no need to register for security but Mike Willis would like to know how many people to expect. http://www.g3pia.org.uk/	
Sept 10	56.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 11	Crawley Roundtable	awaiting details
Sept 30 – Oct 1	National Hamfest	www.nationalhamfest.org.uk/
Oct 7-9	RSGB Convention, Horwood House, Milton Keynes	www.rsgb.org/rsgbconvention/
Oct 9-14	European Microwave Week, Manchester	www.eumweek.com/
Oct 13-16	Microwave Update, Enfield, Connecticut, USA	www.microwaveupdate.org/
	Crowne Plaza Hotel , 1 Bright Meadow Boulevard, Enfield, CT 06082,. Rooms \$99. Sponsored by N.E.W.S. Group. This is where the Eastern VHF/UHF Conference has been held for the past 10 years. Additional info email n2liv@arrl.net and w1ghz@arrl.net for details.	
Nov 5	Scottish Microwave Round Table	www.rayjames.biz/microwavert/
2012		
Aug 16-19	15th International EME Conference, Cambridge, UK	eme2012.com
Oct 29 – Nov 2	European Microwave Week, Amsterdam	www.eumweek.com/

Contests & Activity Dates

July		EME Activity weekends
17 Jul	0900 – 1700 24/ 47/76 GHz Contest (New Format)	2–3 July 3.4GHz loss 0.8-0.4dB sun separation ~10°, declination 19-13°
19 Jul	1900 – 2130 1.3GHz Activity Contest Arranged by VHFCC (RSGB Contest)	30–31 July 5.8GHz loss 0.7-0.4dB sun separation ~ 4°, declination 17-11°
26 Jul	1900 – 2100 2.3GHz+ Activity Contest Arranged by VHFCC (RSGB Contest)	
31 Jul	1000 – 1600 3rd 5.7GHz Cumulative	FRENCH JOURNEES d'ACTIVITE (JA) Activity dates cover all bands from 23cm up.
31 Jul	1000 – 1600 3rd 10GHz Cumulative	
31 Jul	1000 – 1600 3rd 24GHz Cumulative	
August		
7-Aug	0900 – 1700 Microwave Field Day New Event	30-31 July Activity weekend 31st matches UKuG
16-Aug	1900 – 2130 1.3GHz Activity Contest Arranged by VHFCC (RSGB Contest)	27-28 Aug Activity weekend
21-Aug	1000 – 1600 4th 5.7GHz Cumulative	24-25 Sept Activity weekend 25th matches UKuG
21-Aug	1000 – 1600 4th 10GHz Cumulative	29-30 Oct Activity weekend
21-Aug	1000 – 1600 4th 24GHz Cumulative	Duration of all JA is 1700 Saturday - 1700 Sunday
23-Aug	1900 – 2100 2.3GHz+ Activity Contest Arranged by VHFCC (RSGB Contest)	

The RSGB 2011 VHF+ Contest Calendar is available at www.rsgbcc.org