



An Amateur Radio publication for the Microwave enthusiast

MICROWAVE NEWSLETTER

Published by the Radio Society of Great Britain and edited by G3PHO and G8AGN.

Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE

FROM THE EDITOR

2002 – SEPTEMBER

Many thanks to all our contributors this month. Without you there would be no Microwave Newsletter!

There have been some exciting happenings over the past weeks. This issue details new record breaking contacts on 24GHz and 76GHz. While the former used equipment seemingly out of reach of the "normal" amateur microwaver just remember that it's not that long ago that most of us thought we would never have more than a watt on 10GHz. Five to ten watt stations are now commonplace on that band and we feel sure that such power levels will eventually find their way into our 24GHz stations. Meanwhile we must all try to use what we have and extend our knowledge of the millimetre wave bands. At the lower end of the microwave spectrum, on 3.4GHz, it's now much easier to obtain power outputs in excess of ten watts, at very reasonable cost. Cheap, surplus SSPAs are readily obtainable in the UK, easily driven by a DB6NT 3.4GHz transverter.

As winter approaches it's time to review the past year. Activity levels have certainly dropped quite markedly. What are we all going to do about it? Please try to come on a microwave band at least once a week. Monday night is activity night, remember? **Don't forget the remaining contests either ...**

**22 September (10GHz)
6 October (Multiband)
27 October (Millimetre Bands)**



Contents

- Martlesham uWave RoundTable
- Beacon News
- For Sale and Want ads
- Useful websites
- Report on the Prague EME Conference
- A Simple Dot Generator/Keyer
- The Repair of the Input Mixer of the HP 8555A Spectrum Analyser
- UK 76GHz DX Record Broken
- New World 24GHz Record
- Weinheim 2002 - report
- Activity News

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



G3PHO: Peter Day

0114 2816701

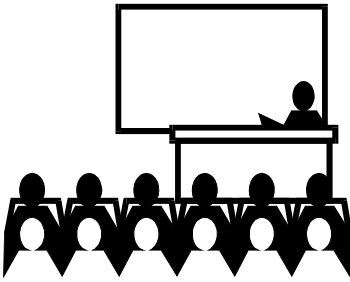


G3PHO: Email: g3pho@qsl.net
or p.day@virgin.net



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

SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO RSGB HEADQUARTERS AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE AND NOT TO THE EDITOR ..



Martlesham Microwave Round Table 2002

9th – 10th November 2002

Programme:

Saturday 9th November

Radar Museum

We have arranged a visit to the RAF Air Defence Radar Museum at RAF Neatishead near Norwich.

Space is limited to a party of 20 maximum so please book early to avoid disappointment. The visit will cost £3 per person. You can find more details and a map at www.neatishead.raf.mod.uk

Evening Dinner

We have arranged a 3 course informal dinner for Saturday evening, at a new venue this year, the County Hotel, Copdock, Ipswich (Just off the A12).

Please book early using the online booking system at <http://www.btinternet.com/~jewell> at as we are limited to 30 places maximum. You will receive an email acknowledgement of your booking. If you do not have Internet facilities then please **write to G3XDY** at the address shown below.

Accommodation

We have a block of rooms available for the Saturday night at a new venue, the County Hotel, Copdock, Ipswich, at the following concessionary rates:

Single Room, B&B, per person: £38.50

Twin/Double Room, B&B, per person: £28.50

Please book direct with the hotel on 01473 209988, quoting "Group No. 784" to gain the concessionary rate. More details can be found at :

www.regalhotels.co.uk/countyipswich

Sunday Programme:

Microwave Round Table, Adastral Park, Martlesham Heath, Ipswich IP5 3RE

For security reasons, **visitors must be pre-registered at least 7 days** before the event. If possible, please use the online booking system to register. You will receive an email acknowledgement of your booking.

A limited number of tables are available for **fleamarket** traders at £5 per table. Please contact G3XDY to book.

The Round Table will open at 9.00 am and the talks programme will commence at 10.45am. In addition to the usual technical talks, there will be an opportunity to review the microwave contest programme, and the UK Microwave Group AGM.

09:00 Roundtable opens

09:30 Test gear available & Flea Market

10:45 Talks programme

10:45 Welcome and Opening, Graham G4FSG

11:00 Talk1 - Chris GW4DGU on Crystal Oscillator design

12:00 Talk 2 - Paul W1GHZ on Microwave Antennas

13:00 Lunch break

14:00 Talk 3 - Grant G8UBN on 'New components for Amateur Microwaves'

15:00 Microwave Contest Forum - Moderator Peter G3PHO

15:45 UK Microwave Group AGM

16:45 Close

17:00 Event Closes

Refreshments including tea, coffee, and filled rolls and cakes will be available throughout the day.

All enquiries should go to:

John Quarmby, G3XDY

12 Chestnut Close,

Rushmere St Andrew

Ipswich

IP5 1ED

Tel: 01473 717830

Email: g3xdy@btinternet.com

GB3NWK Microwave Beacons Closed Down

These beacons, located near Orpington in Kent, have been off the air for several weeks. We have now been informed that the two beacons, which operated on 1296.810MHz and 2320.85MHz, will not be returning to service. Changes to the status of the site where the beacons are located has meant that it is no longer suitable for this purpose. Therefore, after 20 years of operation on 23 centimetres and 16 years on 13 centimetres, these beacons are now closed down permanently.

The Newsletter has not received any further information but it is hoped that the beacon equipment might eventually become operative again from a different location, not necessarily in Kent.

MAKING A SLOT ANTENNA?

Here's a website site at which, you find all you ever wanted to know about slot antennas.

<http://www.uni-duisburg.de/FB9/HFT/home-eng.html>

73 from Andrzej, PE1ROE (ex SP9BPS)

DISH FOR SALE

2.5m (nominal) prime focus dish in four segments to bolt together.

Sturdy GRP construction, f/D approx.

0.4, weight 60kg. No feed, supports or mounting hardware.

Recommend collection from Stockport, Cheshire or otherwise carriage at cost..

£50 ono

Julian, G3TFR, Tel.0161 431 9761

IS YOUR RF BEING RADIATED?

**To be sure, you might do what
G1MPW has done ... read on..**

Maplins sell a "Spy bug detector" (Catalogue ref VH79L) at the R.R.P. of £9.99 , but reduced to £4.99 in their sale when I got mine! Although only rated up to 2.4GHz, they give an indication when held near the feed horn on 10GHz and provide an easy and not too expensive way of checking that the 10GHz tx is working .

73 from Steve Cooke G1MPW

DO YOU NEED A TEST EQUIPMENT MANUAL?

Check the Army Logistics web site at <http://www.logsa.army.mil/etms/welcom1.htm> . They have many HP and other manuals for commercial and military versions of test equipment. To download manuals in pdf format, you will have to register (click on the Request ETRM Access button). Most, but not all, manuals are downloadable (some apparently need some sort of additional password).

Go to the ETM Search page and search for manuals using "TM Title Text". The titles of their database for manuals are quite extensive and include both the military document number and the description, military part number and usually the commercial part number and manufacturer. For example, I searched on 4800 and found 6 items. One was for the HP-4800A 4801 Plug-In.

If you search for Power Meters, you will find manuals on most of the HP power meters from the 431 series through to the 437.

It's a very useful site and you're very likely to find the manual you're after for the price of a fairly large download and then print out the pages you need.

73, Harry, W3IIT

SOS FOR 3cm gear from David, GM4WLL

If there is a Microwave Newsletter reader who has a spare transverter to loan I'd be happy to give it a try in a few 10GHz contests and see if we can't lift the game from this end of the country. I've an offset dish sitting in the garage awaiting a use....**73 de David GM4WLL**

gm4wll@talisman41.freemove.co.uk

10th International Amateur Radio Moonbounce Conference

- EME 2002 -

Prague 16 - 18 Aug 2002

Dave, DL4MUP/G4HUP, tells of his recent visit to the EME 2002 conference. EME and microwaves go together very nicely, as this report shows

As many people around the world observed, tremendous destruction and damage recently took place in Prague and other European cities due to flooding. I was beginning to wonder whether it was wise to travel to the city for this event, as I'm sure a number of others were! However, since the waters started to recede a couple of days before the conference, we set off, with assurances from the organisers that there was no risk at the conference location! Obviously others had the same view, since the attendance was the highest ever, at 101 participants and approximately 75 accompanying wives and families. Including the organizing team, there were about 190 people involved in this event! Countries represented included VK, JA, W, VE, UA, G/GM, PA,DL,OK, HB9,YO,EA,I,OE, S57,LX,SM, OZ, SP,F,SV (apologies for anyone I've missed!)

Travelling by road from Munich, we saw that the Danube at Regensburg was still high and had previously burst its banks. In Pilzen we saw that the river there had been about 8 feet over its banks, and must have cut off the main road through the town - since the motorway does not yet extend round the town, this would have been a major source of congestion!

The event was organised as a self-contained event - accommodation, food and conference facilities all under one roof in the Hotel Krystal on the western outskirts of Prague, near the airport. It is a large building with about 18 floors and had the facilities all on the ground floor. By the style of the building and its likely age, is it most likely a remnant of the former regime in the Czech Republic - nevertheless it proved to be a most suitable and comfortable venue. After registration and dinner on Friday, a sightseeing tour was arranged. We only visited the 'higher and drier' parts of town, around the castle and cathedral are but with a good panoramic view down onto the Karlsbrücke (Charles Bridge) where we could see that the water was still high up the banks (by this time the streets in the area were dry). Although well into the evening, we saw some very picturesque buildings and statues, including the official Presidential Palace. Many of these buildings were from the 14-16th centuries. We also experienced the Changing of the Guard ceremony at the Castle (which includes the Presidential Palace, St Vitus Cathedral and other interesting buildings. Unfortunately the Jewish Quarter, Old Town Square and St Wenceslas Square were unreachable - this was a shame for the many people for whom this may be their only visit to Prague, as they are well worth seeing.

And the event itself? - There was an excellent set of technical papers covering Noise Figure Optimisation, Antenna Tracking (G8MBI/F5VHX), Circular Polarised Feeds (OK1DFC), Stress Dish design (K2UYH), Seti(N6TX), RF Radiation Safety(VK3UM), Linrad (SM5BSZ), JT44(K1JT), TWT Testing(S57UUU) and the progress on 24GHz EME and above (VE4MA). The CP Feed presentation was particularly interesting to me, having been working with the N7ART Diagonal Waveguide feed over the past 10 months. This design is similar in concept but replaces the adjustable polarizer screws with a septum transformer plate, virtually eliminating the setting up. Also very interesting and useful were the Linrad & JT 44 presentations and the novel TWT tester design.

Discussion sessions were also held - lively at times! Operating procedures for 432MHz up session was moderated by G3SEK, and a discussion on how to address the different regional frequency allocations on 13cm EME was chaired by G3LTF.

Whilst the technical session and discussions were taking place on the Saturday, the OK team were also busy measuring the vast array of preamps, etc, that had been brought along for the NF measurement contest - some 41 units in all, covering all bands from 144MHz to 10GHz! The results were presented at the gala Dinner on Sat evening - an event which was a casualty of the floods, since it was supposed to have taken place in a local chateau which had been flooded out. The alternative dinner in the hotel was an excellent substitute, even though it must have hastily arranged!

Along with the extended tombola (I've never seen a raffle with so many prizes that the callers need to take breaks before!), an excellent evening was had by all. It was better for some than others since rumour has it that Austrian flea markets will be kept going for years on the proceeds of that tombola!

Sunday morning saw a visit to the Norodni Technical Insititute, the science museum in the city, ostensibly to visit the telecoms and astronomy sections but I think most of us managed to fit in a number of the other sections as well! There was, of course, much discussion over how some items worked, often with surprising input from various members of our party who, in one role or another, had worked with/seen/or used similar things during their lives. An excellent example was Peter, G3LTF. When we came across a strange looking machine with a clockwork motor, a carriage into which shaped brass blocks could be mounted and a contact switch which read the profile of the blocks, we fairly quickly worked out that this was an automatic CW sender, capable of sending a short message at a constant (and probably high) speed. Peter observed that his early MS work was done using a similar mechanical method of generating the CW, using a disc (because he needed repeating messages) and an opto switch arrangement for detection!

Returning to the event, Sunday focussed on discussions - agreeing proposals for circular polarization as the standard for 23cm up to 10GHz and discussing how digital modes should be integrated into use for EME, in respect of frequency management and also scoring/record keeping. As can be imagined, this was at times a very 'lively' and emotional debate, with some fairly 'entrenched' views. Nevertheless, the general consensus was positive, in recognising that we as EME operators are facing an issue which also affects the rest of the hobby - frequency co-ordination is the responsibility of IARU - in how to cope with 'non-traditional' modes. JT44 use on EME has brought up this issue, but the debate is much wider than being about JT44! It was agreed to put in place a recommendation for EME frequency planning of JT44 type contacts until such time as IARU issues a band plan addressing this. The recommendation was that on 144MHz JT44 CQ calling is on 144.150, with sked activity between 160 and 190. For 432 and 1296 MHz, the recommended calling freq is .044, with sked activity between .075 and .095. the main driving concern for all three bands was to keep the activity windows below the US SSB calling freq's (.200 on 144, and .100 on 432/1296, respectively).

And finally - where is EME 2004? Thanks to a generous offer from AI, K2UYH, it looks as if it will be in Trenton, New Jersey - about 40 minutes drive from Philadelphia and about an hour from Newark NJ airports.

In conclusion, and having attended many professional and amateur conferences over the years, I would like to thank the OK team for the efforts they put in to make this on of the very best events that I have ever attended - in spite of the difficulties that must have arisen due to the floods. They have set a very high standard for others to emulate!

Dave, DL4MUP/G4HUP

HELP WANTED

G8ACE needs loan or copy of Manual for Ailtech 75 Automatic Noise Figure Indicator. Version with +28v Noise Diode supply circuitry to update his old +20v unit.

Email John Hazell, G8ACE at hazell@dsl.pipex.com

NEW 10GHz ATV REPEATER NOW ACTIVE

From: G8DVP, Ken Roberts
[airzoneavionics@btopenworld.com]

I live in Birdwell, near Barnsley in South Yorkshire, and I operate on 24cms ATV, often using GB3YT repeater for central activity. I thought I would let you know that the 10GHz repeater at the same site in Queensbury has become operational. Input is 10.240GHz and output is on 10.425GHz

73 from Ken G8DVP

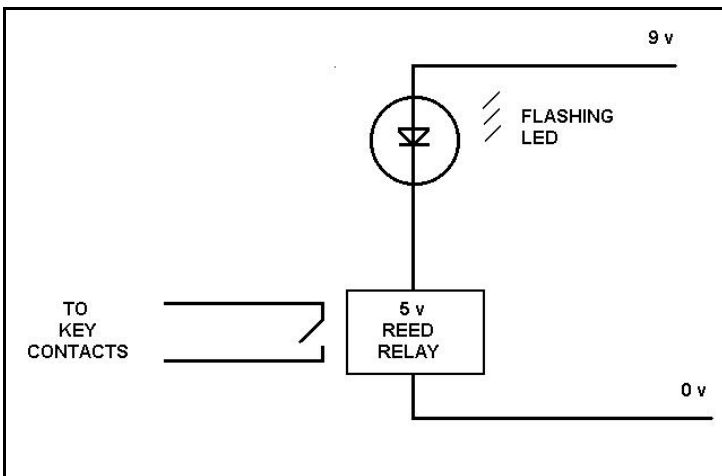
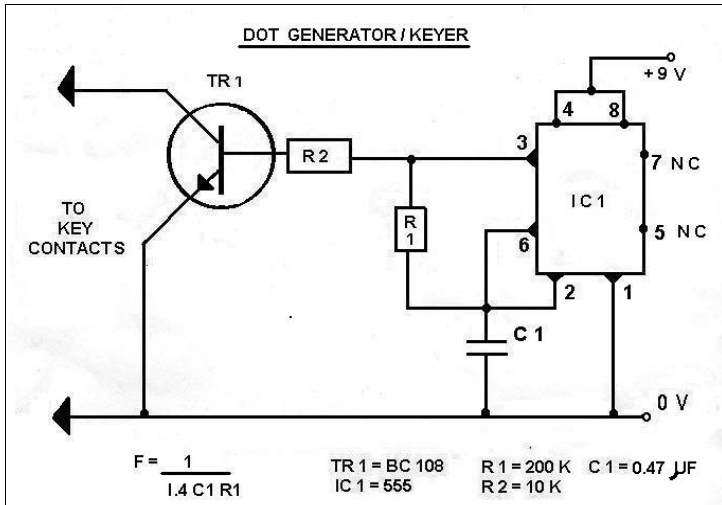
SIMPLE DOT GENERATOR/KEYER

~ by Steve Cooke, G1MPW

Having decided that some sort of keyer was needed to pulse the carrier on 10GHz , I came across the basic astable circuit and added the switching transistor to key the carrier on and off. The switching rate is given by $F = 1/1.4 C1 R1$. With the values given (200k and 0.47uF) it produces rapid dots .

The " simple circuit " was a bit of an after thought but seems to work fine but at a slower rate of about 2Hz .

On the FT290 it is necessary to close the PTT switch as well as the key contacts to TX a carrier in the CW mode . I wanted to use a non-locking push button switch but Double Pole varieties don't seem to be available so I used a small reed relay connected across the 555 timer + and - to provide the extra contacts needed for the PTT.

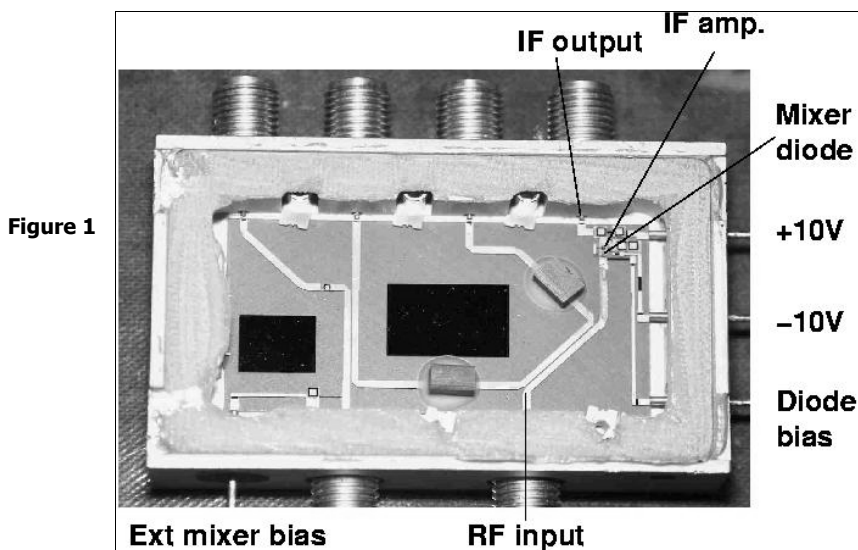


The Repair of the Input Mixer of the HP 8555A Spectrum Analyser

Brian W Flynn GM8BJF

Recently I noticed that the sensitivity of my much prized HP 141T/8555A spectrum analyser had dropped rather drastically. I feared that the input diode had died for some reason and a d.c. check of the mixer diode, as described in the service manual [1], confirmed my worst fears. The diode was short circuit.

After a period of dejection I considered methods of repair. The first mixer is a thin film microcircuit which HP replace as a unit of it is damaged. There is also a small plug-in PCB assembly which contains select-on-test resistors, used to set the mixer bias and the 50MHz IF amplifier gain, to define the calibration of the unit. This PCB is changed along with the mixer. Deciding that there was little to lose, I removed the lid from the mixer package. The mixer substrate is housed in a gold-plated metal case with a lid which is held in place with conducting epoxy adhesive. The lid can be removed by carefully prizing it off using a small screwdriver as a chisel while holding the mixer unit in a vice. This revealed the circuitry on the substrate shown in **Figure 1** below.



The mixer diode is a chip device which is bonded to the substrate and the post mixer amplifier is a grounded base bipolar silicon transistor. The mixer diode output drives directly into the emitter of this transistor, presumably to give a good broad-band match to the mixer diode output impedance.

Initial attempts to replace only the mixer diode with a surface mount packaged device were unsuccessful. For this to succeed wire bonding facilities would be necessary. The next attempt was to replace all of the active circuitry as per the simplified circuit diagram shown in Figure 8-12 of the service manual. This was not very successful as the sensitivity dropped drastically.

The alternative approach adopted was to replace all of the active circuitry with the circuit shown in **Figure 2**, fabricated with surface mount components. The first step was to ground the two common leads to the ERA2 to the earth point on the substrate. This was achieved by careful soldering with a fine bit. Once the ERA2 was in place, the bond wires to the package connections were broken so that connection could be made to them.

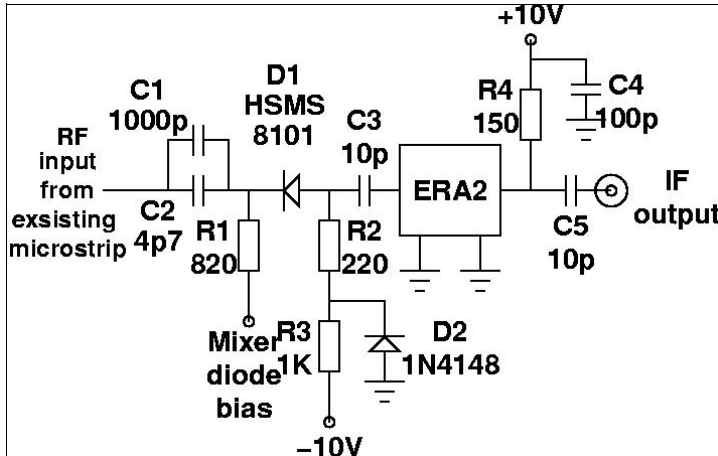


Fig. 2

The ERA2 amplifier operates as a IF 2GHz pre-amplifier and provides a 50 ohm termination for the mixer diode. The HSMS-8101 is a Schottky barrier mixer diode which is available from Farnell. The capacitors C1 and C2 could be omitted if use can be made of the existing component mounted on the input microstrip. Attempts to

solder to it were unsuccessful and resulted in its destruction, hence the use of C1 and C2. These were paralleled to give a broad band capacitor as the instrument operates from 10MHz to 18GHz. It would be preferable to retain the original part in circuit to maintain the response of the instrument at the lower frequency end of its range. The resulting modified mixer is shown in **Figure 3**. The result is not pretty, but it meant that the unit became usable again, (even if HP/Agilent would not approve of the accuracy!). The ground connections to C4 and D2 were made directly to the metal case with conducting epoxy. They were first soldered in place, in contact with the case, using the solder connections to locate them. The ground connections were then formed with sparing "blobs" of conducting epoxy.

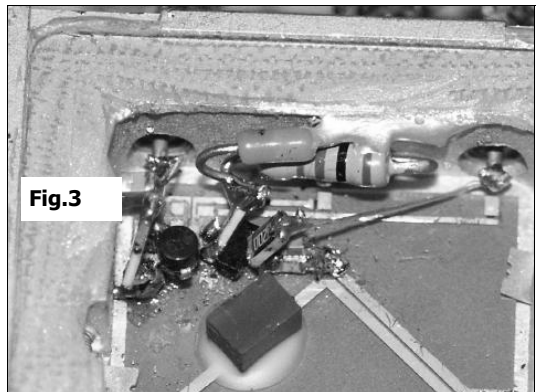


Fig.3

Mixer Bias

The mixer is operated as a harmonic mixer to get the wide tuning range. It operates up to the fourth harmonic of the 2 – 4GHz YIG LO. To optimise the conversion loss the dc bias applied to the diode is set for each harmonic. This is controlled by fixed resistors mounted on the daughter board assembly A10, which is mounted on plug-in board A6. Experimentation with the resistor values can improve the sensitivity. This was achieved by temporarily replacing the appropriate resistor with a 4k7 variable and varying it for best sensitivity on a suitable signal and then re-fitting a suitable fixed resistor.

Performance

The repaired mixer gave reasonable performance over the full range of the instrument. The amplitude calibration is not as good as it once was, but is within 2-3 dB on all ranges. To complete the calibration the resistors controlling the IF amp gain on the A16 assembly would repay attention. When time permits these will receive attention. After testing, the lid was replaced using more conducting epoxy.

Conclusions

This procedure was able to bring an otherwise useless piece of equipment back to life and allow it to be useful for amateur work. Manuals for the 141T mainframe and most of the plug-ins can be downloaded from the website:

http://www.logsa.army.mil/etms/find_etm.cfm and can also be found at:
<http://recordist.com/pdf>

Unfortunately, the full manual for the 8555A is not publicly available on these sites but a none-the-less useful manual giving drawings and component locations and values can be had. The full operation and service manuals for the other 141T plug-ins, preselectors and tracking generators are available. There are also manuals for other items of test equipment available if you search the site. Be warned they are large files!

Reference

1. Spectrum Analyser RF Section 8555A, Operating and Service Manual.
Hewlett-Packard Company, Santa Rosa, USA, 1971.

Acknowledgments

The author wishes to thank Peter, GM4DTH for taking the photographs.

Parts listing

R1 820 0805
R2 1k 1/8W axial
R3 220 0805
R4 150 1W surface mount Farnell 507-878
C1 1000p chip
C2 4p7 ATC100A
C3 10p chip
C4 100p chip
C5 10p chip
D1 HSMS8101 Farnell 994-649
D2 1N4148
IC1 ERA2 Mini-Circuits

New GB3MHS 3.4GHz Beacon

From John, G3XDY, we learn that the licence for **GB3MHS** on **3400.830MHz** on the Martlesham site (JO02PB) has now come through. The transmitter is complete and on soak test and, thanks to Mark GM4ISM, they have two slotted line antennas ready to go up on the tower in the next few weeks. The beacon transmitter produces about 12W after the output filter so, taking feeder losses and antenna gain into account, it should give about 75W EIRP. The antennas have 120 degree horizontal beamwidth and will beam 090 and 270 degrees. It is expected that to be operational before the end of September, with the **upgraded GB3MHX** beacon back in service at the same time.

UK 76GHZ DX RECORD BROKEN ONCE AGAIN

On the 1st of September 2002 successful two way contacts were made on 75976.2¹ MHz between **G3PYB/P** located near Ventnor, Isle of Wight and **G8BKE/P** and **G8ACE/P** located near Highclere to the west of the A34 and south west of Newbury, Berks. **The distance is 79.6km.** Contact between G3PYB and G8ACE was on NBFM² and between G3PYB and G8BKE on NBFM² and CW (G8BKE)³. The success in making this contact, thought to be a new UK distance record for this amateur band was we think due to favourable humidity conditions prevailing on the day.

Attempts during 2001 were by and large prevented by the Foot & Mouth restrictions. During earlier 2002 attempts the weather conditions were either unfavourable due to rain or excessive humidity often above 80-90%. G3PYB measured the humidity as low as 39% during these recent tests. The BBC web weather information gave humidity values of 58% for Ventnor and Newport IOW, 43% for Southampton and 35% for Andover and Newbury for 1400GMT, all significantly lower values than we had experienced before. The attenuation at these frequencies is significantly affected by water vapour. Earlier experiences show that, in choosing a suitable test path, a K value of 1 is much more likely to lead to successful exchange of signals rather than K=1.33. Additionally, when examining possible path profiles, at least 20 metres of clearance has been found necessary between any intervening high ground and the LOS path to avoid penetration of the fresnel zone by trees and buildings. These constraints mean that few long paths from accessible sites in the South of England will meet the concluded criteria for successful communication at the limited transmit power levels we can obtain.

Notes

1. UK preferred frequency for narrow band operation. 75976 - 75978 MHz.
2. G3PYB and G8ACE use Impatt diode transmitters producing a mW or two of power.
3. G8BKE uses a beam lead diode multiplier transmitter producing a little less power than the Impatt devices.
4. Receivers are based on the DB6NT design using anti-parallel beam lead mixer diodes.

MURPHY VISITS F1GHB AND HIS BEACON!

I have had a visit from Mr Murphy (!) and now have some problems ...

The F1XAP beacon is based on a 1152 MHz PLL and it is true that the phase noise affects the signal. It explains the wander some UK stations have noticed . We have made this choice of oscillator recently (the beacon originally used a G4DDK oscillator) to have better stability and to be a frequency reference. Now it's a fact that we are actually facing a problem, with the 3 beacons on this site based on a single reference oscillator. We don't know yet if it is a problem of temperature at OXCO's power supply in the PLL (sometimes the beacons come back to normal) or a problem of power supply. Recently, the VHF repeater on the same site and with the same power supply has been completely upgraded with lot more HF power and may be when it's running the voltage at the beacon , after a long cable run, sometimes drops too low. I was on vacation in August and we should have by now investigated the fault. Anyway it is nice to hear that some English stations are listening to this beacon .

At home (35 Km from the beacon) , I couldn't hear the beacons at all with the antenna on the mast (78cm offset dish) but I am hearing them (when they are working!) with an open waveguide! I think I have some water in the feed, so I will have to climb the mast during my vacation .

I will keep you informed of the progress of the investigations and try to not meet Mr Murphy anymore!

73 from Eric, F1GHB (02 August 2002)

New World 24GHz Record by Brit/American duo !

On September 7, 2002 at 1235UTC, WW2R/5(Dave Robinson, G4FRE in disguise!) and Al Ward, W5LUA, made a record breaking contact on 24192MHz. Dave was operating portable in EM41HC near Natchez, Miss and W5LUA was operating from his home in EM13QC, Allen, Texas. CW signals of 549 were exchanged.

The distance, based on 6 digit to 6 digit grid square, is 337.3 miles or 542.8 km

The equipment at WW2R/5 consisted of a 2ft dish fed through 2 foot of flexible waveguide by a retuned Hughes 12-18GHz TWT running **11W output**. The 1.8dB HEMT preamplifier was mounted directly on the waveguide switch. The homemade transverter fed an IC402 at 435MHz. Frequency calibration was achieved by a frequency counter locked to GPS by an HP Z3801A time/frequency standard. Signals on 10GHz were consistently around 10dB above the noise. After the QSY to 24GHz, and overcoming the surprise of hearing anything, initial signals were estimated at around 6dB above the noise but by the end of the QSO were barely audible above the noise.

The equipment at W5LUA consisted of a ft MACOM dish with azimuth and elevation control at 65ft. LNA noise figure at the dish measured 3dB. Al was using an Alelco TWT **producing 50 watts** in the shack. The actual power getting to the dish was considerably less. He had two 1.5 dB loss WR-42 flexible pieces of waveguide in the shack feeding about 60ft of EW-180 waveguide with about 4dB loss and another 1.5dB loss WR-42 flexible jumper at the antenna. The transmit losses add up to 8.5dB giving Al about **7 watts at the feed**. W5LUA's azimuth rotator is an Orion 2800 which allows him to get to within tenths of a degree. He uses a small actuator to give about -1 to +16 degrees elevation control. This worked OK for horizon shots for AO-40.

Dave and Al first tried 10GHz where signals were 5 to 10dB over the noise. They made an easy contact and then QSYed to 24GHz where Al was much surprised to hear Dave at about 10 to 15dB over the noise on a nice peak. The initial peak may have been due to aircraft scatter but afterwards the signals became more constant, settling in about 10dB over the noise for several minutes and an easy QSO resulted.

Based on 6 digit grid square to 6 digit grid square EM13QC to EM41HC DX is 337.3 miles or 542.8km.

Based on actual latitude/longitude locations, the DX calculates to be 338.2 miles or 544.3 km, establishing a new world record on 24192MHz.

W5LUA is 33 deg 6 min 53 sec north by 96 deg 36 min 54 sec west. WW2R/5 is (from map) 31 deg 7 min 22 sec north by 91 deg 20 min 33 sec west

The weather at EM41HC was 75 degrees F and 88% relative humidity with relatively clear skies with some high clouds. **The weather at EM13QC** was 72 degrees F and 70% relative humidity with skies partly cloudy.

Attempts to repeat the contact over the same path 12 hours after the initial QSO resulted in no signals being identifiable either way on 10GHz, suggesting the morning QSO was under enhanced tropo conditions. No signals were heard on 2 meters or 70cm at the time of the contact. The sked was set up earlier in the week via email with no liaison on any band including cellular! Numerous attempts over a slightly shorter TX-MS path on 10GHz in July also resulted in no signals being identified.

Submitted by W5LUA and WW2R on September 9, 2002

WEINHEIM 2002

G3PHO, G3PYB AND G8ACE MAKE THE PILGRIMAGE

"Where to this year?" was the question on my mind all through the summer. Having been to Microwave Update in the USA twice in two successive years, as well as to countless UK Microwave Round Table meetings at Martlesham, GCHQ, R.A.L and the like, thoughts turned to Germany. Originally Peter, G3PYB, and myself (G3PHO), had planned to attend Update 2002 in New England but that had to be put on the "backburner" as our respective XYs were not too keen to go and we had wanted to make a real holiday over there rather than just a few days with the microwavers. Sam, G4DDK, had often spoken in glowing terms of the VHF/UHF/SHF Convention at Weinheim in the Rhine area of Germany. Apparently this annual event has a strong microwave component. So, that was it ... a few days (four to be precise) of pure amateur radio with no whinging wives (please don't tell Sandy and Judy I've said this!!) to complain about there being nothing for them to do. In any case we left them at home!

Organising the trip was a breeze. With friends like Dave, DL4MUP (aka G4HUP), to book us a hotel and provide maps of the local area and Jonathan, HB9DRD (aka G4KX), to give hints on what to look for and where to go at the event, we couldn't go wrong. Two's company and three is even better company when it's John, G8ACE! He decided to come as well so we all left G3PYB's Portsmouth home at 6am on Thursday, 5th September and drove to Weinheim via the Channel Tunnel and a series of excellent motorways from Calais to Brussels and eventually Weinheim. The contrast in driving techniques and road conditions between England and the Continent was very marked to say the least. With many stretches of German autobahns having no limit at all we found ourselves cruising along at speeds between 90 and 100mph (sometimes over that) while BMWs and Mercedes passed us well in excess of that. It all appeared to be much safer than our crowded UK motorways.

After seven hours on the Continental roads we arrived in Weinheim at 7pm local time, checked out the location of the radio event and then signed in at the Schmittbergerhof hotel, an excellent family-run place on the SE outskirts of the town. Three days, with breakfast and evening dinner on the first night, came to just £80 each ... can't be bad!

After a good night's sleep, we spent much of Friday sightseeing in nearby Heidelberg and being treated to a guided tour by a German friend of G3PHO. That evening we made our way to the local radio club room and barbeque. Club room is an understatement! It's located seemingly miles from the road, in the middle of a vast expanse of flat fields. Next to it are two or three towers, bristling with antennas covering 80 metres up to 10GHz or so, as well as a large field where hundreds of visiting amateurs were to camp for the weekend. On arriving we couldn't miss a group of Dutch microwavers who were camping right next to the barbeque and beer area! This group included PA5DD, PA3AGS and PA3BAT, familiar to many of you who have been to Martlesham in recent years. Their sense of humour shone through both barbeque evenings at the club house. They were a great bunch to be with and we swapped much valuable microwave information in the process.

Next day, Saturday, we were up early to get to the famous radio fleamarket! This part of the convention was reputed to be a little down on previous years but we were very impressed none the less. There was an official fleamarket located in the lower yard of the school housing the convention and much interesting stuff was to be seen there, albeit at rather high (like UK) prices. However, a short walk away was a really big, unofficial "flohemark" in a large public carpark. Here were rows and rows of cars and tables, all bristling with radio surplus (and surprisingly very little computer stuff). There was quite a lot of microwave surplus and test gear. However, with the three of us being a little "long in the tooth" microwave-wise, we did not buy much apart from the odd box and surplus connectors. Back at the main event we registered for the two days, Saturday and Sunday, and proceeded into the official sales area. The first floor of the school was crowded with dealers selling the latest in VHF to microwave technology. They were all there... Kuhne Elektronik (DB6NT), Eisch-Kafka, UKW Berichte, Giga-Tech and so on, along with dozens of small dealers we had not heard of before. The highlight for me was to see the 5 watt 24GHz amplifier on DB6NT's stand. Michael said I could not have afforded it even if it were for sale (which it wasn't)! Nevertheless I did spend some Euros there, purchasing a 3.4GHz transverter to drive my recently acquired surplus 14W amplifier. On the same day we met up with Sam, G4DDK, who was on a family holiday in Bavaria.

An excellent series of talks was scheduled for all of Saturday and up to 3pm Sunday. The three lecture streams covered many topics including sub-millimetre radio astronomy, 47GHz amplifier techniques, VHF antennas, new microwave antennas, a software-based TX/RX sequencer, and amateur laser transmissions. The problem was that almost all of them were in German and we three UK amateurs could not cope with that!

Sunday saw more talks and the trade stands but the fleamarket had shrunk somewhat as many folk had gone home. Nevertheless there was still brisk trading taking place! We had one last look around before leaving at 1pm for the long drive back to the UK. Arriving in Portsmouth around midnight, we didn't feel like staying up long! The drive up to Sheffield on Monday afternoon was a nightmare! The heavens opened and torrential rain made the usual four hour journey into one of five and a half! Back in Germany we had been roasted in hot 29 degree C temperatures and sunshine!

**Many thanks to all the DLs who helped to stage this excellent amateur radio event. We will return!
(A photographic report will shortly be on G3PHO's website: www.qsl.net/g3pho)**



ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHZ

The highlights of the past few weeks have been the breaking of two microwave distance records, firstly the UK 76GHz DX record by G3PYB, G8ACE and G8BKE, closely followed by the world 24GHz record achieved by our own ex-patriate G4FRE as WW2R/5 and W5LUA. Our congratulations go to all concerned. You will probably have already read all about the two events elsewhere in this newsletter.

Coming down to earth a little, we have some reports of the August UK multiband contest and the 10GHz Cumulative. Both contests saw poor support from UK amateurs. Where have you all gone to? It's not many years since we had 40 to 50 UK stations on 10GHz on a regular basis. Now we are lucky to break the 20 mark. If it were not for our friends in France and Holland we would have a poor day out! If you have expensive microwave equipment gathering dust on a shelf then for goodness sake use it! As we have said many times, you may have been there and got the T-shirt but you owe it to the others who haven't. Can you remember when you started out into microwaves and relied on the veterans to provide activity for you? Now onto the reports ...

JULY 10GHz CUMULATIVE CONTEST

From: Steve Cooke [scooke@tiscali.co.uk]

For the July contest, Dave, G6KIE and myself chose a new location JO01NC and took the opportunity to try out the new 2m talk-back rig running 25w from a TR751. Conditions on 2m seemed very poor -- many people in the south seemed to have the same problem -- and 3cm didn't seem much better! We only managed 5 contacts and a one-way but that did include 3 countries! I managed to work F6DKW for my first QSO into France so the new talkback rig was worth it after all! 73 from Steve Cooke G1MPW

From Chris Bartram. GW4DGU/P: IO71VV was OK and close to home but I was screened by forestry towards the Midlands and North of England and I'd also put the dish too close to the car roof to beam towards GD! Apart from getting on late (1200), and an initial problem with a power supply feed up to the preamp/PA box, I was tolerably happy with my results. OK, I only worked 6 people but the closest was G3JMY at 132km, and the best DX, G4ZXO, in West Sussex at over 300km. Most of the contacts were close to, or beyond 200km. I heard a couple of other people, including Ralph, G4ALY, who was beaming into his usual Kit Hill /P site!

AUGUST MULTIBAND MICROWAVE CONTEST REPORTS

Martyn, G3UKV, sends this email report:

The intrepid four of **Martyn G3UKV, Dave M0VZT, John G4ZJY and Mike G3JKX** decided to operate from somewhere a bit different. After 23 years, so we decided to return to Wales and chose Pen y Gadair Fawr, near Abergavenny in the Black Mountains. We got authorisation and a key from Forest Enterprise - so it was all done properly. We were told that the last bit might be tricky in a saloon car but we should be OK. Other Amateur Radio groups had operated from the 800m asl site (eg Bristol group on VHF NFD). On Saturday we set off in rain and mist via Ludlow and Hereford. Martyn recalled using the site. Geoff Tibbett's (G3NUE) group in the long distant days of AM on 2 metres (late '60's?), used a Land Rover, which actually got stuck and gave the then new-born Mid Severn RAYNET Group its first proper callout! Ah, things are sure to be better in the new century....

Anyway, we opened the access gate (the key fitted!).. so far, so good. I see forestry is simply arable farming with big plants - conifers. So, we weaved from left to right, and right to left endlessly along forestry roadways to gain height, tracking the contours. At one stage, a mud flow crossed the stony track. We just about got through, although our white van and red Peugeot 306 were suitably restyled a graduated brown sludge colour from bottom to top. Never mind, we had brought a tow rope just in case and it wasn't needed. We eventually reached what might be the top level at 625 metres asl, but the ridge to the east and north east was about 650 metres. So, how would we reach the summit, which lies just outside the actual forest perimeter fence?

Patrolling on foot revealed the need for a vehicle with a bit more ground clearance than your average Ford van or 306 so, reluctantly, we decided we to operate on Sunday from within the forest boundary at 625 metres. So we drove down to civilisation to get a night's rest locally.

However, it was not to be! We had chosen to rely on B & B rather than camping for our overnight stay on Saturday night. We stopped at every hostelry or B&B sign in Abergavenny, only to find no vacancies anywhere! Apparently there was some local festival taking place and the area was packed out with visitors. On top of the disappointment at being unable to scale the summit of Pen y Gadair Fawr, we decided to cut our losses, have a good meal at a roadside restaurant and take up the overnight vacancies of our own comfortable beds at home. So we drove back to Telford and returned to one of our usual haunts in Shropshire, Brown Clee (IO82QL) on Sunday morning.

The rest of the weekend was relatively uneventful. On 23cm we had 7 QSOs (G1SLE, G4BRK, G8JVM, G8BHH, G3PHO/P, G0UPU and G4EAT- who was our best DX at

235km). With borrowed 13cm gear we had just 2 QSOs (G8JVM and G0UJU) with our 8 watts and 66 ele QLY.

10GHz wideband TV resulted in 4 Midland QSOs, and narrowband picked up 10 more (G1SLE, G4BRK, G3PHO/P, F1PYR/P (JN09LN, 408 Km), G8JVM, F1GHB/P (IN88IN, 438 Km), G0UJU, G4ALY, G4LDR and G3FYX.). Finally, on 24GHz, Peter (G3PHO/P, IO93FB) gave us our only successful QSO. Dave's gear for 47 and 76GHz never left the van. As far as we know, there was no one else QRV that day on these higher bands. What a let down! Where were the microwavers on August 11th? The French stations gave us our best 10GHz DX ever from Brown Clee, with a near miss, incomplete QSO also with F6DKW (533 Km away), so that cheered us up a bit.

Our thanks to Peter G3PHO for Internet publicity of our Welsh gallivantings. For those of you who normally operate microwaves from the comfort of home, give a thought to idiots like us who travel over 200 miles, get wet, muddy, lost and frustrated trying to operate from somewhere a bit different on a weekend in August. **How about coming on a bit more, guys?**

Peter, G3PHO/P (Alport Height, IO93FB44)

reports very poor conditions during the August multiband contest, on both 2m and microwaves. Only 19 UK stations were thought to be active! Once again the Continental support, in the shape of F6DKW, F1PYR/P, F1GHB/P, PA5DD and PA0WWM, was very welcome. Of these Peter managed 16 contacts (15 UK stations) on 10GHz including F1PYR/P(JO09LN) and G0HNW/P (IO85VE). He was delighted to work G4ALY from Ralph's home station in deepest Cornwall (IO70VL06). 5.7GHz brought 7 contacts with F1GHB/P (IN88IN) as a one way and excellent two way ssb contact with F1PYR/P. 24GHz saw only one contact, G3ZME/P (IO82QL) and attempts with G4BRK and G3LRP at their home stations failed. 23cm was also used to bag 7 contacts with G0UJU (IO91AX) as best DX. This band apparently yielded EA7AJ until Peter realized the Spaniard was coming down the 144MHz IF coax as a VERY STRONG sporadic E signal! Nevertheless Peter managed an RS57 report using the G3PHO 23cm transverter and antenna on 2 metres!!!

AUGUST 10GHz CUMULATIVE REPORTS

From Ralph, G4ALY (Cornwall) comes the following email... On Sunday the 25th August the following stations were worked in the 10GHz Cumulative: G3PHO/P, G0API, G4ZXO/P, G4LDR, G8SHF, G4UVZ, G3FYX, G3JMY, F1GHB/P, GW8AWM/P, G4NNS, G1JRU (One way), F6APE, G0RRJ, and G4MAP, in that order. I am very pleased with this result from home and I now feel more confident for the future from this site.

I have slightly modified the aerial arrangements on the mast, reducing it by nearly four feet and taking off one of the 19el 70cm aeriels. There was too much movement above the bearing and the dish was offpointing by 2 or maybe 3 degrees vertically with modest winds. So, while the wx was good I decided to chicken out and opt for a

more stable rig. Especially as we get extremely strong winds here in the winter.

The 1296MHz contest was a washout on the 19th Aug. only saved by a contact with Pete, r G3PHO/P, towards the end of the contest. I heard quite a lot of stations off the back of their beams and some quite strong, as they called CQ whilst moving the beam. IO70VL06 is, or maybe was, a sought-after square at quite a distance. Please boys, turn your beams to the southwest to save the claw marks getting worse up the shack walls! I run 70W to 2 loop yagis and mast head preamp and have worked quite good distances so I know you could get a few points more by working me!

Peter, G3PHO/P (Houndkirk Moor, IO93EH98)

found conditions in the August 10GHz cumulative extremely flat once again! The list of active stations, including himself, came to 29, of which 8 were Continentals and only 21 UK stations. In spite of the poor conditions Peter managed 26 QSOs, including 5 countries in 13 locator squares. The perseverance of the Continental stations is to be much admired. They kept trying until Peter made two way contacts with F1PYR/P (JO19EC, 544km), F1DBE/P (JO19EC, 544km), F6DKW (JN18CS, 572km)PA0WWM (JO22FE, 426km), PA5DD (one way JO22IC, 444km), ON1ALJ (JO10SS, 451km) and 20 UK stations, the best being G4ALY (IO70VL, 365km). The flat conditions highlighted the need for good 2m talkback, the willingness of both stations to keep on trying to make the contact, and the use of CW! The continental stations were all marginal at RST419/519. **It was a special delight to have a contact with Barry, G8AGN**, after his five year absence from the microwave operating scene. He is now so "hooked" on microwaves again that he has bought a DB6NT 5 watt PA for 10GHz. Look out for a BIG signal from him during the rest of this year!

From Roger, G0UJU comes this newsy report:

Since building a new DB6NT 3cm transverter and adding a solid state power amp, I have been using this in a temporary lash-up state as I have been working on other projects. So far I have only run it at 5W output but it has worked very well in recent contests. With the recent multiband contest coming up, I decided to put my efforts into the middle bands and completed a DB6NT transverter for 9cm together with a switching system to combine my 6, 9 and 13cm transverters so that I would not have to go climbing about on ladders to change bands. I managed to complete this in time for the contest but was disappointed that there was not much activity about and conditions were dismal. 9cm worked well on my only contact on that band but on both 13cm and 6cm I seemed to have trouble receiving signals although I was getting out ok and did just manage a contact on each band. Tests carried out since then have not shown up any faults so I'm not sure what the problem is.

I hope to complete my 9cm rig by adding a 15W PA to it but I still have some more design work to do on the

power supply. While checking the pin connections on the 15W PA module (Ionica type), I encountered an unexpected effect. I had accidentally connected my ohm meter between the +9V line and ground and found a dead short circuit. This was also there with the meter reversed. At first I thought that the amplifier was duff but then wondered what the depletion mode FETS would do without any negative bias on them and if this could be the problem. I then connected up the amplifier to a set of power supplies and found that it was working correctly and amplified 9cm signals up to the full 15W. Phew!

I am trying to design the power supply for the 9cm PA so that it will provide the necessary + and - supplies from a 12V source as efficiently as possible so that I can go out portable with it. I have also developed a sequencer and interlock circuit to avoid problems if the negative supply fails. Luckily, both the 9cm and 3cm solid state PAs have control lines to turn them off when not in use as they are not very efficient, particularly the 3cm amplifier which does take a lot of current and would soon discharge a battery if left on for a length of time.

The home station of G4ALY is finally up and running on 3cm. On the 19th July, The 3cm station, described on page 9 of last month's Newsletter, was switched on from home (IO70VL06/SX404675). The whole system is up at 26 feet and the QTH is at 450 feet ASL.

The first station Ralph worked was G4LDR on SSB. Neil was 55 and Ralph was 58 (receiver down?). This was followed by GORRJ 51/52. The French beacon F1XAP was about 559 (IN88HL).

The contest on the 28th August gave Ralph nine contacts the best being G4ZXO/P.

Ralph has been running regular skeds in the evening with GORRJ, Dave, in Andover and has failed only twice. Hecan work him on SSB most days and CW the rest of the time. 1296MHz is used for talk back as that path is very reliable. Since then Ralph has had various contacts, having been active every day to assess the system. Peter G3LRP (IO93HO) and he started to run skeds to see if there was a possibility of a path between them. This was done at 8-30 local and in the evenings. G3LRP was heard on aircraft scatter but was only for a moment. Then on the 31st July at 0735z they had a two way 519/ 319. A second contact was made 1st Aug 2002 at 319 both ways. This was during the spell of heavy rain to the north of Ralph. He also worked G4EAT in JO01 under normal conditions on the evening of 31st. Finally, on the 3rd Aug, Ralph worked Ken G3YKI in IO92 via rain Scatter. Ken only had 250mW.

Ralph is at home most days, so if anyone wants to try a 10GHz contact please let him know. He can be contacted via email at: Ralph.Bird@btinternet.com

Ted, G3JMY (Bristol) emails the following report:

My activity has been down a bit this year, but I have taken part in 3 cumulatives so far, with reasonable results.

Conditions have varied a lot and it is not surprising that portables did not wish to venture out in any numbers in May - the wind and storms did not help! June was better, but only just, with more /P's. July was a bit thin on the ground, with excellent WX, but, of course, it was the

holiday season, and many were elsewhere.

My contacts were 16 in May and 18 in June, 18 in July, with the best DX being 333K (G3PHO/P in IO94 and F1GHB/P in IN88). Total number of stations worked so far this year is 29.

I missed out on GD0FDZ/P, which would have given me an extra square - he just heard me for a few seconds and I did not hear him at all on 10GHz. A belt of tall, wet trees over a 30 degree arc spanning his direction no doubt clobbered both signals.

The number of stations in the Microwave All Bands contest in August must have been very low. Conditions were bad, I gathered. I missed several hours operating due to a masthead preamp problem - a speck of foreign matter between the RX relay contacts, now cleared.

My thanks to all the hardy /P's who brave the elements in wind, storm and heat to help raise the scores of the rest, who, like me, stay at home.

A report from Peter, G3PYB: Contest day 28th July 2002

The morning was spent on some millimetric tests with G8ACE and G8BKE over a repeat of our earlier path of about 52km from a site near Walbury (IO91GI) to Salt Hill on the next hill over to the West from Butser Hill in Hampshire. Path proving tests on 24GHz and 47GHz went well, but signal strengths on 47GHz were lower than expected. The temperature was 27C and Relative Humidity about 76%. It looked poor for a 76GHz test. However we continued, to find 76GHz working well with some 20dB margin in 3kHz. Both G8ACE and G3PYB were using a TX power about +10dBm and 30cm FP dishes. FM copy with smooth background noise lasted for over one hour with slow fading of about 3dB on the channel. This was surprising and did not co-relate with previous experience on 47GHz signals.

Transvertor to transvertor signals were near to noise; G8BKE tested a small signal double diode X2 multiplier driven from 38GHz and this was about 10dB down on the relatively high power FM TX from G8ACE. This is a good practical way to get what must be about 1mW, if the attenuators at G3PYBs are to be believed. This was an excellent set of tests considering the temperature and humidity and success was partly due to G8ACE hosting a 76GHz range test about two weeks earlier, enabling a side by side comparison of dishes Tx power and a comparative RX test for all three Hampshire millimetre band stations.

The afternoon was spent on 10GHz with about 12 stations worked though 10GHz and 2m conditions were poor. G4ALY in the South West was worked at home and a good signal. G3PHO on the North York Moors was worked with a struggle as I had some local obstructions at the site.

I finished the day on 24GHz again with some tests for DEL G1JRU near Southampton water proving his 24GHz home station, with very big signals over the 30Km path. A good day but I needed the sun shade and lots of refreshment! 73 from **Peter, G3PYB**