

6th Microwave Information Sheet

Winchester Round Table: A reminder that this will be held at IBA Crawley Court, Winchester on Sunday 9th November starting at about 10.30 am. Included will be a review of 24 GHz equipment and activity - please bring any equipment you have; a talk by Don Hayter, G3JHM on 10 GHz operation in France; and a review of the cumulatives. Also, we hope to announce the availability of pcb's for 384 / 378.666 MHz oscillators. Further details are available from Don Hayter, G3JHM on 0420-63315.

Martlesham Round Table: This was held at the PO Research Centre on the 19th October. There was an interesting talk introducing fin line techniques - these could prove very useful for amateur use as they are a means of combining pcb and waveguide techniques and could be a means of avoiding some of the machining parts required at present.

G3WDG talked about 10 GHz narrowband equipment and gave a demonstration of a two way SSB link, and the use of a Droitwich locked marker generator for frequency calibration.

Their comprehensive array of test equipment was very popular - spectrum analysers, power meters, frequency counters, scopes etc. It was an excellent opportunity for anyone to check their equipment on state of the art test equipment which we hope will be repeated next year.

Beacon News: The beacon GB3LEX is now operational from a site near Leicester, so please any reports of hearing it would be most appreciated and should be sent to M. Barker, G8CAC, 3 Burley Close, Desford, Leicester.

Report from F6DLA: William reports from France that he hopes to install a 10 GHz beacon near Paris in the near future. He also hopes to be coming to the Winchester round table.

He proposes a method of calibrating a receiver's noise level by taking the s-meter reading on noise alone (with the antenna input terminated), then adding 3 dB attenuation in the IF strip, and increasing the level from a calibrated generator on the antenna input until the same meter reading is reached. This input level then equals the receiver noise level.

He also suggests that the local oscillator in narrow band equipment should be slightly low of its nominal frequency so that the receiver covers from about 10367.900 to 10368.300 or so (using a usual 144 MHz transceiver for the IF), so that signals on 10368.000 from CW transmitters using 96.000 MHz crystals can be found even in the worst case when both equipments drift the wrong way.

William warns that it is possible to listen to a spurious signal, rather than the main one, when listening to a 96 MHz derived 10368.000 transmitter on a receiver with a 144 MHz IF. The receiver normally listens on 10368.000 MHz, and with a 144 MHz IF has an image response on 10080.000 MHz. The 96 MHz crystal comes out on both these frequencies ( $96 \times 105 = 10080$ ,  $96 \times 108 = 10368$ ). The same is true for a transverter on transmit - some power will also be produced on 10080 MHz as well as 10368 MHz. So particularly when testing over short paths, it is possible to hear the signal on the image frequency, despite the large attenuation that the 10368 MHz filter provides. Be careful not to align the equipment on the image by mistake!

Finally William reports that he now has 200 uW on narrowband transmit, and that F6CGA has 2 mW. He would also like to know if there is any power mixing device with a low conversion loss which can be used at high power levels of several Watts (perhaps a varactor diode could be used?).

Enhanced Conditions: On the 3rd October there was a tropo lift on the VHF bands, and G8ADP (who is now doing narrowband tests with G3YGF on 10 GHz) heard G3YGF about 30 dB above the usual signal levels. Several hours later G3YGF heard G3JVL about 15 dB up on normal levels, although the enhanced conditions did not last for long.

Crystal Oscillators: G8ADP has built 5 boards based on the VHF Comms DCODA 005, and finds that they all come out 10 to 20 kHz higher than expected at 384 MHz. Several MM oscillators use a 2 pF capacitor across the emitter-collector of their oscillators so the frequency can be pulled onto the correct value. Stability does not seem to be good enough for microwave purposes.

1980 Cumulative Results

<u>Position</u>	<u>Callsign</u>	<u>Points</u>	<u>QSOs</u>	<u>Best Period</u>	<u>Best Dx</u>	<u>Equipment</u>
1	G3YGF/P	3701	47	1770	175	WB, NB
2	G3ZME/P	2889	35	1052	151	WB
3	G3YJH/P	2003	32	962	105	WB
4	GW3PPF/P	1616	20	636	162	WB, NB
5	F8WN/P	1256	13	808	198	WB
6 xx	F1AXP/P	1067	11	871	150	WB
7	G4CNV/P	1042	16	449	121	WB, NB
8	F6DLA/P	954	10	398	130	WB, NB
9=	G4ETU/P	900	17	702	182	WB
9=	G2DSP/P	900	17	702	182	WB
11	G8SHF/P	887	17	400	89	WB
12	G3FYX/P	818	12	310	114	WB
13	G3PFR/P	806	11	507	128	WB
14 xx	G8RHI/P	761	15	449	117	WB, NB
15	G3RZD/P	753	17	368	73	WB
16	G8EXL/P	615	12	315	88	WB
17	G8GKV/P	602	14	389	120	WB
18	G4HUP/P	596	10	178	143	WB
19	G8ADP	576	11	266	149	NB
20	G4EBF/P	490	11	220	88	WB, NB
21 xx	G3WDG/P	378	8	195	95	WB, NB
22 x	F6FBE/P	280	4	280	111	WB
23	G8CXK/P	250	8	127	83	WB
24 x	G4KGC/P	183	5	183	59	NB

Check logs also gratefully acknowledged from GM3FYB/P, GM3HYX/P, G3KSU/P, G3MWQ/P, G3RPE/P and G6XM/P. Also in table, xx=from 2 periods, x=from 1 period.

Reports from IARU Contest on 4 & 5 October: A few stations were active during this contest (confined mainly to the Sunday afternoon), as suggested in the last newsletter.

From Oxford, G3YGF and G4CNV/A operated as separate fixed stations, and both worked G3JVL, G3WDG/P, G4KGC/P, and G8RHI/P. G3YGF also worked G8ADP. All contacts were two way using narrow band equipment.

G8RHI/P operated from near Nuffield in the Chilterns, working G3YGF and G4CNV/A after eventually finding a site in a very woody area. Attempts with G3WDG/P and G8ADP failed, possibly due to trees on the horizon about 3 miles away.

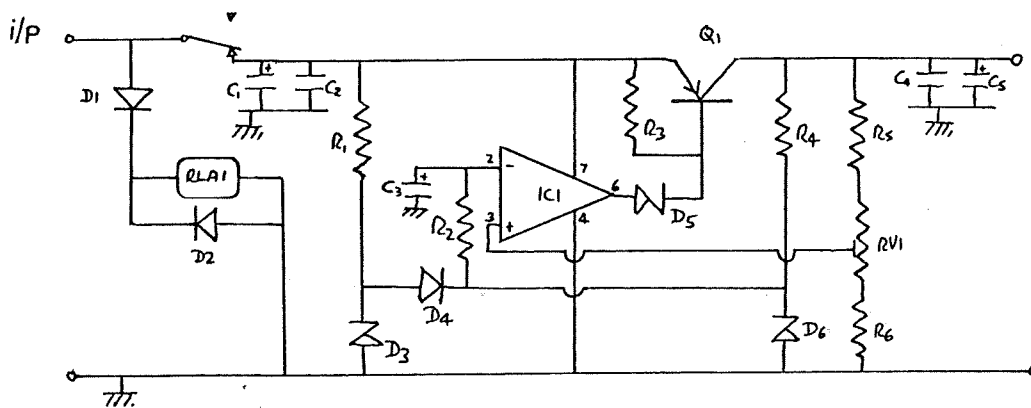
No other stations were heard on 2m - was anyone else out? Perhaps we might get more activity during this contest next year? Note that in the IARU event (as distinct from the RSGB contest at the same time which only includes 70cm, 23cm and 13cm) the higher bands are included when an overall total is produced for each group and the multiplier on 10 GHz is x20!

A Low Voltage-drop, Reverse supply Protected Regulator

For many pieces of equipment that are used portable, a well-regulated supply is essential to prevent drift, chirp and other problems, as the voltage from car batteries etc does vary somewhat according to state of charge, current drawn etc (typically 11.5 to 16 V). The following circuit was developed for use with the G3JVL 10 GHz transverter, and as well as making the oscillator well and truly insensitive to supply voltage variations, provides overvoltage and reverse supply protection. It will regulate down to a minimum voltage drop of approx 300 mV (governed by the  $V_{ce\ sat}$  of the transistor).

The relay used for reverse supply protection (RS 348-510) is rated at 1A, 28V. RV1 sets the regulated output voltage; something like 11.2V is suggested as a reasonable value that will guarantee a regulated output even at the lowest supply voltages. The BD132 transistor is bolted to a suitable heatsink (diecast box wall) with the usual insulating washer.

A pcb has been produced for the design, which should be available with the 384 / 378.666 MHz driver pcb's. The circuit diagram is reproduced below:



regulated  
o/p

o/p voltage range  
10.0 - 12.7V nominal

$R_1$	4K7	$C_1$	10 $\mu$ F 25V	D 1, 2, 4	1N4149	IC1	741
$R_2$	15K	$C_2$	1nF disc	D 3, 5	4.7V zener	Q1	BD132
$R_3$	1K	$C_3$	10 $\mu$ F 25V	D 6	5.6V zener	RLA1	RS 348-510
$R_4$	3K3	$C_4$	1nF disc				
$R_5$	18K	$C_5$	100 $\mu$ F 25V				
$R_6$	18K						
RV1	5K Germet D						

HDC 7/10/80

IC202 Spurious on 1.3 GHz

Those of us who use an IC202 as a tunable IF for 1296 may have noticed a spurious signal in the beacon part of the band. This occurs at about 1296.86 MHz, tunes very fast, and is most noticeable when the IC202 is near the 1.3 GHz antenna.

It is actually caused by the 87<sup>th</sup> harmonic of the IC202 vfo fundamental, which comes out at 1296.86 MHz, and is radiated from the IC202 at a surprisingly high level ( a test dipole held near the rig can easily pick up -70 dBm). The fundamental is at 14.907 MHz, and this is tripled twice to provide the IC202 LO, and it is a harmonic of the first multiplication (29\*3\*14.9) that causes the problem. Has anyone noticed the same effect on other 144 MHz rigs with a 10.7 MHz IF?

Reports from the Cumulatives

1. G4CNV Hugh was at Hardy's Monument in S. Dorset, and worked G3KSU/P and G8MCQ/P on wideband, G3YGF/P, G8ADP and G8DEK one way, on narrowband. He found conditions poor and was not able to work GW3PPF/P or G3FYX/P over paths that although non optical, are usually quite easy.
2. G3ZIV Keith is now operational on 24GHz.
3. G8ADP From his home QTH Clive worked G3YGF/P and G8RHI/P at Walbury (35k), G4CNV/P one way near Dorchester (114k), G8DEK at Winchester (21k), G3WDG/P and G4KGC/P at Liddington (59k), and G3JVL, although for this last QSO he had to raise the mast in a very bad thunderstorm, but reports no enhancements due to the lightning or rain. All his contacts were on narrowband, but even from his badly obstructed home QTH, most contacts were made using low power, or had sufficient in hand to enable low power to have been used. High power certainly makes establishing a contact easier, but without it, careful operating techniques can go a long way to overcoming this disadvantage. Clive says that he is always willing to come on from home for tests on 2.3, 3.4, 5.7, or 10GHz, (2 watts of SSB on each band). It takes him about 15 mins to pump up the mast and insert the appropriate dish feed. Phone 0420 62316.
4. G3RZD Ern has been doing some tests on 24GHz with G3JHM, and is satisfied that his gear is working ok. Together with G8GKV, he put on a demonstration of 10 and 24 GHz gear at the Radio Museum at Amberly. They had a number of interested visitors, including ZL2TAX who hopes to be at Winchester in Nov., and also some members of the staff of Practical Wireless.
5. G8ARO Peter hopes to be active on 10GHz next year, and also would like to see information on the other bands (1296 and up) in the newsletter.
6. G3AYJ Dennis has built a slotted waveguide omni directional aerial for 10GHz, which he hopes to test shortly. It is intended for use on a narrowband beacon. He has offered to help anyone in his area with advice on 10GHz.
7. G3FYX In the 4th cumulative, Roy operated from Charterhouse, and had two way contacts with GW8SHF/P and GW3IZD/P near Abergaveny (60k), G4CNV/P near Dorchester (71k), and G3THW/P at Worcester Beacon (94k). He also heard G8ANZ/P on Cleeve Hill.
8. G3YJH In the 5th Cumulative, operating from Titterstone Clee, Dave worked a total of nine stations, the best dx being G3YGF/P, one way at 139k. He thought wideband activity was a little disappointing, presumably due to the wet weather.
9. G3PHO Peter operated from near Sheffield with G8AGN and worked G3ZIV at Selby, although G3PHO only managed a one way due to receiver problems.
- 10 G3RPE All three were at Liddington Castle for the last Cumulative. G3RPE worked G3WDG G3YGF/P and G8RHI/P (24k) on wideband. G3WDG and G4KGC worked G8RHI/P and G3YGF/P (24k), G8DEK (58k), and G3JVL (95k) one way, all contacts narrowband. In the contact with G3JVL, Charlie and Petra noticed that the signal was audible 10 degrees either side of the correct heading for some time due to a storm front along the path. We hear that Dain said that it was great fun doing some genuine Amateur Radio after a long time!
- 11 G3PFR In the 4th cumulative Mike worked G3ZME/P (Snowdon) and G3SMU/P who was also on Winter Hill, about 1k from Mike, giving G3SMU his first 10GHz QSO. He had an interesting test with EI2VDE/P in the Wicklow Mountains (257k), which was very non optical. (EI2VDE was G8AFC and G8AXE). Although no signals were heard some interesting observations were made. In the evening, about 1915, the haze which had been limiting visibility to about 30km cleared dramatically, around sunset, and a very strong inversion layer was visible, stretching from N Wales across the Cheshire Plain. Signals from a French repeater were heard using a hand held rig. Optical sightings were taken along the Welsh coast and the Menai Straits to Anglsey. From Winter Hill (1400ft), the limit of visibility should have been about 83km, while from Wicklow (2850ft), it should have been about 112km. Paul, EI2VDE, reports seeing the north coast of Anglsey at the optical limit, and all of the Winter Hill party saw and identified the coast of Ireland which was

also beyond the optical limit. It is interesting to speculate that had both stations been at sea level, or been able to decline their dishes, a G to EI first might have been achieved.

In the fifth Cumulative, Mike was again at Winter Hill, this time with G8PNL and G3XMZ. G8AFC/G8AXE were about 1/4 of a mile away at the same site. He worked G3MWQ/P and G8HNV/P on the Wreakin (104k), G3ZME on Brown Clee (128k), GW3PPF/P on Long mountain (112k), and G8DTF at Moorside, Oldham(37k) and also a one way QSO, being heard by G3FNQ/A near Southport (34k). The path worked the other way round for G8PNL only 6 feet away. An attempt with G3YJH on Titterstone Clee failed because Brown Clee formed a very effective obstruction in the path. Mike hopes to have narrowband gear by next year. He is also prepared to help others in his area. He has a wide range of test equipment, spectrum analyser, power meter, wavemeter, couplers isolators, detectors, and a slotted line. G8PNL is interested in building gear for receiving OTS, based on his experience on 10GHz.

For Sale:

- G3RZD : 10GHz calibrated attenuator, WG16 bends, coupler.
- G3ZEZ : 10ft lengths of old English waveguide (a sliding fit over WG16) at £7-50 per length. Buyer collect only, QTHR

Wanted

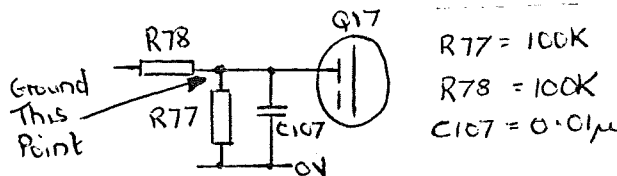
- G3RZD : 18inch dish, BXY41E
- GW8NBK ; Micrometer head for 24GHz wavemeter

Other reports

GW8NBK now has 24GHz receiving capability, and has heard G3FYX over a 34km line of sight path across the Bristol Channel, when signals were 30dB over noise. Jonathan is also building 10GHz narrowband equipment. He says that Phil, GW3PPF heard the Alderney beacon GB3ALD again from S. Wales with the aid of good conditions. Perhaps we will hear more from Phil at Winchester.

We have also heard from G3PHO / ZL2LA who has just returned to the UK after five years absence. He is very keen on getting going again, and has two complete 3.4GHz wideband stations, and 10GHz wideband equipment. Peter has also nearly finished crystal controlled equipment for 3.4GHz, and intends to build 10GHz narrowband as well.

Lastly, an idea from F6DLA to modify an IC202S to reduce the power output when driving 10GHz transverters. It consists of shorting the Gate 2 of the 1st 144MHz transmit amplifier to ground, see Fig, This reduces the output power to about 100mW which reduces the battery drain, and wastes less power in the attenuator. This is done by a small jumper lead, which fits into two small sockets, one soldered to the screen round this part of the circuit, and the other, to one end of the 100k resistors by scraping some of the white insulation off the lead. This avoids having to remove the pcb.



A number of people have expressed interest in the newsletter continuing over the winter, and provided that we receive enough to make publishing worthwhile, the next issue will be late December, the deadline being saturday, 20th dec. Please send SAEs, enough to cover duplicating costs, news etc., to

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