SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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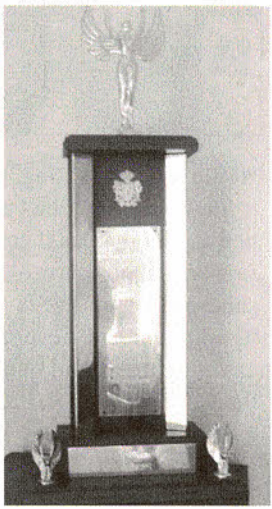

Gus G8PG pictured recently, and his QRPp DXCC trophy

Signal Injector and Tracer ~ Using the BITX20A on 17m
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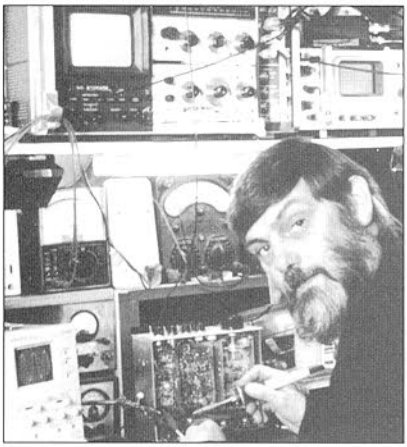

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At the time of writing, George & Jo-Anna moved house a few days ago and are busy trying to squeeze the contents of a 6 bedroom vicarage into a 3 bedroom semi-detached house. George has therefore handed the reins for this Sprat to me - so he has one less job to worry about during this upheaval. He has commandeered the smallest bedroom as a shack/office, and he is also setting up a garden shed as a workshop. It gives me a chance to ask members – especially at this time – to take it easy on George - please ensure that anything that should be sent to someone else is sent to them and not to George – many thanks. The members handbook sent with this issue of Sprat shows who to contact for everything. Elsewhere in this issue, you will see that we have a new (to us) Drew Diamond book. Drew let us sell copies of volume 1 of his radio projects book and it sold well for many years until we ran out of stocks. Now he has given us permission to reproduce volume 3 for which we are very grateful. If you want volume 4, you will still have to order from Oz (see Sprat 135). Volume 3 will be available from me by the time you read this – and will be on sale at Rishworth (You have booked the date haven't you?)
72/3

G3MFJ

The W1FB Memorial Award 2008/9

For 2008/9, the project is to **Design a piece of Test Equipment of practical use in a QRP Station**

Please submit your design to G3RJV as soon as possible, with circuit diagrams, all values and brief notes.

The project will be published in SPRAT and the winner will receive an engraved plaque.

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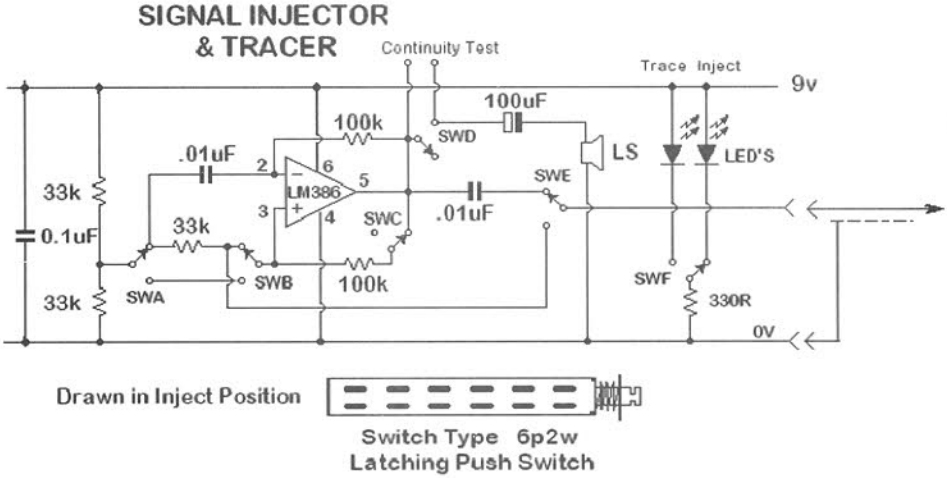
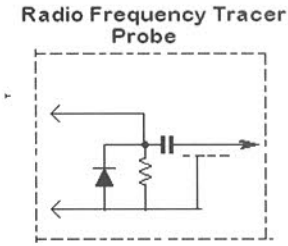
WIFB MEMORIAL ENTRY

Signal Injector and Tracer

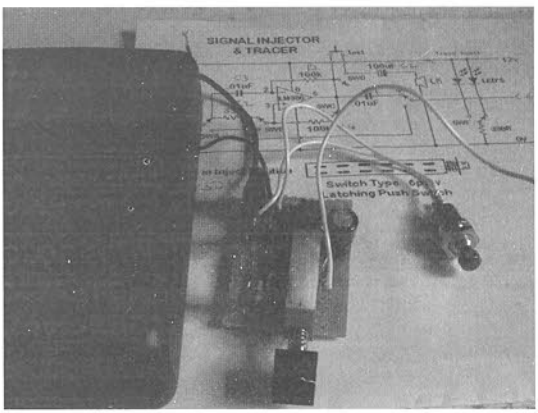
Peter Howard G4UMB 63 West Bradford Road Waddington
Clitheroe Lancs. BB7 3JDA





It is always necessary to check out a piece of freshly built QRP equipment . This simple piece of test gear is made from changing the circuit of an audio IC from a square wave oscillator into an amplifier using a six pole two way switch. I have included an option to check for wiring errors by connecting the test points together and as a means of knowing the circuit is oscillating by sending the output to the loud speaker when in the switch is in the inject position. Continuity checking must be done with the QRP unit under test turned off. Do not use headphones instead of a loud speaker because the output is loud unless you modify the circuit. I have not made the optional radio frequency probe yet drawn in dotted, all it does is add a diode detector which will help RF signals to be heard and demodulated.

The unit was constructed and fitted into a ready made speaker cabinet from a pound shop.



USING THE HENDRICKS BITX20A ON 17m (and other bands)

Nigel Flatman G0EBQ, 2 Deben Valley Drive, Kesgrave IP5 7FB

The original Hendricks BITX20A 20m SSB transceiver kit is becoming well known amongst QRP aficionados; 20m is a good choice for both short and long haul QSOs but sometimes it can be hard work competing with the big boys. The excellent Yahoo BITX site does indicate quite a bit of interest in a 17m version, a band which can perhaps be described as more gentlemanly and more suitable for QRP use.

I have attempted to use the existing Hendricks kit, changing as few parts as possible, to produce an easily reproducible 17m version, using a 12.96MHz IF and a VFO at 5.2MHz. I must stress that all credit for this must go to two of the original Hendricks kit designers; Arv Evans K7HKL and Dan Tayloe N7VE, who's help and advice freely given, have made this project possible.

Take a Hendricks kit and assemble and test each stage, and align, EXACTLY as described in the manual, except substitute components as follows. All capacitors are ceramic except as stated and wire gauges for all coils are the same as specified in the original kit -

BFO/CARRIER OSC	L5 use 6.8uH	X5 use 12.96MHz
CRYSTAL FILTER	C56 use 68pF	C55 use 82pF
	C54 use 68pF	X1-X4 use 12.96MHz
VFO	C35-C35 use 390pF polystyrene	
	C37 use 130pF polystyrene (see following text)	
	C15 use 120pF	
	L7 use 36 turns (may need some adjustment)	
	VC use section A - 60pF	
RF AMP	L10 use 1uH	C25 use 68pF
FRONT END FILTER	C24 use 6.8pF	L6 use 14 turns
	C20 use 68pF	C19 use 8.2pF
	C17 use 47pF	C16 use 8.2pF
	L4 use 14 turns	C13 use 68pF
	C11 use 8.2pF	
TRANSMIT PI FILTER	C47A-C47B use 82pF	L2 use 11 turns
	C48A-C48B use 150pF	L9 use 9 turns
	C92 use 51pF	C49A & C49B use 82pF

A further mod, suitable for all Hendricks BITX20A kits, was originally posted by Martien PA3BWI on the Yahoo site and is strongly endorsed by both Dan and Arv as a cure for possible PA instability which can arise in this design -

Add a 1K resistor between the drains of Q18 and Q19
Add a further 220ohm resistor across the primary of T3.These will need to go under the board.

All parts are available from JAB of Birmingham with the exception of the 12.96MHz crystals which are unobtainable at a reasonable price in the UK. These are obtainable cheaply from Mouser in the States but they do charge a flat $25 postage irrespective of quantity. I have obtained a few which I am offering at £5 for a set of five plus 75p UK post - Paypal or cheques welcome. It would be helpful if anyone ordering a kit from Doug Hendricks were to indicate that they intend to modify it to 17m so that he can judge demand. Hendricks kits can be found at www.qrpkits.com, where you can find full ordering instructions, and even download the excellent manual before you buy.

I am very pleased with the result. The receiver seems as sensitive as the original and the front end peaks sharply. The VFO is very stable; I used JAB's 1% Philips polystyrene capacitors, order code SC, which are worth the expense. Using 130pF for C37 gives a frequency range of 140 kHz; if less is required reduce though this will affect the frequency. If you do wish to experiment I would suggest that you initially mount this capacitor in parallel with VC to save having to keep removing it from the board.

I am getting about 5 watts out, more would probably require more radical redesign of the driver and pa stages. Audio reports have been favourable though I have not had many QSOs yet since the band is only starting to wake up.

There is no reason why the kit cannot be adapted to other bands; I have copies of the data supplied to assist in this by Dan and Arv if anyone would like it, including some suggestions from Dan on improving power output. Changes might be needed to the broadband toroids in some cases though.

See you on 18130 then?

A new QRP Club is born

Paul Brice-Stevens G0WAT 31 Lodgefield, Welwyn Garden City AL7 1SD

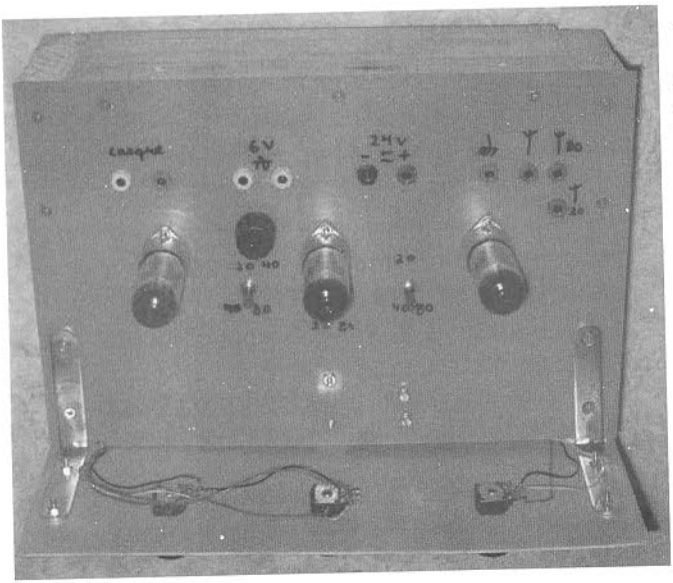
Paul, G0WAT & Nicolas M1HOG are pleased to announce the formation of the Home Counties QRP Circle (HCQRPC). This has been set up in the manner of similar QRP Clubs in the USA – No dues, no rules, just fun!
By the time you read this, they will have had their first meeting – HOGCON 2008, in September. Further info from Paul – address as above, or www.hcqrpc.wordpress.com

Low voltage 3 Tube Shortwave Regenerative Receiver

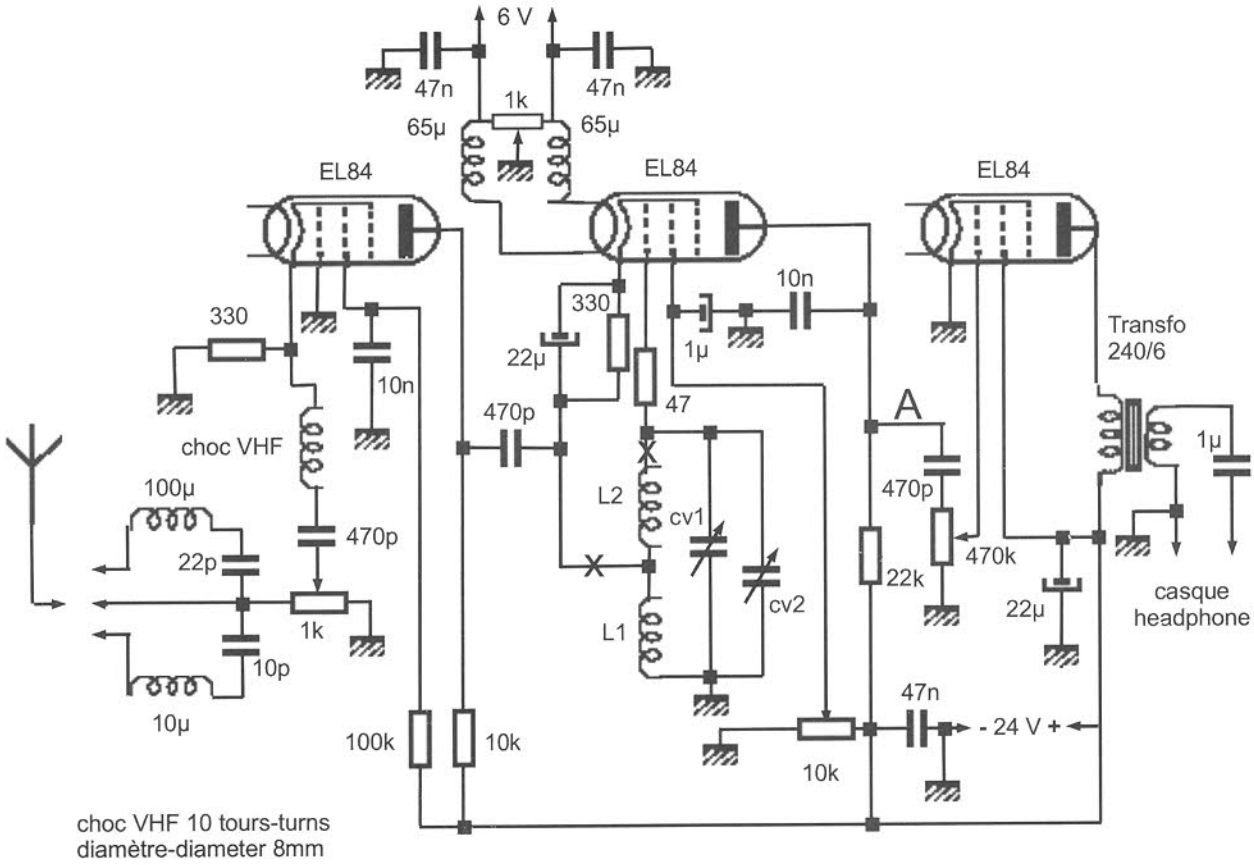
Ernst Olivier F5LVG, 2 Rue de la Philanthrop,
59700 Marcq-en-Baroeul. France. oernst@free.fr

Electronic tubes can be used with "B" voltage less than the usual 250V. Best tubes for low "B" voltage are tubes with high transconductance and high plate current. Tetrode or pentode designed for power audio amplifier like 6V6, 6L6, EL84 (6BQ5) have these criteria. I chose 3 EL84.

The first EL84 is a ground grid RF amplifier. The second EL84 is an ECO regenerative detector and the third an AF amplifier. This is an old 1V1 designed to receive all bands from 3 to 18 MHz, but optimised for the 3 ham bands 80 40 20 m.. The RF amplifier is untuned, except for 20m and 80m to avoid interference from broadcast stations in the 41 m band. Two series-resonant circuits are used. To avoid 50 Hz frequency modulation when the detector is oscillating, the 6V AC line must be centre tapped and 2 RF chokes must be used in series with the filament of the detector. Ham bands must be received with more than 200 pF of CV1 capacity to obtain a good frequency stability. To decrease the tuneable hum the 47 nF capacitors in the power supply are necessary. A drive reduction is necessary for CV2. The results may be greatly improved by using an audio preamplifier. The receiver becomes a 1V2.



The results of this receiver are amazing! It is not uncommon to receive in France SSB stations from North America in the 20m band as well as the 80m band!



choc VHF 10 tours-turns
diamètre-diameter 8mm

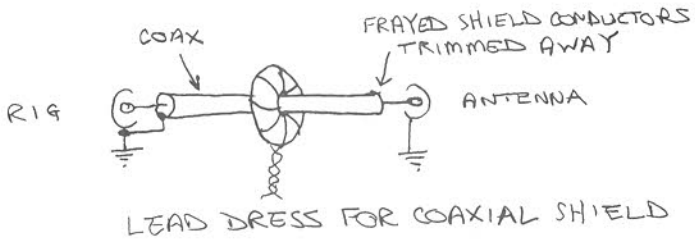
Bande-band/L1 (tours-turns)/L2 (tours-turns)/diamètre-diameter 80m/3/11/22mm 40m/3/6/22mm 20m/3/3/12mm

cv1 365 pf cv2 20 pf (20 & 40 m) 70 pf (80 m) F5LVG 2008 Openoffice.org draw Linux

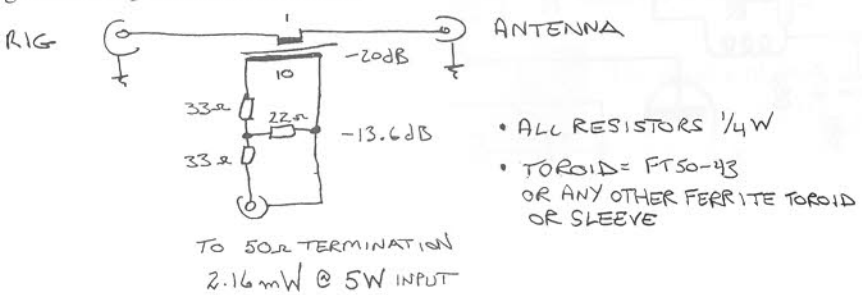
Line Sampler

Mitch Lee KB6FPW 686 N 21st Street, San Jose, CA 95112 USA

From time to time I find it useful to connect an oscilloscope to the output of a transmitter for the purpose of checking waveform purity, hunting down spurious oscillations, viewing keying characteristics, or simply monitoring the transmitter's output. Other times, I want to attach a counter to get an accurate measurement of my operating frequency. Making these measurements without disturbing the 50 Ohm integrity of the coaxial line is always problematic. There is no convenient place to attach a scope probe or counter.



The diagram shows a satisfactory solution I have used for some years. In series with the transmitter input to my antenna tuner, I place a current sampling transformer with a BNC output. The secondary's output is already attenuated by 20dB, but I load it with a 13.6dB attenuator to cut the signal level further and to stabilise the winding's burden. The attenuator is designed for a 50 Ohm load, but no harm is done by any other impedance ranging from an open to a short circuit.



A small penalty is paid as the current transformer absorbs 1% of the power it samples, amounting to 50mW out of the 5W signal. It also adds 0.5 Ohms to the line – equally inconsequential. Built into a small aluminium box just large enough to hold 3 coaxial connectors, the sampler can be left in line permanently and plumbed to a convenient point, ready for use when needed.

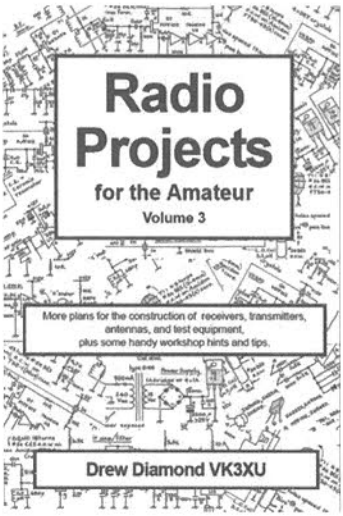
The current sampling transformer is wound first, comprising 10 turns of insulated wire evenly distributed around a small ferrite core. Either solid or stranded wire works equally well, in the range 20 to 30 gauge. Type 43 material is ideal for the toroid, but almost any ferrite material serves the purpose.

The core need be only slightly larger than the primary wire or coax so that the 10 secondary turns have room to fit. Something on the order of 0.5" works well with a primary of RG174 or, a wire which should be well insulated, and with a little care in winding the secondary, a 0.5" sleeve accommodates RG-58.

While the primary can be nothing more than a length of insulated wire stretched between two coax connectors, for best fidelity and isolation I recommend using a piece of coax with the outer braid grounded ONLY at the transmitter connector. This shields the secondary from coupling capacitively to the inner conductor, thereby preserving a true current measurement. Further, floating the secondary's output connector with respect to the enclosure eliminates ground loops that might otherwise introduce extraneous noise or distortion in the measurement. Special BNCs are made for this purpose although they are rather expensive, installing the normal type in an insulated bulkhead works just as well.

When resistively loaded, the transmitter's current waveform is an identical scaled version of the voltage waveform. Assuming the sampled line and sampler output are both terminated in 50 Ohms, the scaling factor passing through the sampler totals -33.6 dB, or about $1/48^{th}$ of the voltage on the coaxial line. A 5 Watt signal produces 15.8V across 50 Ohms; at this power level the output from the line sampler is 15.8/48 = 330mV, a safe and predictable amplitude for any oscilloscope or frequency counter.

The sampler is essentially flat throughout the 160m to 10m range. With a little forethought, the sampling toroid is easily slipped into other projects, such as antenna tuners and SWR meters, thereby simplifying and reducing the number of connections between the rig and antenna.



Radio Projects for the Amateur. Vol. 3
By Drew Diamond, VK3XU
Members price - £5

134 pages of projects, hints and tips from Drew Diamond, VK3XU. Build - Receivers, Transmitters, Antennas, Test Equipment, Power Supplies. Workshop hints and Tips for the home constructor. Projects include; simple receiver convertors for HF and 70cm, AM/CW transmitter for 160/80m, Antenna tips and plans, lots of test equipment, and much, much more. Projects feature B/W photos of the finished item, plus schematic diagrams and parts layouts. Drew has very kindly allowed the G-QRP Club to reprint this book and it will be available in early October 2008.
To order, see Club Sales on the back cover. Copies will be available at Rishworth on 18th October.

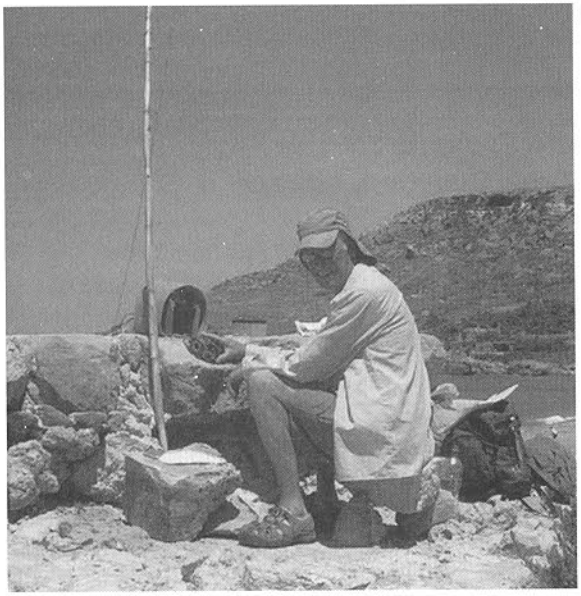
Taking QRP on Holiday – a DIY QRP DXpedition

Rev Les Austin G0NMD, The Parsonage, 1 The Glebe, Bratton Fleming, Barnstaple, Devon. EX31 4RE

I am a very slow CW op, both Rx and Tx, and thus not given to contests, nor chasing DX. However, due to the complete failure of angling in previous trips to Gozo - the northern island of Malta - I decided my 2008 trip would be radio-based instead.

Preparations began with the construction of an Elecraft K1. I got the 4 band version with auto-ATU and built it in March. Then I put together everything that might just be required to mount a reasonable portable station: SLA battery, solar panel, ex-Army key, head-phones, all manner of connectors and converters, plus wires and a ready-soldered up ground-plane to 300 Ohm ribbon feeder. A gas-powered soldering iron and some lead-free solder completed the kit.

We were in Gozo from 17th to 23rd May. I tried operating from the hotel roof in Xlendi, and got a couple of QSOs there – and one from the sea-front with 8ft of wire up on an umbrella! But I found it best to set up near the beach whereever my wife, her sister and brother-in-law wanted to sun-bathe. This was a new experience several times over. I had always wanted to "go portable" but never done it, wanted to try operation close to the sea (easily done here in Devon) but again never got it together, and often wondered what it would be like to have a slightly more exotic call-sign than g0nmd. To be 9H3LA was indeed a new experience. Over three main days of operating, and ruled by the timetable of the sun-worshippers rather than the propagation, my 4 or 5 Watts worked about 50 stations, a few of them QRP. It was so enjoyable I want to go back and do it again.

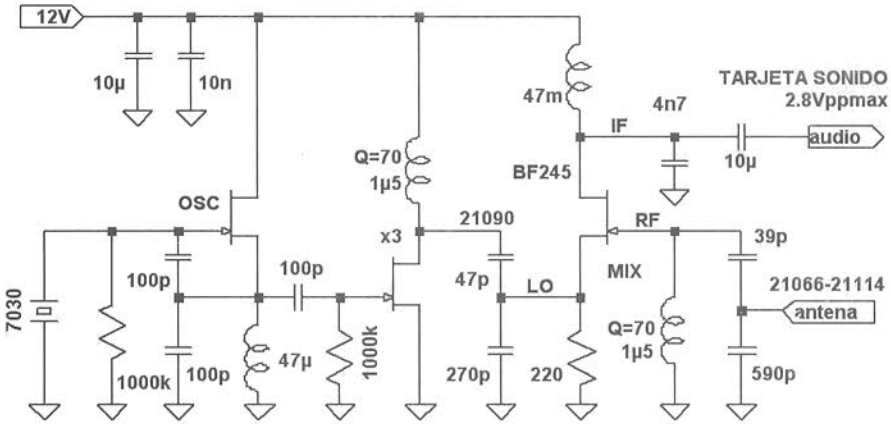


The picture shows me operating from some Roman ruins above Ramla beach. Although I only operated on 14MHz the aerial is the ground-plane, cut for 10.1 MHz, supported on a bamboo pole borrowed from a kind local gentleman. I probably should have tried to get closer to the sea, but it seemed to work well there and it was convenient – though sitting on a hard rock was a little trying! The K1 needed a 'bonnet' made of plastic foam to keep the sun off, to stop any tendency to drift, but it performed very well. What a lovely little rig it is. I only contacted two other G-QRP members (as far as I know) but it was a great experience and the small pile-up around local 4pm each day (before the sun-bathers cried "home-time") made me feel like minor DX. As Dominic M1KTA said in the Summer issue, "Everyone should try a trip like this at least once".

TRIPPI15, DSB DETECTOR FOR SOFTWARE-DEFINED RADIO

Eduardo Alonso, EA3GHS
ea3ghs @ qrp.cat http://ea3ghs.googlepages.com

My interest in shortwave communications has been centred in digital modes. Here we discuss a small crystal controlled double-sideband receiver with digital intermediate frequency, covering from 21066 to 21114 kHz.



This circuit has been designed as simple as possible. Let's see how works:

Oscillator

It is a Colpitts oscillator running at 7030 kHz. This xtal is very easy to find in any QRP club. The output of oscillator is send to a multiplier.

Multiplier

A transistor working in on-off mode generates a current with a lot of harmonics. With a high-Q LC network we extract the third harmonic: 21090 kHz. We connect the multiplier to the 220 ohm mixer input port with a capacitive transformer. I measured 1'5Vpp here (+1dBm/220ohm).

Mixer

It is the receiver's core. The signal from de local oscillator VLO is injected in the source of the FET. The signal from the antenna VRF is injected in the gate. The transistor generates a drenator current proportional to the difference squared, ID=k*(VLO-VRF)^2 appearing harmonics currents in FRF+FLO, 2FRF, 2FLO and, the most important for us, FRF-FLO.

IF Filter

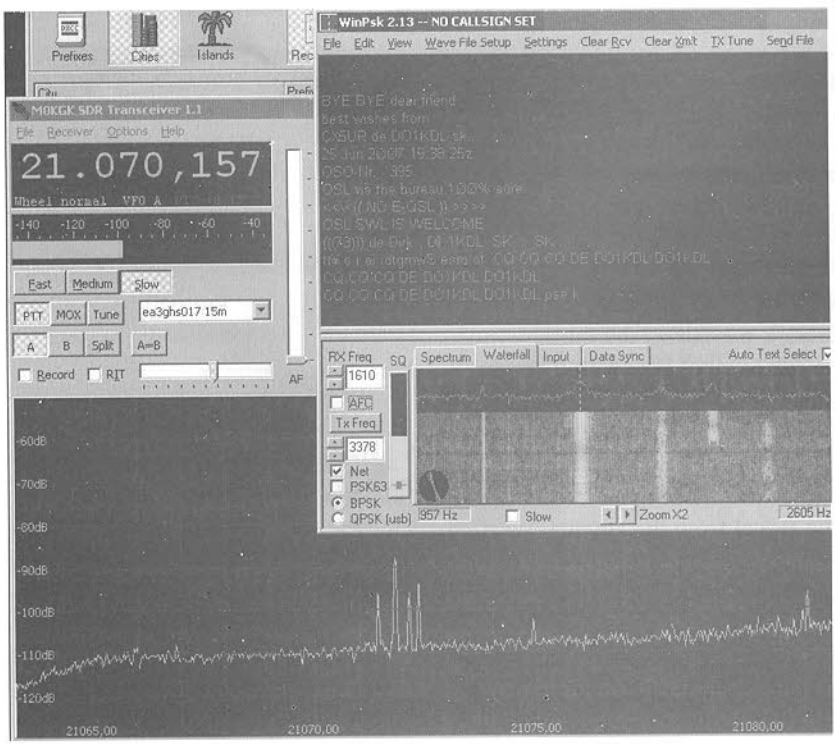
The PSK31 traffic is centred in 21070 kHz. We extract de difference signal from the drenator current with a LC filter centred in the lower sideband 21090-21070=20 kHz. This signal is send to the computer (or to an audio amplifier). The bandwidth here is not very well defined. The sound card input impedance is not lower than 1 K ohm. Attention, you will listen signals and noise simultaneously at 21090+20=21110 kHz from the opposite sideband.

RF Filter

The preselector is a simple tuned circuit. At 21 MHz, I measured a Qu=70 in my 1.5uH inductor, ie an equivalent parallel resistance of RP=Qu*XL=70*2*pi*21M*1.5u=14 K ohm. With a capacitive transformer, we adapt the 50ohm of the antenna to 14kohm of the LC filter. With SPICE, we estimated a medium-wave signals rejection of 70 dB. In on-air night tests I have not observed out-of-band signals (auto-rectification).This validate the balance between performance and simplicity.

Digital IF

Use the microphone input of the computer (max input level: 100mVpp). Digital signal processing can be made with the nice software from M0KGK. This program has a direct output to RTTY/PSK/... decoders like WinPSK and MULTIPSK. Try Canadian Rocky, too.



Test 1
Connect the antenna to the receiver, read the noise floor level. Disconnect the antenna and read the noise level again.
If the level is the same (here is the same) the total receiver gain is not sufficient. The noise that you view in the screen is internal receiver noise, not atmospheric noise.

Test 2
What antenna level I need to obtain 100 mVpp in the output (+0 dBFS/10kohm)?. in my case, I need 110mVpp (50ohm,-15dBm). The receiver has a power gain of -23dB. Fortunately, the sound card has a high input range and we can detect signals 100dB smaller: 1.5uV. Then, we can not hear signals under "S2".

Operation
Few hours after I assembled this receiver, I was able to receive almost all central European countries. Unfortunately, we are in minimum solar cycle and the propagation is unstable. QSB can be viewed in PSK31 spectrograms. Few operators make fast contacts in PSK63 between propagation minimums (QSB). Some special stations were listened: PC650DAM from Holland, II2SFI "Spirit Flame of Italy" and TM7EO from France.

CLUB SALES – new crystal frequencies

Those of you who build crystal control rigs may be interested to see that in response to member's requests, that I have added (with help from W1REX at www.qrpme.com) a few new frequencies to the HC49U calling frequency collection. I have added 7.028 – useful for VXO to get below 7.030; 7.040 – used in the USA for QRP; and 10.116, also used in the USA for QRP. Ordering info is on the back page as usual 72/3 Graham G3MFJ

MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS - MEMBERS ADS

WANTED: ELECRAFT K1 (not KX1) wanted for use on 80m. Any offers, basic model or with options considered. John G3GTJ, 01963240319. [Somerset]

FREE: Model 2001 AKD 2 metre transceiver and PSU, aerial matching and measuring meter. Also various components including packet equipment [Watson multimode unit] All free!. G3ASV. Telephone 01444 415053. Haywards Heath, West Sussex.

EXCHANGE: ICOM 745 100 watt T/RX with mic, power lead & manual for Velocette, BMW R25 or similar with cash adjustment. Will deliver/collect Mike Bowthorpe G0CVZ 01733 322227 or g0cvz@bowthorpe.org

WANTED: I wish to borrow the instruction details and circuit diagram for the Howes Kit DFD5 Digital Frequency Display also AA2 HF Active Antenna. Postage will be refunded Contact John G4VPU on 0191-2522304 address as in G-QRP Handbook No10181

MFJ HF/VHF SWR Analyser MFJ-259B (as new) £125 PLUS p&p.
THE MORSE MACHINE MM3 super keyer with extensive facilities i.e. 8k characters in 20 memories. Can send full specs by e-mail £75 plus p&p. Tom G0HIN g0hin@aol.com

Beacons

Dick Arnold, AF8X, 22901 Schafer St. Clinton Twp., Mi. 48035. USA

I have never quite figured out how to interpret all those numbers associated with propagation. Here is an easy way to see if the band of interest is open to a particular area. The beacons listed here by location and band is a great help to see if a band is dead or just quiet.

NCDXF/IARU Beacon Transmission Schedule

Each beacon transmits every three minutes, day and night. This table gives the minute and second of the start of the first transmission within the hour for each beacon on each frequency. A transmission consists of the call sign of the beacon sent at 22 words per minute followed by four one-second dashes. The call sign and the first dash are sent at 100 watts. The remaining dashes are sent at 10 watts, 1 watt and 100 milliwatts

Call	Location	14.100	18.110	21.150	24.930	28.200
4U1UN	United Nations	00:00	00:10	00:20	00:30	00:40
VE8AT	Canada	00:10	00:20	00:30	00:40	00:50
W6WX	United States	00:20	00:30	00:40	00:50	01:00
KH6WO	Hawaii	00:30	00:40	00:50	01:00	01:10
ZL6B	New Zealand	00:40	00:50	01:00	01:10	01:20
VK6RBP	Australia	00:50	01:00	01:10	01:20	01:30
JA2IGY	Japan	01:00	01:10	01:20	01:30	01:40
RR9O	Russia	01:10	01:20	01:30	01:40	01:50
VR2B	Hong Kong	01:20	01:30	01:40	01:50	02:00
4S7B	Sri Lanka	01:30	01:40	01:50	02:00	02:10
ZS6DN	South Africa	01:40	01:50	02:00	02:10	02:20
5Z4B	Kenya	01:50	02:00	02:10	02:20	02:30
4X6TU	Israel	02:00	02:10	02:20	02:30	02:40
OH2B	Finland	02:10	02:20	02:30	02:40	02:50
CS3B	Madeira	02:20	02:30	02:40	02:50	00:00
LU4AA	Argentina	02:30	02:40	02:50	00:00	00:10
OA4B	Peru	02:40	02:50	00:00	00:10	00:20
YV5B	Venezuela	02:50	00:00	00:10	00:20	00:30

Occasionally beacons may be off air – current info is available at http://www.ncdxf.org

A Side-Tone Monitor

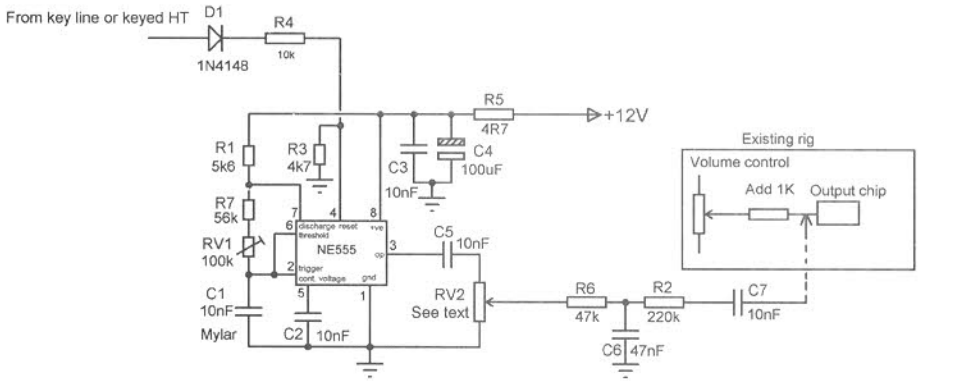
David Smith, G4COE, 54 Warrington Road, Leigh, Lancashire. UK

Side-tone monitors we see in homebrewed rigs are usually fixed frequency, this circuit is entirely variable, it is derived from my homebrewed el key internal monitor and can also be used for other things. No explanation should be needed here only to point out that in many circuits that we see the volume control in the rig may go straight to the output chip via a capacitor, in which case a 1K resistor needs to be inserted between the volume control and the input of the audio output chip if no resistor at all is fitted, otherwise when the volume on the rig is turned down there will be no or very little side-tone.

This circuit can also be used as a code practice oscillator or an audio signal generator by taking the output from the level control, the filters and attenuator can be included here if required.

To use as a code practice oscillator, simply put the key between the key line and the +Ve supply line and increase C to a 100 or 220uF the positive of the cap going to the IC and the negative to the level control, speaker or headphones being connected directly from the wiper to ground for this the filter attenuator circuit being omitted.

Winding the frequency up a little makes the ears twitch... just a little...!



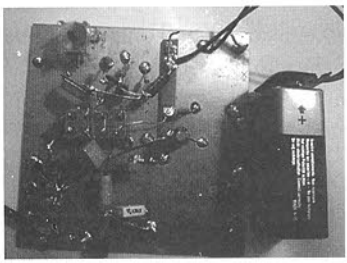
NOTE:
RV1 - 100K preset or linear pot
RV2 - 100 K pre-set for use in rig or 1K log for code practice oscillator and change C5 for 100 - 220uF
R5 in the supply may be deleted

VLF Reception of SAQ on 17.2kHz

Roger Lapthorn G3XBM, 37 Spring Close, Burwell, CAMBRIDGE, CB25 0HF

On Christmas Eve 2006 I wanted to try to copy the VLF morse code signals from SAQ at Grimeton in southern Sweden. These special commemorative CW transmissions happen every few months. This is a brief summary of this attempt. CW transmissions on VLF are rare today as most remaining VLF stations use data modes.

SAQ was built between 1922 and 1924. The 200kW transmitter was, and still is, unusual as it consists of an AC generator (alternator). The antenna consists of six 127m high antenna towers placed at intervals of 380m with the 46m cross-arms carrying the eight copper antenna wires. On Dec 1st 1924 it first transmitted with the SAQ callsign on 16.1 kHz, but this was later changed to 17.2kHz on which frequency it operates occasionally today. Today the same station and antennas are preserved as a UNESCO World Heritage site some 80 years later.



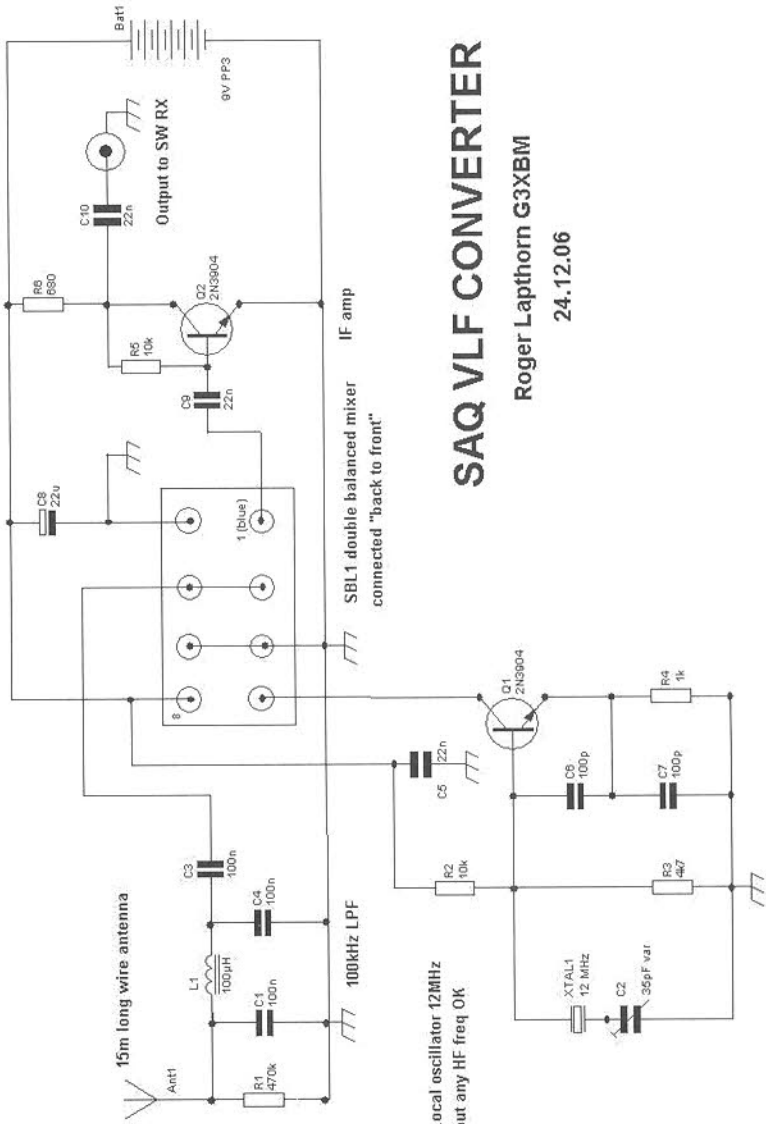
The converter below was built to use with my FT817, but it will work with most SW receivers. The circuit consists of a low pass filter feeding into an SBL1 double balanced mixer connected "back to front" with the IF port as the main RF input, a 12MHz crystal local oscillator, a 2N2904 IF pre-amp feeding the output at 12.0172MHz (12MHz + 17.2kHz) into the FT817 in CW mode. Of course the choice of crystal depends on what is in the junk box.

The converter will work reasonably well from a few kHz up to around 100kHz. The antenna was my usual random wire down the garden tuned against the central heating ground. You will see that I am not into grand PCBs - rats nests are more my style! It shows that a circuit can be thrown together quickly and got to work with fully acceptable results.

Just before 8am SAQ was RST559 with me whereas MSF on 60kHz was RST599+. Unidentified data signals around 20kHz were RST589. The initial signals were just "VVV de SAQ" but then followed a short message in CW which I copied. I sent them an e-mail report with an MP3 recording of the signals as I heard them. I am not sure if they QSL, but I hope so as it would be good to have a VLF QSL on the wall.

My circuit, far from optimised as it was designed and built in just 20 minutes, is shown opposite. This is shown for ideas only and you are probably able to do something much better with more care. Reception would have been possible without the IF preamp too.

Check the SAQ radio station website http://www.alexander.n.se/ and have a go at receiving its historic commemorative CW transmissions when they are next broadcast. These CW transmissions are sent at about 12wpm. Reception reports may be sent to the station via the SM ham radio QSL bureau, via their website e-mail address, or by post.



Components Used

R1	470k
R2	10k
R3	4k7
R4	1k
R5	10k
R6	680
C1, 3, 4	100nF
C2	35pF trimmer
C5,9	22nF
C6,7	100pF
C8	22uF
Q1, 2	2N3904
SBL1	double balanced mixer
L1	100uH choke
Battery	PP3

A Simple Telephony Transmitter Tester

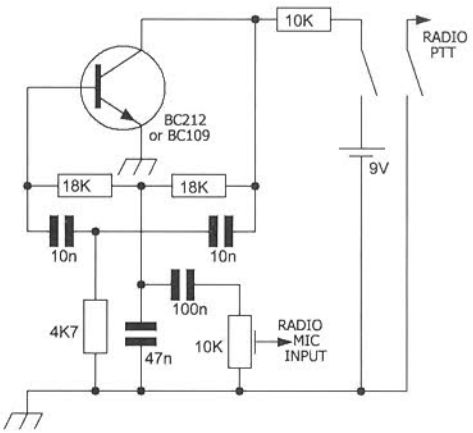
Steve Hartley G0FUW, 5 Sydenham Buildings, Lower Bristol Road, Bath. BA2 3BS. [g0fuw@tiscali.co.uk]

Most voice transmitters require a steady audio signal to be fed into the microphone socket during testing. This can be achieved by whistling or saying 'aaaahh' but I find that I run out of breath just as I am making the final adjustment of a preset or trimmer. Most annoying.

This little circuit was devised for use at the first Bath Buildathon where we had twelve first-time transceiver builders and we needed some consistency for multiple transmitter testing. The tester is based on a simple 'twin-T' audio oscillator that is often promoted for Morse code practice (e.g. see RSGB Cookbook p284). Using the component values shown produces a signal of around 600Hz. The pre-set resistor allows the output to be set to emulate your microphone of choice. Typical CB type dynamic microphones develop 20-40mV peak to peak, some ex-PMR models slightly more. A quick check into an oscilloscope allows the tester to be set to the correct level – alternatively use with a power meter and a known transmitter/microphone to compare.

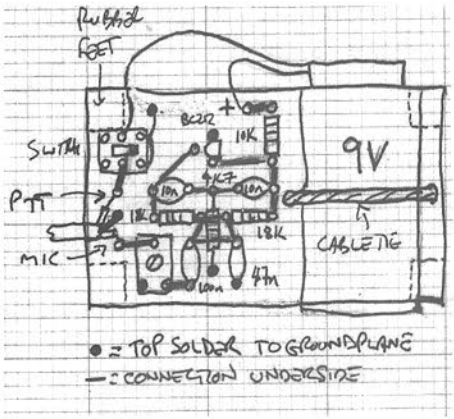
A switch is included to activate the push-to-talk control and to switch the audio oscillator on and off to prolong battery life. My original used a double pole double throw switch but in retrospect two separate single pole switches would provide more flexible switching options. Whilst this circuit lacks the sophistication to provide proper two-tone peak envelope power measurements it is ideal for setting up homebrew voice transmitters. You could build one into a sideband transmitter to provide a steady carrier for antenna tuning or even key the audio for CW transmissions.

Circuit



Suggested Layout

Squares are 0.1" pitch so could be used for Veroboard but I used plain single sided PCB with copper side up, ground connections to top side with point to point wiring underneath.



FDC FD-460A review

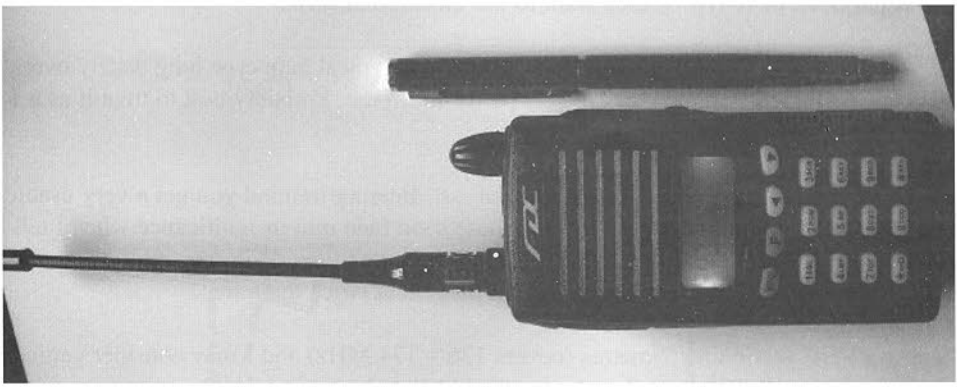
Richard Mekka, G4AWY, 57 St Johns Rd. Caversham. Reading. RG4 5AL

A friend of mine recently purchased from Hong Kong a small handheld rig which he was very pleased with. When I visited him and saw it I too was intrigued, and ordered one. Thought I would write up my findings in case any members are considering getting a UHF h/held, so they will know what to expect.

The FDC FD-460A is a small (125 x 60 x 40mm) FM transceiver that covers 400 – 470 MHz. This means it covers the entire amateur 70 cm band, both in Europe and other parts of the world. Note that it receives AND transmits throughout this entire range!

I purchased my FD-460A from a well known Internet auction site. Having placed the order on a Sunday (and paid for it) I received an e-mail the next day saying it had been dispatched. Sure enough it turned up on the doorstep the following Friday. No complaints on that score! So what do you get for your money?

The well wrapped box contained:
The rig itself, c/w with NiMh battery pack
A screw-in "rubber duck" type aerial (approx. a ¼ wave on 70 cm)
A drop in charger c/w UK plug psu (nice touch this I thought)
An earpiece/external microphone
A belt clip
An instruction manual, printed in both English and what I assume is Chinese.



For anyone who has used a dedicated ham handheld or a scanner the operation of the rig will be straight forward enough. As is usually the case there is a "VFO mode" and a "memory mode". Dealing with the former first it is a matter of punching in the required frequency (say 433.375 MHz), selecting the transmitter offset (+1.6 MHz for repeater operation in the UK) and selecting the correct CTCSS tone on receive & transmit (if

required). "Tuning" of the VFO is done by pressing the "up" and "down" buttons – there is no tuning knob. The user can also select step size – 25, 12?, 10, 6? and 5 kHz. In fact all of the facilities on the rig are controlled via a menu system and the up & down buttons – power output (5 or 1 watt), squelch level and several others. The only conventional analogue control is the volume control (which doubles up as the on/off switch).

Once the VFO is set up with the various parameters it can then be transferred to any of the 99 memories. Most settings are "remembered", certainly things like CTCSS and repeater shifts. Once you have your local repeaters & simplex channels stored you can then scan them and the rig will stop on any that are active.

I have no way of measuring power output at 432 MHz but have no reason to suspect it is less than stated in the specs. Ditto, none of my test gear for receivers goes up that high but sensitivity & selectivity seem very good, and there are few "birdies" throughout the entire coverage. I haven't found any within the UK 70 cm band.

Are there any drawbacks with the rig? Well, a few but they are pretty minor. There is no 1750 Hz toneburst. The scanning and search facilities are primitive. You can only scan ALL the memories – there is no way of organising them in "banks". If you set the rig to search it trawls through all 70 MHz (which takes ages). In both scan and search mode when a signal is found the rig stops for 5 seconds and then carries on. You can't adjust the pause time, or even turn it off.

The aerial connector is a slightly unusual one. The rig has an SMA *male* socket on the top. Chances are that most people will have to make up or buy an adaptor to "go" to the more usual BNC or N-type if they want to use an external aerial.

At 5 watts output the battery doesn't last long! A few typical ham-type long waffly overs will see it sadly depleted, and the rig gets pretty warm too. Probably best to treat it as a 1 watt rig if you favour this style of operation.

I have kept the best part of the FD-460A until last. Bearing in mind you get a very usable radio, albeit with one or two little niggles, these soon fade into insignificance when I tell you I paid £30.00 for the rig! And that included delivery to my door! You really cannot quibble at that price. I'd have considered it a bargain at twice that price.

There is a VHF version for 2 metres (covers 136 – 174 MHz) and I may consider getting one of these as well. £30 for a 2 metre handheld has to be a good deal by anyone's standards. Spare battery packs & a lead for programming the rig are available, and work on both the UHF & the VHF models.

A Stand for the FT817

Told in pictures by IK5BDP

Material

Plastic pipe Int. ∅ 2 mm x 100 mm about

Steel wire
∅ 2 mm x 398 mm about

Fig. 1

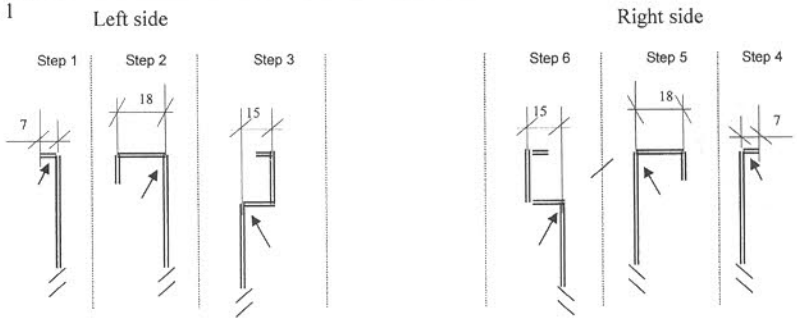


Fig. 2

The wire
After the step 6

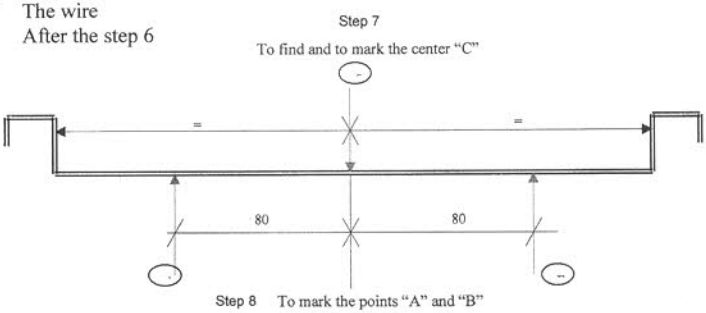
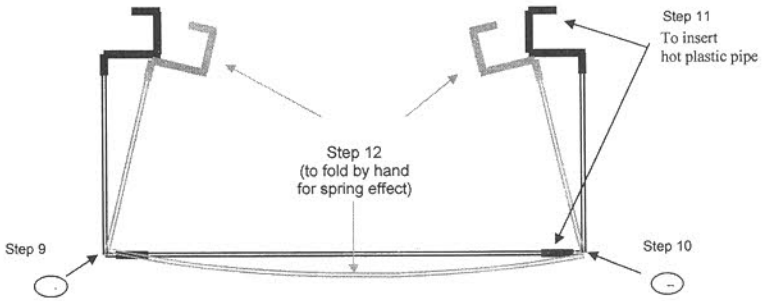


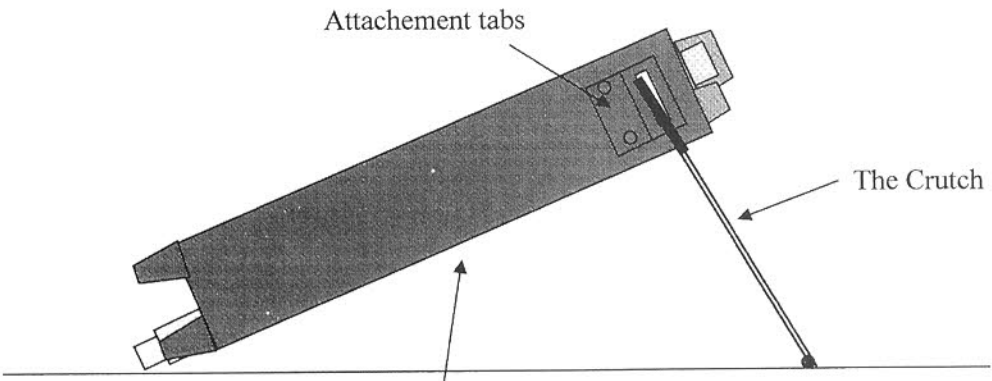
Fig. 3



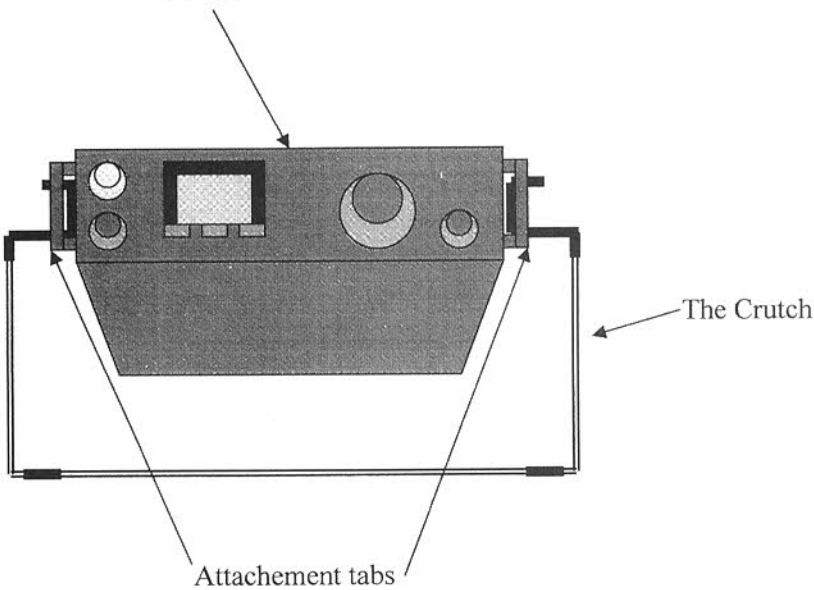
By IK5 BDP

→ = To fold by pliers

Ph. 1


Attachement tabs
The Crutch

Ph. 2


FT 817
The Crutch
Attachement tabs

Easy Meter Shunts

Jim Brett G0TFP, 11 Manor Rd. Tyldesley. Manchester, M29 7PH

Simple meter shunts can be made using garden wire. This is usually a steel wire coated with green plastic typically obtainable from garden centres or stores such as Wilkinsons "general purpose garden wire" which has a coated steel wire 0.5 mm diameter.

The following describes a method of shunting moving coil meters without the need of any test gear or other meters.

Connect up the meter to be shunted to a power supply in series with a suitable resistor to give a reading near to full scale and note the reading. Measure say 200 cm of garden wire and connect this in parallel with the meter. Note the meter reading. The difference between this and the original reading is the current flowing through the shunt.

Since the voltage across the meter and shunt is the same we can now express the internal resistance (R) of the meter in terms of length garden wire using Ohms law:-
R x current through meter = Length of wire x the shunt current calculated above

Thus R = Length of shunt wire x the shunt current calculated above current through meter

We now know the resistance of the meter in terms of wire length.

If we want to shunt the meter to read say 100 times the fsd value then 1% of the current must flow through the meter and 99% through the shunt. By Ohms law the resistance of the shunt must be 1/99th of the meter resistance or 1/99th of the length of wire R as calculated above.

Due to heating of the shunt for currents greater than say 5 amps it is better to use several wires in parallel i.e. for 20 amps use 4 times the calculated length of garden wire connected in parallel to keep to the correct resistance.

Getting started with PSK31

John Rehak N6HI

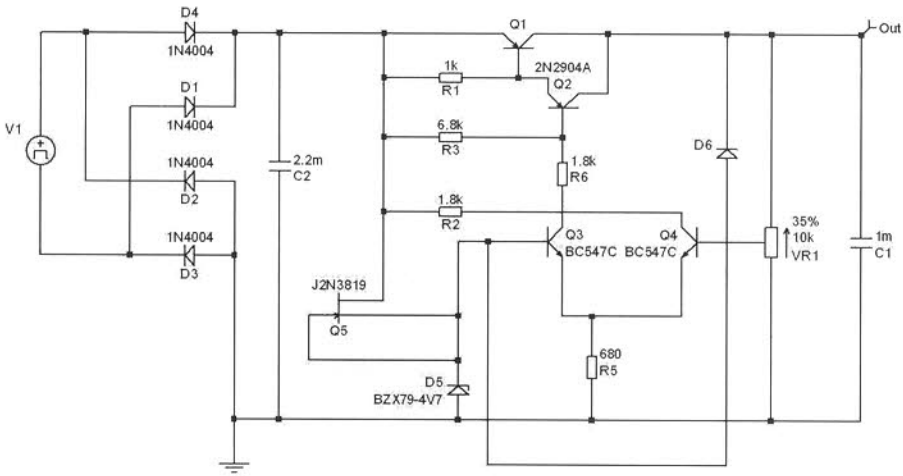
After 44 years of nearly 100% CW operation, with the last 12+ years 100% QRP, late last year I "discovered" PSK31, possibly the best mode ever for QRP! Using just a 20 foot long hunk of hookup wire with a rock tied to the end, thrown into a tree out of my window, and 2 watts output, it took me only 99 days to work all states on PSK31. Now this "hardcore CW op" spends about half his time on CW and half on PSK!!!
I learned a lot along the way that could be very useful to QRPers getting started with PSK31, and I have placed a new page – "Getting started with PSK31" on my website <http://members.cox.net/jrehak/> ... then click on "Getting started with PSK31"

Amplifier, filter unit and power supply

Aren van Waarde, Boslaan 62, 9801HH Zuidhorn, The Netherlands

In his book *"Ontvangers"* (Receivers, 2nd edition, Bussum 1973), F.A.S.Sterrenburg writes: "An AF power amplifier produces a fair amount of heat, which can negatively affect stability of the receiver VFO. A built-in loudspeaker may also cause microphony of the tuning capacitor. The simplest solution, particularly for valve receivers, is: AF amplifier, power supply and speaker in a separate enclosure. The amplifier/PSU unit can be used for several receivers, which reduces the expense not insignificantly. Receiver circuits should end with a simple driver stage for headphones" (p.195). I took this advice to heart and made a stand-alone amplifier, filter unit and power supply

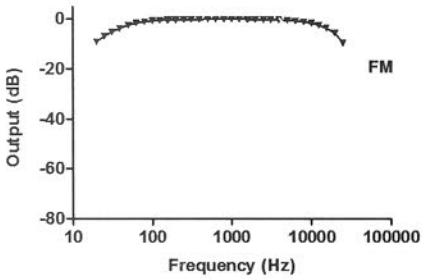
My PSU was built from discrete parts, using a circuit from a very old book (J.H.Jansen, *Meetinstrumenten en Meetschakelingen Zelf Bouwen*, Deventer, 1970, see Fig.1). Q1 can be any PNP power transistor (I used a 2SA1294). D6 is a germanium diode, in my case AA143. The circuit is fed from a 15 VAC, 50 VA toroid transformer and the output can

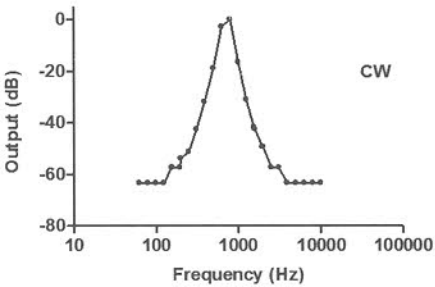


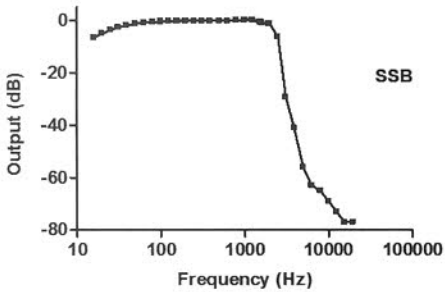
be adjusted from +4.7 to +15 V, using VR1. Output currents up to 2A are possible at voltages ranging from 6 to 15 V, with sufficient cooling of the pass transistor (Q1). The reference zener (D5) is fed by a JFET current source (Q5). I_{DSS} of the JFET should lie between 3 and 10 mA. If it is greater than 10 mA, a 270 Ohm resistor should be inserted between the gate and source nodes in Fig.1. I measured a drop of the output voltage of 50 mV when the load was increased from 0 to 0.9 A, corresponding with an output impedance of 60 milli-ohms. There is no audible hum when this PSU feeds the power amplifier. D6 ensures short-circuit protection. When the output voltage drops below the zener voltage, D6 begins to conduct, Q3 is cut off and there will no longer flow any current through Q1 and Q2. In my copy of the unit, PSU voltage is set to +12V.

The output module is the "Quality Audio Amplifier" developed by GM4ZNX and G3ROO (SPRAT 63, summer 1990, 28-32). I followed the instructions in SPRAT to the letter, including the PCB layout. By feeding the line output from my Sony ICF-7600D portable to the "quality amp", and comparing its speaker audio with that of the Sony, I noticed that the GM4ZNX amp is much better than the output stage of this commercial SW receiver.

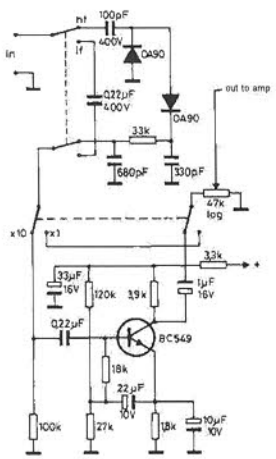
CW listening is done with the "Active Audio Filter" described by GM3OXX in SPRAT 10, summer 1977, page 3. A PCB layout is shown there. Instead of 741 op-amps I used NE5534s. As an SSB filter, I employed the circuit presented in SPRAT 70, spring 1992, page 3-7. Measured frequency responses of power amp and filters are shown here







Much attention should be paid to the cabinet and speaker if good sound is to be obtained. After several trials, I settled for an oval broadband loudspeaker from Germany (Haes LPB 713/19/65, 130x70x55mm, shielded magnet, impedance 4 Ohms, power handling 12W RMS, sensitivity 86dB/W/m, frequency range 65...16000 Hz, available from Pollin Electronic). Electronics and speaker are mounted in a heavy enclosure, made of 4 mm aluminium, which originally contained a 27 MHz transmitter in the Rotterdam harbour. I glued a layer of thick felt (5 mm) to the inside of the cabinet to improve its acoustic properties. Human voices are now well reproduced. One can listen to FM broadcasts for several hours without getting fatigued.



The usefulness of the unit may be increased by the addition of an RF/AF probe, gain=10 preamp, and output indicator. It can then perform all functions of a signal tracer. A suitable probe and preamp are shown here, taken from *Radio Bulletin,* an electronics magazine defunct since the late 1980s. On his interesting website (*Vintage Radio Repair and Restoration*), Paul Stenning presents a simple output indicator (http://www.vintage-radio.com/projects/output-indicator.html).

Got Problems Soldering?

Here are some tips to make the job easier
Mike Street G3JKX, 12 Ullswater Cl. Priorslee, Telford. TF2 9RB

When building a circuit on a PCB it is necessary to pass the leads of quite small components through holes, then, turn the board over to solder the wires to the pads on the reverse side. Sometimes these components have to go into a very small space between other parts. Also, you usually have to bend the component leads a little on the reverse side to hold the part in position whilst you solder. This is great IF you can bend the wires. Some leads, on relays for example, must NEVER be bent. Another problem is holding small printed circuits till whilst soldering. The usual 'third hand' that you can buy, is clumsy and quite difficult to use, even for an able-bodied person. Both of these problems were easily resolved by using lumps of Blu-Tack!

By sticking an acorn sized piece onto the top of a component makes it much easier to hold. After placing the wires through the holes, you then **push the** Blu-tack down onto the board, which then holds the part firmly in position whilst turning the PCB over for soldering. This works like a charm and I realised that this technique was ideally suited to a disabled intermediate student, who only had the proper use of one hand.

During the build of his course work project, we also used a big lump of Blu-Tack to temporarily stick the Printed Circuit down onto the bench. This held it quite still whilst soldering took place. Aha, some of you are saying yes, stick the component into place, good. Yes, stick the board down, great. But don't you need two hands for soldering; one to hold the iron and one to apply the solder? With my disabled student I fixed the solder wire to one finger on his duff hand with tape. Problems sorted. Using all these methods he was able to easily complete his project, which worked first time.

Soldering two components or wires together is also so much easier if they are both stuck down and made immobile whilst soldering. Using Blu-Tack to hold wires in the right position to go into plugs and sockets makes that job so much easier too.

Assembling electronics also involves getting small screws, washers and nuts into position to fix things together. Once again Blu-Tack comes into its won. A tiny piece on the point of a screwdriver holds a bolt head whilst you get the threaded part into its hole. Washers can be pre-positioned on a screw using another tiny piece, which stops it falling off into the works! Nuts can be stuck in position whilst a screw is started into it. Naturally you must ensure that these bits of Blu-Tack are retrieved for re-use and not left around inside your bit of kit.

I hope that some of you who have never made anything, or who used to, but now have unsteady hands, will try these methods, which makes assembling electronics that bit easier. Maplins have got some 'starter' kits to break you in. There's more advertised in the various radio magazines of course. Go on, have a go. You never know, you might enjoy it! There is nothing quite like making something for the shack, yourself, that works.

QRP from a Difficult Location [a personal story]

Dave Lindsay, GM4HQF, 39 Seamount Ct. Aberdeen. AB25 1DQ

I passed the RAE and Morse test 35 years ago but did not take out a licence till 10 years later. I had been advised that I would never be able to work anything from this concrete and steel "anthill", however, years later better counsel prevailed.

My QTH is on the 5th floor of a 17 storey tower block, 126 three roomed apartments having narrow balconies front and back. My aerials are on the north facing bedroom side and are about 60 feet above the ground. As the building sits on a small hill, it might be about 80 or 90 feet above sea level, which is about 1 mile away.

Over the years I have tried all sorts of things to get a signal out and probably my location is better than most apartment dwellers. The best asset I have is height, everyone should try to get their antennas as high as possible. I have been lucky that I have had very good neighbours and although they have changed 3 times since I was licenced, none have objected to me invading their balcony space with odd bits of wire and string. Any objection and I would have, of course, removed everything. I can fit a 10m dipole into my own balcony space of 19 feet long and by using my neighbours I can manage a 20m dipole.

Many years ago I purchased "Dipoles of Delight" from GM3HAT for 10,15 and 20 and they work very well. I did not like the idea of the antenna wire touching the middle balcony pillar so considered a way of getting it a little bit clear of the building. I procured a bamboo pole which you used to get inside rolls of carpet and lashed it to the end balcony pillar with strong nylon cord. One end of the dipole was attached to this and the other was supported through an insulator on my neighbours pillar by polypropylene string folded back and tied to my other balcony pillar. Changing bands took about 10 minutes as I could put everything up and down with the string pulley system without intruding on my neighbours balcony. This is fine until you get a gale force north wind. The wind hits the top of the building and comes down the side with a terrific force. Removing the bamboo pole meant untying it and having to lash it back in calmer WX, not the best solution.

As I am at the end overlooking the North sea I have a couple of feet of balcony at the corner of the end pillar. My old school friend is a blacksmith and he made me a couple of steel brackets which would fit over the end bit of balcony. The bamboo pole would fit into bolts protruding from each bracket at different heights, so that the pole would be elevated a bit, and held in place by small steel plates and wing nuts. I could now remove the bamboo pole quickly in high winds and put it back up without struggling to get nylon cord round the pillar. The end of the dipole is only about 4 feet from the pillar and I suppose it does not make much difference as it is very close to the building but it makes me feel a bit better about it. This worked well till some kids managed to break my bamboo pole. How they managed to do that from the ground is another story. I could not get another bamboo pole of the same diameter so I have been using a short aluminium mast pole. This is ok but it is heavier than the bamboo. I have managed to get another bamboo pole lately which I will try out in the summertime.

I like to work the odd contest or two and changing bands is a doddle in the middle of summer. Not so in a winter blizzard. I tried a 10, 15 and 20m trap dipole but found that even the smallest commercial traps were too heavy and were no use even in a moderate wind. My next job is to try and make lightweight coaxial traps for QRP work. Why does nobody sell them?

I have also used mono-band mobile whips attached to a bracket on the balcony. I used a long clamp which fixes to the balcony and my blacksmith friend welded a couple of steel bars to each side of it at a 45 degrees angle and these lie along the top of the balcony to stop the clamp twisting. Gutter mounts attach to the steel bars.

Dropping a wire down the side of the building was ok on a nice calm night but no use if it was windy. A great danger of the wire getting snagged on another balcony.

I have also tried many hair-brained things which were probably highly unsafe so I won't go into them. About 9 months ago I decided to try an end fed wire. The neighbour two along works abroad a lot and I asked him if he minded me putting a thin wire along his balcony, no problem. I now have a 66 foot long end fed along our 3 balconies so I don't need to go out in the cold and change bands. Must be getting lazy in my old age!

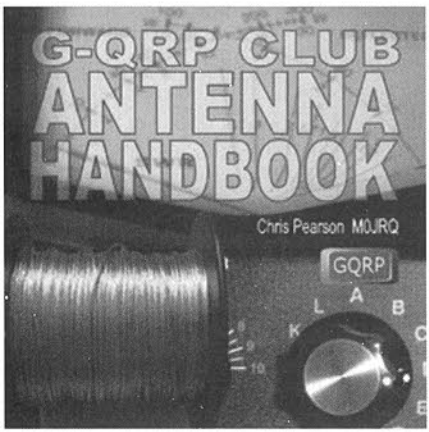
A few points.

Nothing is ever resonant at the correct length due to being so close to this hunk of concrete and steel. I just set everything to the right dimensions and use an ATU. Even though I have never run a great lot of power I would say that my Howes ATU is essential with all the houses around me. My end fed behaves ok on 10, 15 and 20m but definitely needs a counterpoise on 40 and 80. I use the MFJ Artificial ground as it lets me see the current flowing on the meter. G3MHT's design for a loaded counterpoise in Sprat 118 would do equally as well.

This system works ok to the north but because of this building and another behind it, working into Africa and South America is very difficult. Of course over the years there have been the odd exceptions.

My location is probably unlike anyone else's but where there is a will there will be a way to get a signal out.

It helps to have good neighbours and do try to convince your best friend to learn blacksmithing!



The G-QRP Club Antenna Handbook – 2nd edition

This book has been very successful - so successful in fact that we have had to order a second printing.
This has given Chris M0JRQ, the original compiler, the opportunity to tidy up the first printing and to make clearer a few of the old diagrams.
Price – still £6 to members and £10 to non-members. The new printing will be available at Rishworth.

Working with SMD components

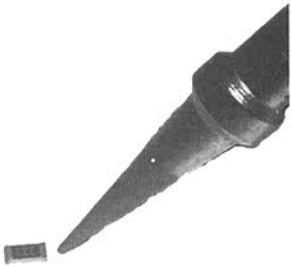
Tony Fishpool G4WIF

Working with SMD components need not be any harder than with conventional components and success often depends upon technique and having the right tools.

The first and most obvious tool is one that gives you the ability to see what you are doing. Magnifying glasses with built in lamps are available from many outlets. My local "Hobbycraft" shop has a choice from several. Get one that allows you to position it where you need it. Mine has a cantilevered arm and it clamps to the bench. Unless you are blessed with perfect vision you will come to find (as I have) the magnifying lamp a real boon in the workshop.

The work area is important. These components are quite tiny and will certainly disappear amongst clutter if given the chance. The work surface should be well lit and the magnifying lamp will help in that regard.

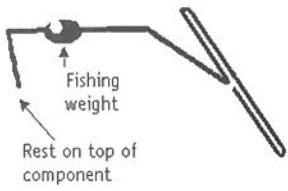
Your soldering iron needs to have a fine point. Compare the picture of my bit against a 1206 size resistor. That old chisel edged iron will probably not be suitable for SMD work. The solder you use is important too. The thicker diameter stuff we've been using for years is the soldering equivalent to "taking a sledgehammer to crack a walnut". A few years ago at Hamcom I bought a reel of 63/37 alloy (approx 26 SWG) solder for a couple of dollars. I've used it quite a bit and it still looks full because the solder is so thin. I reckon this reel will still be in use by my grandchildren – it goes such a long way!



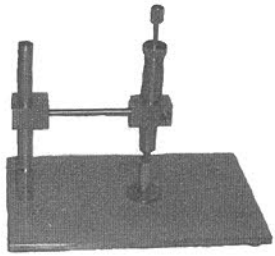
I have read that it for SMD work it is also better to select a solder that contains a small amount of silver. This mix lowers the melting point and it reduces the rate at which component metallisation leeches into the solder itself. Tin/lead/silver solder ratio is usually 62/36/2.

The temperature of the iron should be no hotter than you need it to be in order to make good joints. Too much heat can really cause problems with these tiny components – not to mention what it can do to the PCB. A variable temperature iron is the ideal but I have a friend who uses an ordinary iron and controls temperature using a light dimmer. Obviously there is a warning here. If you aren't confident and competent to work with potentially lethal mains voltages then don't try the dimmer trick.

When I first started to use SMD components I found it hard to position them and keep them still while soldering. Using a small pair of plastic tweezers was a disaster as I "pinged" the components to places never to be seen again. A small sprung loaded pair of needle nose pliers works for me to pick them up, then place and nudge the components into place – but how do you keep them there? My first device came from a tip from Jerry Henshaw KR5L and involved a bent coat hanger wire and a 50 pence fishing weight.



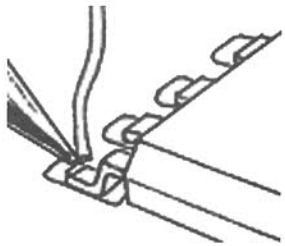
The second device was made by engineer *par excellence* Ted G0ULL and consists of a sprung plunger contraption that you can see resting on the penny in the photograph. Graham G3MFJ manages without anything and relies on manual dexterity – holding the component down with a jeweller's screwdriver whilst soldering one end. At the end of the day, as long as you can keep the little blighters in place while you solder that's just fine. There is usually enough solder on the tinning on the PCB to enable you to tack a component down, then you can solder the other end properly. Finally, go back to the first end – and do that properly.



There are bound to be times when you make a mistake and want to remove the component or where too much solder has been applied and you are causing a short circuit. Add another essential tool to your list – solder wick! With SMD work this is far more effective than a solder pump.

Now to soldering

Having carefully placed the component and double checked you have it round the right way, select a corner pin (in the case of an IC) and apply solder as shown in the picture. Again, there will probably be enough solder in the PCB tinning to secure the component. If at this point you've got it wrong then the solder wick can get you back to square one. With one pin anchored it is easy enough to work around the chip soldering the rest.



Components

The numbering on the body can usually identify SMD resistors. A resistor marked "333" would be a 33K resistor. The first two digits signifying the value and the last is the multiplier, in this case - number of zeros, i.e. 33,000. We are not quite so lucky with capacitors, they are generally not marked at all and if they are, it may just be "house" mark. Take care when removing them from the identifying packets if you have bought a kit.

SMD components come in many sizes – the ones that the hobbyists tend to encounter and their sizes are shown in the table below, although the range goes down to at least 0102. After some practice it is perfectly possible to use the smallest in the table for home constructed projects although I would not recommend anything smaller.

0603 (60 thou long, 30 thou wide)
0805 (80 thou long, 50 thou wide)
1206 (120 thou long, 60 thou wide)

Antennas Anecdotes Awards

Colin Turner G3VTT
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G3vtt@aol.com

I have decided this quarter to hand AAA over to M0GAE who sent me this article about how he made a simple vertical antenna from a tank whip. It might seem straight forward to some of us to make our own antennas but it shows how a simple piece of government surplus can be put in to use and money saved.

A Simple 'FIELD' Ground Plane antenna

THE ORIGINS

In the spring of 2006, a fellow radio amateur brought along to the Tynemouth Amateur Radio Club, a few items of radio related junk. At the end of the evening there was only a green metal rod remaining. I picked it up and was contemplating its' use, when a fellow club member informed me that it was a section of a *Tank Antenna.* According to him I needed a further three sections to make an antenna for use on the amateur bands. It's not like me to pass on a free offering so all I needed now was three more sections to begin some antenna testing.

After a short while I received a message from the same club member informing me that he now had a complete *Tank Antenna,* and if I was interested I could have it. So I hot footed it around to his house, collected it and donated some money to club funds in exchange.

The Rod Ends

I had acquired four sections of a *Tank Antenna*; a top, middle, and two bottom sections which measured in total approximately 4.9 metres when screwed together. The sections were constructed out of sprung steel with an outer copper sleeve and finally painted green. There is a short broad thread which allows them to be pushed together and then given a quick twist to lock the sections together.

MOUNTING

I had an antenna, all I needed now was to figure out how I was going to mount and feed it. Again another fellow Tynemouth Amateur Radio Club member came to the rescue, this

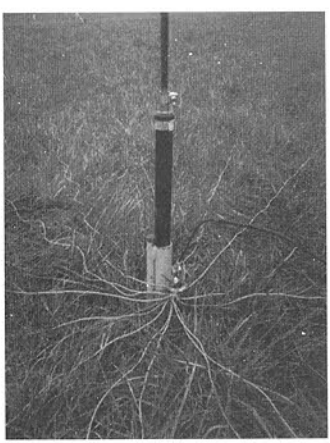
time with a spare proprietary fixing. This consisted of a short stainless steel metal tube fitted into an insulator into which the antenna is pushed supporting it in its mount.
There is a metal collett that also tightens to secure the antenna. For several weeks I pondered on how I was going to fix the antenna with or without the new mount. I would stand with it in the garden and ponder what to do with it. I didn't know what the neighbours thought I was doing but the main thing that struck me was that it had a low visual impact. There is a great deal said about Stealth Antennas and I thought that it might be a good antenna to mount at the top of a garden fence and couple it to an auto ATU. Looking through catalogues there were lots of vertical antennas on the market that were mounted close to ground level, so that was going to be the starting point for my tests.


Tube and Mount

In June 2006 a few of us from the Tynemouth Amateur Radio Club organised a 'Field Day' with the intention of trying out a few new ideas. Mine would be to test the 'FIELD' antenna. With this planned it made me work more quickly to sort out a Mounting for the antenna. I had a short section of an old broken SOTA Pole lying around (the result of my son trying to use a SOTA pole to retrieve a Frisbee from a tree) which I cut down and finally I used a ground spike with an attached tube from another manufactured portable antenna and then I was in business.

RADIALS

The 'FIELD' antenna is about 4.9 metres long, so you don't have to think too hard to work out that it was going to work on 20 Metres. So thinking back to a Christmas lecture at the radio club about 'Ground Planes and Radials' I remembered various points and subsequently made some radials. In the talk it was mentioned that a good target number of radials was 120, so I decided on 12 (yes, twelve). As with all experimental wire lengths, I planned to cut the radials over length and then fold them back on themselves until I achieved a satisfactory SWR, then I would make the final cut. The radials would be bolted, via a short earthing strap, to the ground spike. I had a length of coax with a BNC connector on one end and crocodile clips on the other which was from my SOTA setup. I copied this and put a PL259 plug on one end, and longer leads on the other end for the crocodile clips, this made connecting to the radials much easier.


Mount, Ground Spike, Radials

OPERATION

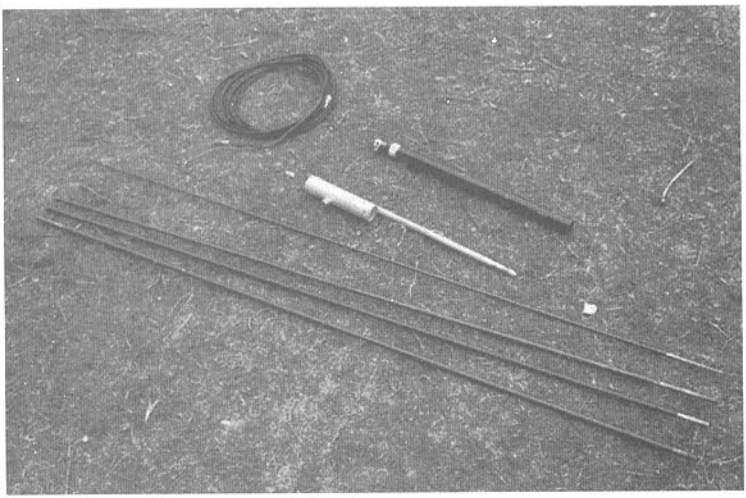
During the June 'Field Day' two other members of the radio club, Tony (G8YFA) and Glen (G0SBN) who were also interested in QRP portable operation, brought along their gear. The three of us all have Yaesu FT 817ND's and we were all going to power them from either internal batteries or gel cells. The main difference between each of the setups would be the antenna.

I also took along with the new antenna, an SWR metre, an ATU, and a small external amplifier (this was for insurance just in case the 5 watts SSB wasn't enough).

I set up the 'FIELD' antenna and radials, connected the radio and powered on. Immediately I was receiving clear strong signals. But I wasn't here to listen - I wanted to work stations. So I hooked up my SWR meter and made a check of the SWR. The needle didn't budge. I called over Tony and Glen, we checked over the setup and I checked the SWR again. The needle still didn't move. (It was suggested the antenna was duff, a probable dummy load – Glens little joke)!

However the truth was soon to be revealed. I kept the SWR metre connected to the radio just in case. I made 12 QRP SSB contacts in total throughout the day at a fairly leisurely pace. My first contact came after a couple of CQ calls and was with Ian (G3PHD) in Tilbury, Essex, who gave me a 57. Overall I had one 59 report, a couple of 57 and a lot of 55 reports which were more than satisfactory.

The special event station DQ2006S gave a 55 report and obviously found it hard to believe I was using only 5 watts, confirmation of QRP was required on several occasions during the QSO. His station was using 500 watts and was therefore a very gratifying contact; I think it made him think again about QRP.



The Three Component Parts

OPERATION

Since the initial trials and success with the antenna I have been operating QRP with it on many occasions. Minor cosmetic changes have been introduced to the feeder and radial connectors but the concept and dimensions of the antenna remain the same. Some achievements with the 'FIELD' antenna using the Yaesu 817ND with 5 watts of power include numerous genuine 59 reports with North America. During another 'Field Day' in February 2007 I had a QRP SSB QSO with PT7CB in Brazil, using the Yaesu 817ND and the internal battery pack! Just to add the icing on the cake the same day I had a QRP SSB QSO with CN8PA in Casablanca.

The antenna was certainly cheap and it is very effective and goes together quickly allowing me to get on air before my friends. They are still guying their fishing pole masts while I am operating. I tend to use the antenna for 20metres but I have used it with a tuner on 17, 40 and 80 metres (using an extra very long counterpoise on 80). Initially the antenna was not intended to be used solely for QRP although it is well suited to this type of operating as I have found out and it could certainly be used with more power or as a home base antenna, but I get such a buzz from making a contact using it on QRP that I am now totally hooked and I would always make sure that I have my 'FIELD' antenna for portable work.

Thanks to M0GAE for this submission. I am always interested in any antenna projects members may be experimenting with particularly those from locations with limited space. What can you offer? **G3VTT**

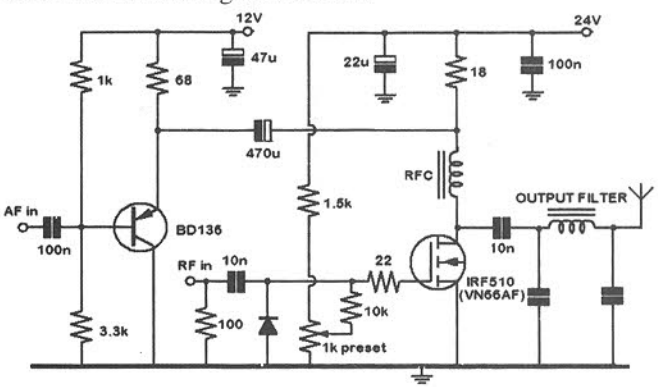
G3JSR Wins First WABC Certificate

Congratulations to G3JSR for being the first station to submit 60 stations worked in G3MCK's Worked All British Counties. Phil used an FT817 and a low G5RV multiband dipole from his Chadwell Heath home in the woods and fields of Essex. Well done. You get this month's cat. 'Good for G3JSR!'

Transistorised PA/AM modulator

Gordon Pope G3ASV – 5 Penn Crescent, Haywards Heath

Here is a circuit of an AM modulator in response to a request in a recent Sprat. I use it on 80m where there is an increasing use of 80m.



COMMUNICATIONS AND CONTESTS

Peter Barville G3XJS, Felucca, Pinesfield Lane, Trottiscliffe, West Malling, Kent ME19 5EN. E-mail g3xjs@gqrp.co.uk

CHELMSLEY TROPHY 2007

My first task in this issue is to offer Dave **G3YMC** my sincere apologies for having left out his entry from the results published in the last issue of SPRAT. The error was entirely of my making, having filed his emailed entry in the wrong folder on my PC. As Dave has always supported the event with outstanding logs I really should have noticed his apparent absence from the list of entries!

Dave's log was, as usual, an extremely competitive entry but he has very generously suggested that I allow the results to stand 'as published'. To give some idea of Dave's efforts during the year, his total number of qualifying QSOs was 2559, and the total number of DXCC countries worked was 128. He used his trusty Elecraft K2 with 5W CW into a 110ft wire antenna, or 30ft loaded vertical for 160m. Amongst the **G3YMC** highlights of the year, Dave worked the 3B7C expedition on 4 bands, and successfully experimented with re-resonating his 160m vertical to the new UK 500kHz allocation. Its efficiency was very low and only around 5mW erp was achieved, but even with this low power (truly QRPp!) he was able to have quite a few QSOs around the UK. He was even heard by John GM4SLV in the Shetland Isles, although no QSO resulted. I fully agree with his final comment, "Let's hope some more G-QRP members can join in the fun and have a go at the Chelmsley 2008 award!"

With regard to the origins of the Chelmsley Trophy, I am indebted to Dave, **G0DJA**, who writes:

"In SPRAT No. 46 Spring 1986 it was reported that the first award was made to Bob Fowler (G3IQF) for a combination of CW and SSB QRP operation. So, it must have been proposed in 1984 (it being a year-long event) when George moved from Chelmsley Wood."

24th YEOVIL QRP CONVENTION

Gary **2E0BFJ** has supplied the following report on this year's Fun Run and Convention:

The 2008 QRP Convention was a success and we look forward to next year's which we hope will be a real bumper event as it will be the 25th Convention, and we hope to have the Rev George Dobbs as our main speaker.

The Fun Run proved very popular, with the winner Peter **M0PTR** beating the German QRP Club to 1st place by just one point. They were closely followed by Peter **G3BPM** and George **G3ICO**.

Fun Run regular Joseph **F6GGO** won the 40m section, with the prize for the most consistent use of low power going to George **G3ICO** (another regular) who used no more

than 2W throughout the event. A big thank you to Richard **F5VJD** for doing such a fine job and running the continental bonus station.

The event was sponsored by Walford Electronics, who kindly supplied the winner with a voucher for £40 towards a Walford kit of his choice. We hope to hear him using it during next year's Fun Run! Below is a picture of Peter receiving his certificate from Gary **2E0BFJ** (Fun Run organiser).

Walford Electronics will be sponsoring a construction challenge for the 2009 Convention. The rules are still being devised, so watch out for details.

20th Homebrew & Oldtime Equipment Party (HOT-Party)
Hartmut, **DJ7ST**, has kindly sent me details of the results from this event. Drop me a line if you would like a copy.

I've just noticed the words with which I finished this SPRAT column 12 months ago, and make no excuse for quoting them again now. "I hope we're due a late "Indian Summer", together with spell of good Autumn HF conditions. The deadline for the next issue is the end of October, by which time we'll know whether my hopes have come true!"

72 de QRPeter
G3XJS

Membership News

Tony, G4WIF

In the Spring 2008 Sprat I mentioned that UK members might find an additional message on their Sprat label. That message is "Your standing order needs attention" and it means that we cannot tell from the information provided by your bank (to ours) which member has paid. We need your membership number to clearly appear on our bank statement and from 2009 this is an absolute requirement. There are 51 members whose bank is not providing this information and so far only two members have contacted me confirming that the problem has been fixed. So for 49 members your label still carries this message. If I cannot easily tell that you have paid then your membership will not be incremented and you risk the Spring Sprat being your last issue. The easiest way to deal with this is to send a new standing order form to the bank asking that the old S O be cancelled. Make sure that your membership number is in the "quote reference" box.

Thanks

MEMBERS' NEWS

by Chris Page, G4BUE

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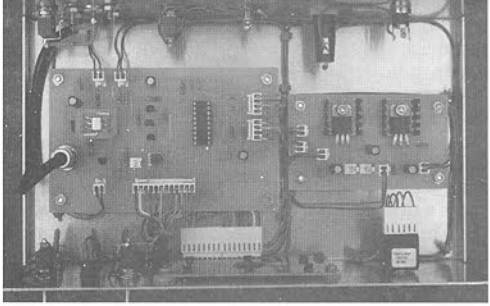
E-mail: g4bue@adur-press.co.uk

"What do you do in the summer when the solar flux figure is one of the lowest for years?", asks **GM3OXX**. George had been running out of space for his QSL system and a friend offered him another filing cabinet, so he moved the shack about to make space for it. The photograph below shows the result. He still found time to work some nice DX in July and August (ZD7X, 3DAØOK, **K9AJ/VYØ**, **CN8QW**, **5X1NH** on two bands, **J28JA**, **4Z5AD/60**, **JA** several times, **9G5MM**, **YI9WV**, **KH6MB** and **PY4ZF** plus Europeans **T7ØA**, TF, OHØ and **E71DX** on two-way QRP. George heard **ZD7X** calling 'CQ QRP' on 4 August on 14060kHz, but couldn't raise him.

F4EAI built a Small Wonders Lab PSK kit and (despite four missing components) finds it runs perfectly. Christian is looking for a copy of a March 2001 *QST* article containing a schematic diagram of the NJ QRP Wrambler 80m PSK transceiver that he has built for 20m. He will pay IRCs to anyone who can send him a copy of the article. **G4WIF** refers to the useful toroid winding chart on page 26 of *SPRAT* 135 and says **G4COE** has provided more tables that Tony has up-loaded to the *SPRAT* section of the Club web-site.

G3XBM found 10m in good shape during the CQ WPX CW Contest at the end of May when he made four QSOs with 50mW and his recently built Homebase10 halo antenna (September 2008 *Practical Wireless* and <http://www.g3xbm.co.uk>). Roger says, "I'm sure these stations would have been workable at 5mW but I couldn't find a larger RF attenuator!". His best QSO with the antenna is a SSB QSO on 10m with N2MM (NJ) on 6 August, receiving a 53 report.

US1REO reports the UR-QRP Club were QRV 1/3 August as **EM1ØQRP** from the Blue Lakes district to celebrate their tenth anniversary, and **UR4RWR** was QRV 30 July/4 August from the banks of the Desna River near Saltykova Divytsya. **IØ/N2CQR** (**MØHBR**) has been bitten by the QRSS bug and now has a 20mW signal on or about 10140040Hz (3 second dits) from Rome. Bill says the *SolderSmoke* podcast continues, with a new episode every two weeks. There is now also a *SolderSmoke* blog (updated frequently) at <http://soldersmoke.blogspot.com>.

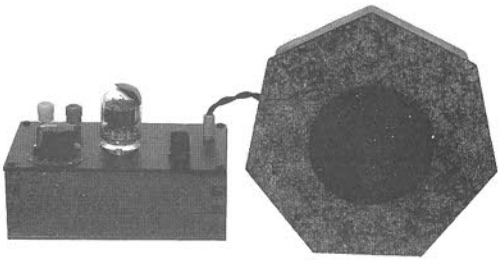


G3ZOH's latest project (pictured left) is a VFO/signal generator using a CMOS SI570 controlled by a 16F628 PIC. Brian writes, "As you can see, I do like multi-way connectors! The SI570 is mounted on a small daughter-board and the three transistors to the right of it are the level converters for the I2C lines. The transistor just below the daughter-board allows remote switching of the 'output enable'. The separate module to the right provides voltage regulation at 5V (for the PIC and LCD display) and 3.3V (for the SI570). Tuning is via an optical encoder. Frequency range is 10-99.99MHz with selectable frequency steps down to 10Hz and stability is excellent. The SI570 is surely set to become a highly versatile building block for use in a wide range of QRP projects. I am indebted to **G4OEP** for his help with the project".

GØAZS recently built the Hendricks PFR-3 transceiver, that was featured in the July *RadCom*, and is planning to use it for SOTA activities and in the IOTA Contest from EU-037 as **SM7ZAU**.

Marc has put pictures of the build on the Internet at <http://www.flickr.com/photos/28485944@N00/>. **GØEBQ** modified his Hendricks BITX to work on 17m and says a 15m version is next. Nigel took his 20m BITX and Cub copy to his local club field evening and had a few QSOs with it, surprising quite a few members with what can be done with simple QRP equipment, especially with 1W CW.

ON4KEN and his father, **ON7NI**, have just built **ƉH3FAA**'s one valve receiver featured in *SPRAT* 135, pictured above. Etienne says the receiver is working perfectly and is a very nice design. **G3JFS** has made 500 QRP QSO this year up to 18 August, including some on two-way QRP. Peter has worked 40 countries on 10 and 12m in sporadic-E and tropo openings on his end-fed wire and a Smartuner. Some of his recent DX on the other bands is 80m: **ER3R/P**; 40m: **6W1SE**; 30m: **ZP6CW**; 20m: **A61Q**, **CX5BW**, **HK3CQ** and **P43JB**; 17m: **ZP6CW**, 15m: **5U5N**, **HC8N**, **V51AS/P** and **JY4NE**.



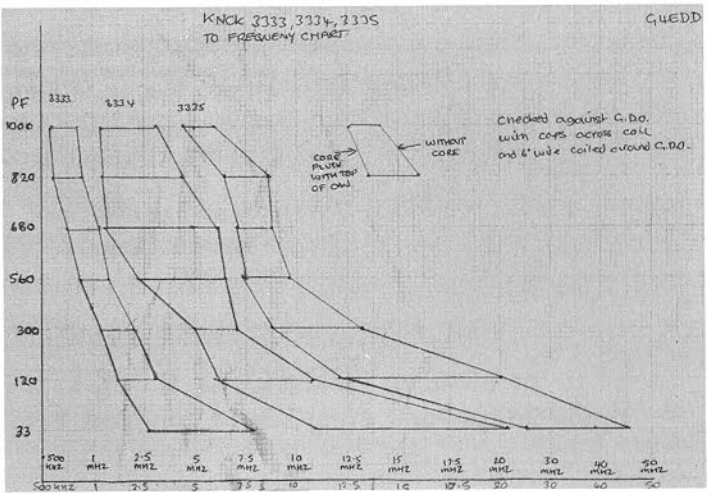
M1KTA reports he heard **G4BUE** on SSB in the IOTA Contest and correctly states it wasn't me operating! My wife June, **MØBUE**, did the SSB and I did the CW in our little multi-op effort (with QRO). Dom and **M5CHH** did a QRP multi-op entry in the contest. Dom was also QRV 28 July for two weeks as **F/M1KTA/P** while touring the French coast around Dieppe on a bicycle. **ƉF5SF** QSO'd **YI9WV** on 30m with his KX1 and new antenna, a two x 33 feet doublet with 300 ohm ladder-line. When **F5NZY** QSO'd your scribe on 25 May on 10m from Normandy, Steph was running 5W with a solar panel as shown in the two photographs on the left.

On a recent holiday to Scotland, **G4ICP** walked up Ben Wyvis (3432 feet ASL) near Ullapool and worked into **GB3NG** Fraserburgh, about 118 miles, with 200mW on 2m FM from an IC-ICQ7 micro handie with its rubber duck antenna! Richard says, "I was 'in cloud' at the time. Other mountain walkers will know what this means, (driving wind and rain and fog but great fun)!". New member **AA1TJ** QSO'd your scribe on 20m on 20 August while running 1.75W. Mike uses a small homebrew transceiver to an end-fed 80m half-wave wire at 35 feet and worked **EA6UN** while running 230mW and **LW3ƉG** with 390mW. He writes, "I only returned to amateur radio last November after a lapse of over 25 years. In fact, up till last week I hadn't been on 20m since the early 1970s! Needless to say, I have been having a blast even without sunspots. Better yet, I've met many wonderful people since my return".

Are you interested in using QRPp on 1.2gHz? If so, then look at **9H1LO**'s web-site at <http://www.9h1lo.net/ah1-v2.pdf> where Stan describes a 200mW amplifier. **MØNJP** has recently moved to Brussels and will try and get an ON9 licence. Nick's new garden is only about 46 x 59 feet and so he is looking for suggestions for suitable HF aerials. The first thing he plugged in, in the new house in Brussels, was his faithful old Weller soldering iron station! Another member on the move is **GØSVO**, to New Zealand in September where his new call will be **ZL4TE**. Pete will also hold the call **ZL1PETE** for echo-link.

ƉL2BQƉ now has a web-site about his local radio society in Schwedt on the River Oder, at <www.swschwedt.de/kunden/dl2bqd>. If you are looking for a low-power indoor portable HF antenna, **G3LLV** suggest you have a look at the Notebook antenna that **N5ESE** has built from a **G8PG** design at <http://www.io.com/~n5fc/notebk_ant.htm>. Monty writes, "My first QSO from central

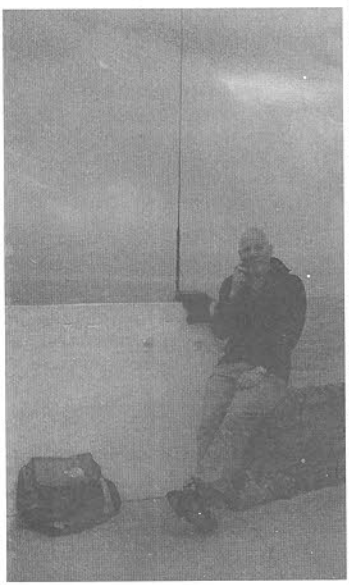
Texas, with the antenna hanging from coffee hooks placed in the ceiling of my first floor bedroom, and using 5W on 15m, was with **VE3AJDX** who gave me a 549". **2E1LOK** adds the antenna design is from *SPRAT* 64 and page 55 of the (2007) *G-QRP Antenna Handbook*.



The chart on the right was compiled a few years ago by **G4EDD** who used KANCKs 3333 3334 and 3335 with capacitor values from 1000 to 33pF. John says he 'GDO'd' the frequency, with the core out, then in, and plotted the result! As you see, a 3334 with 33pF, will tune from 11 to 21MHz and a 3335 with 680pF from 7.5 to 9MHz. **G3XBM** says activity on 501kHz has dropped off a bit. Roger built a two element Moxon antenna for 70cms using one of his wife's coat-hangers and used it to QSO F8BRK at 326km with 5W SSB in a recent contest. Work is continuing on his DSB10, a small QRP DSB transceiver for 10m.

GØUBE has recently returned to amateur radio after an eight year break caused by living with a small garden (46 feet long). John has TVI problems, even at QRP levels, and is looking for antenna ideas for 40m and possibly 80m. As soon as he received *SPRAT* 135, **EI3IZ** built the loop antenna and found it worked fine. Terry has ordered some 12SH1L valves to build the valve regenerative receiver by **DH3FAA**. **MØNJP** has been working on valve equipment, home-made valve receivers, valve and digital frequency circuits and an SSB transmitter. Nick has put the details on the Internet at <www.pettefar.eu/m0NjP>. He has just purchased his sixth Eddystone, a 680X.

M5AKA reports the Delfi-C3 team gave presentations to the AMSAT-UK Colloquium in Guildford on 26 July about their exciting new satellite. It has a CW/SSB 435/145 linear transponder and was due to be activated a few days later. The transponder runs just 250mW PEP output and can support up to 10 simultaneous QSOs meaning, says Trevor, that each user's downlink signal could get as little as 25mW! **GØWAT** and **M1HOG** announce the inaugural meeting of the Home Counties QRP Circle, known as HogCon 2008 on 21 September in Stevenage. More information is about the event is on the Internet at <www.hcqrpc.wordpress.com>.



In July, whilst on a short holiday to the Pyrenees, **G4GXO** managed a brief QRV from the summit of La Rhune mountain near St Jean De Luz in southwest France, as shown in the photograph on the left. Ron writes, "The ascent of the mountain was effortless, a vintage electric mountain railway does all of the hard work. Using a FT-817 and ATX antenna, I managed a 55 report SSB QSO on 20m with **G4AKC** who was 'pedestrian mobile' on the sea-front at Blackpool, before a failing battery forced me into the mountain restaurant for a good Basque lunch! From the picture it looks like Gill caught me mid-vowel! The view in the background is the Spanish border with Hendaye in the foreground and Hondarribia across the estuary in Spain".

That clears the files once again. Many thanks to all the contributors; without them, there would not be a *Members' News* column. Please let me know how your autumn goes, including your entries in the QRP sections of the many autumn contests, and photographs of what you have been building, etc, by 20 December please?

GQRP Club Sales

Graham Firth, G3MFJ, 13 Wynmore Drive, Bramhope, LEEDS. LS16 9DQ 0113 267 1070

Antenna Handbook – 2nd edition – members £6.00, non-members £10.00 plus post } £1.00 (UK); £2.30 EU
Radio Projects volume 3 – Drew Diamond – members £5, non-members £10 plus post } DX - £3.90 per book
6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out **£12 plus post** } £0.80 (UK); £1.00 (EU)
6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out **£12 plus post** } £1.70 (DX)

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] **£6 pair** } **plus** postage
SA602AN - £1.75, MC1350 - £2.00, IRF510 FETs - £1.25 } **(ANY quantity)**
MAR-4 RF amplifier - £1.50 } 60p (UK),
HC49U (wire) crystals for all **CW** calling freqs – 1.836, 3,560, 7.028, 7,030, } £1.20p EU,
7.040, 10.106, 10.116, 14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each } £1.70p (DX)
HC49U (wire) crystals for DSB on 40m – 7.159MHz - **£2.00 each** } If
HC49U (wire) crystals – 3.5795MHz, 3.6864MHz, 4.1943MHz, 10.0MHz, }
13.50MHz, 32MHz – 30p each }
HC49U (wire) crystals – 10.111MHz – 50p each } ordered
Miniature crystals (watch crystal size – very low power) – 3.560, 7.030, 10.106, }
18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each** } with
Ceramic resonators – 455kHz, 2.0MHz, 3.58MHz, 3.68MHz & 14.30MHz – 50p each } heavier
Polyvaricon capacitors – 2 gang (A = 8 to 140pF, O = 6 to 60pF) c/w shaft ext & mtg screws - £1.20 each }
Schottky signal diode – 1N5711 low fwd volts for up to vhf/uhf **20p each** } max of 5 } items
Varicap diodes – **MVAM109** – 40pF @ 9v, 500pF @ 1v. **75p each** } max of 2 } use that
– **MV209** – 5pF @ 12V, 40pF @ 1v **35p each** } per member } postage,
CA741 op-amps 8pin DIL – **5 for £1** } plus
2SC536 transistors (npn) fT - 100MHz, hFE-320, VCBO+40V **- 5 for 50p** } 10%
MPSA92 transistors (pnp) fT - 50MHz, hFE-40, VCBO-300V **- 5 for 50p** } of this
MK484 radio on a chip - £1.00 inc circuit diagram. } postage

Toroid cores – Priced per pack of 5 – max of 2 packs of each per member

T37-2 – 75p; T37-6 – 75p; T50-1 – £1.00; T50-2 – 90p; T50-6 – £1.10; T50-7 - £1.20; T50-10 – £1.20; T68-2 - £1.80; T68-6 - £2.20
FT37-43 – 80p; FT50-43 - £1.20; FT37-61 - £1.00; FT50-61 - £1.20; BN43-2402 - £1.00; BN43-302 - £2.00 BN43-202 - £1.80; BN61-202 - £2.00
Ferrite beads – FB-73-101 (3.5mm dia x 3.2mm long, 1.2mm dia hole) – **40p for 5**
Plus postage – up to 5 packs = 60p (UK), £1.20p (EU), £1.70 (DX); 5 – 10 packs = £1.20, £2.40p, £3.40 etc. (please note – if you order 2 packs – you will probably get all 10 in one pack)

Binders for Sprat - the original 'nylon string' binding type back in stock again! Black with club logo on spine **£3.75 each plus postage** (one: UK – 1.00p, EU – £1.80, DX - £2.40. More – add 80p, £1, £1.20 each)

Back issues of SPRAT are still available at 50p each. I have most issues from 78 plus a few earlier ones. UK Postage is 1st magazine – 50p, each additional magazine add 40p.
Sprat-on-CD V3 – 1 to 132 (see Sprat 132) – members price - £5 plus post UK - £1.00, Eu - £1.20, DX - £1.70

NEW - Drew Diamond - Radio Projects Volume 3 – members price £5 plus post – see above

I have sold out of the HW8 book, FT114-43 and FT240-43 toroids and no more are expected.
Please note - I only have stock of the above items – I do not sell anything else. Anything in previous advertisements not shown above is out of stock – if it becomes available again – it will be in the next magazine.

To keep within second class postage limits, orders may be sent in more than one package!
Cheques (UK) and payable to G-QRP Club. Sorry, but cheques in other currencies are uneconomical to us due to bank exchange charges!

Visa/Mastercard. - Due to insurmountable problems, we have now ceased to accept credit card payments – sorry to anyone this affects – if it really stops you buying from the club, or paying your subscription - please contact me and we will sort something out.

If ordering multiple items, enclose the highest postage charge plus 10% of the rest please.

MINIMUM ORDER for cheque or PayPal payments is £5

For orders less than £5 – please use postage stamps (any denomination £1 or less please), or cash. We can accept cash in GBPound, or US$, or € uros – but please send securely!
PayPal is very successful – if you can use it, please do – it is easy! Send the order to Paypal using g3mfj@gqrp.co.uk - show clearly what you want with the payment – pay in GBPounds please - and include your membership number!