SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

ISSUE Nr. 119 | © G-QRP-CLUB | Summer 2004

Bob, G4JFN, [right] presents the G2NJ Trophy keepsake plaque to George, G3ICO, in recognition of the continuing work in QRP of the Yeovil Amateur Radio Club

Ian, G3ROO, [right] and Bill, N8ET, are inducted into the QRP ARCI "QRP Hall of Fame" at the Dayton Hamvention 2004

Rochdale Convention ~ Simple VFO ~ Marsh Transmitter
Marsh Receiver ~ Field Strength Meter ~ 0V0 Receiver
Twin RF Meter ~ Unitenna – RIT for VXO ~ Protection Circuit
KX1 Review ~ 74HC04 Oscillator Buffer & Harmonic Generator
Lambdaette 160m AM ~ K2 or 817? ~ 817 Cradle
Inkjet PCBs ~ Dayton Honours ~ World of QRP Award
Antennas-Anecdotes-Awards ~ Communications & Contests News
SSB & Data News ~ Member's News ~ Club Sales

JOURNAL OF THE G QRP CLUB

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Welcome to SPRAT 119, which may be a little late because of my personal timing and work commitments. We do try to keep to our publication schedule but remember SPRAT is not produced by paid workers.

May I wish you all a pleasant summer with antenna work or portable operation.
Keep the contributions coming to ensure that SPRAT remains a journal that people wait to read.

The W1FB Memorial Award 2004

For 2004, the project is to

Design a simple Monitoring or Metering Device of practical use in a QRP Station

Please submit your design to G3RJV as soon as possible, with circuit sketch, all values and brief notes.
The project will be published in SPRAT and the winner will receive an engraved plaque.

72/3

G3RJV

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK
Printed & Distributed by G QRP Postal Mailing

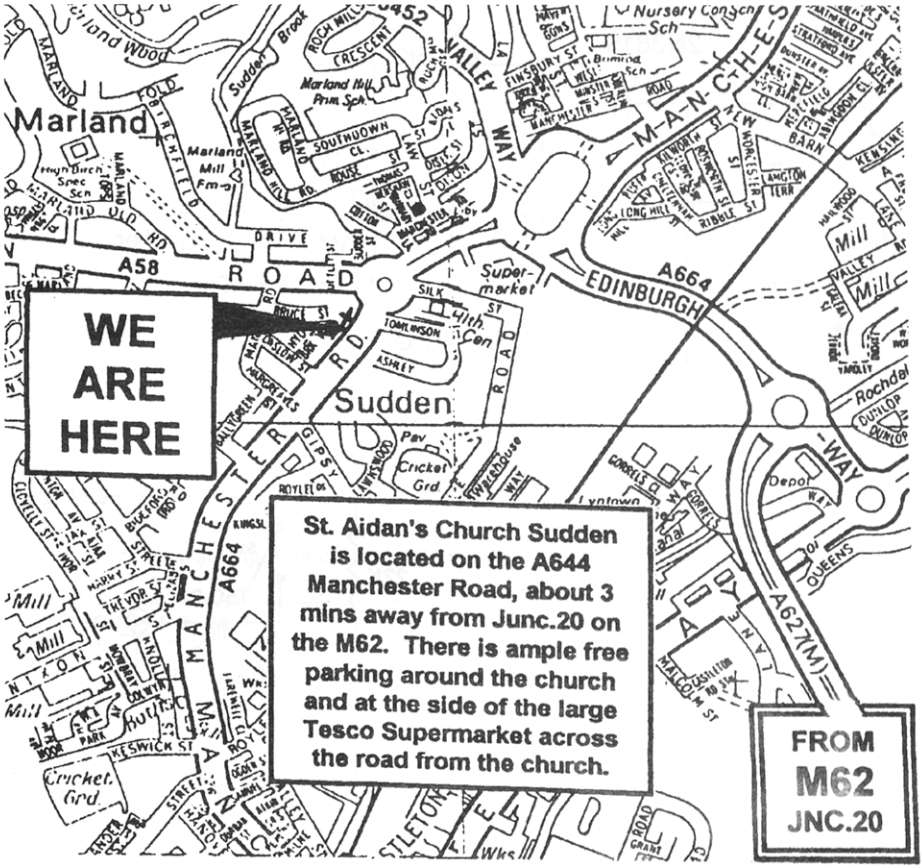
THE G QRP CLUB
MINI-CONVENTION
SATURDAY 9th OCTOBER 2004
ST. AIDAN'S HALL SUDDEN ROCHDALE

ADMISSION £1 - DOORS OPEN 10am - TALKIN S22

LARGE SOCIAL AREA - LECTURES ON QRP SUBJECTS

BRING & BUY - SURPLUS - JUNK - COMPONENTS - KIT TRADERS

FOOD & DRINK ALL DAY - INCLUDING THE FAMOUS PIE AND PEAS



LOCAL ACCOMMODATION: The Royal Toby Lodge - Tel: 01706 - 861861.
Oakenrod House : 01706 – 642115 ~ The Norton Grange Hotel : 01706 - 630788

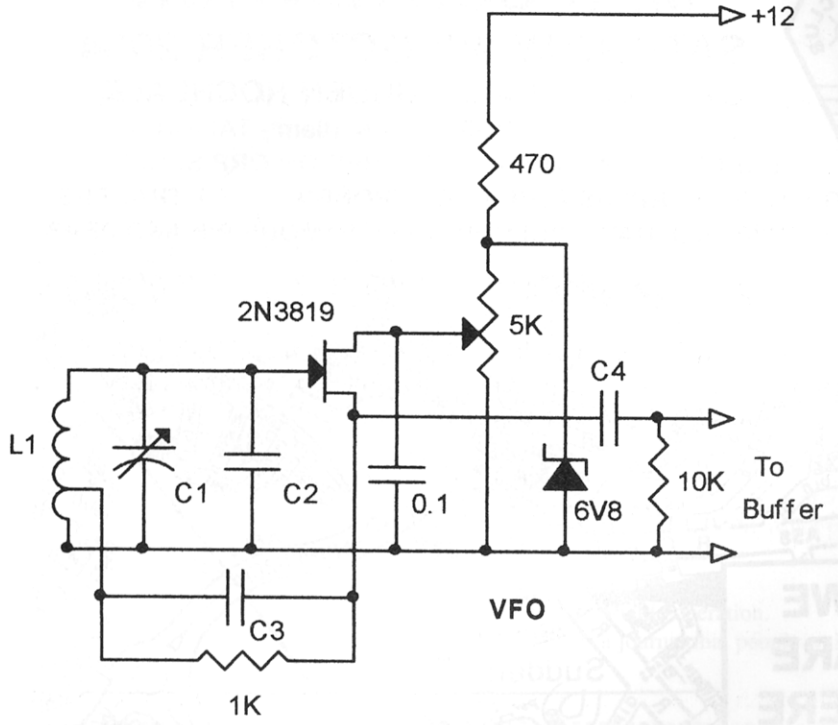
Also within close ra nge of the site :

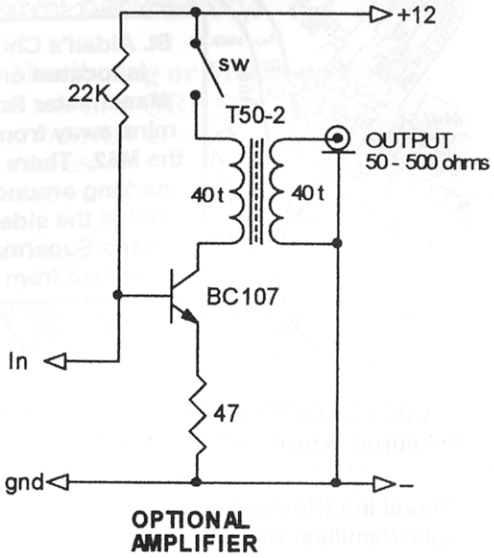
Travel Inn (Rochdale) about 10 min away 01706-299999. www.travelinn.co.uk

Couples/families: www.hollingworthlake.com : lakeside guest house - edge of town

A "Keep It Simple" VFO

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





There are many excellent designs for VFOs, but which to chose? The decision was made to design the simplest circuit for the HF bands with no exotic or difficult to obtain components.

After much thought and trial the circuit as shown was arrived at.

Two facts soon emerged. One was how hard to work the FET and the second the amount of positive feedback.

The combination of the quarter way up tap on the coil and feedback via the 1 K resistor in parallel with C3 were arrived at experimentally. The reactance of C3 being near or just above 1K at the operating frequency (i.e. 100pF at 160m to 6.8pF at 10m) C4 was also made to the same value to prevent to tight a coupling to the subsequent amplifying stage.

The "working" of the FET being set by the voltage applied to the drain and is set to give approximately 1 volt peak to peak across the 10K resistor. This of course can be used to adjust to the oscillator output over a range of say 0.5 to 2.5 volts peak to peak.

The oscillator output obviously needs a buffer amplifier which can be your favourite circuit or the one shown. I decided on the transformer output for sheer convenience in feeding into further circuitry.

My final version was built in a small diecast box for top band and the switch in the collector enabled the output to be killed without stopping the oscillator.

In performance, with an output of 1.5 volts rms. from the transformer secondary feeding a 470K resistor, the second harmonic content could only be detected with a communications receiver but not moving the "S" meter and third virtually non existent.

Only one word of warning. Check the frequency after any adjustment of the potentiometer

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

FOR SALE: 430MHz JAYBEAM 7104, 11 element 50ohms, feeder RG213 with TNC plug. Never erected outdoors. For details phone Doug 07812 513 441 G0NVR

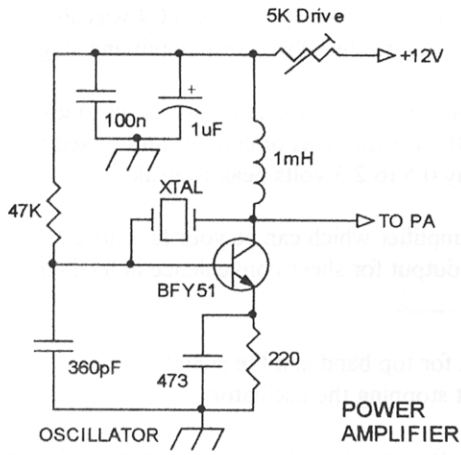
FOR SALE: FT343 Xtals 54th harmonic, Actual freqs around 400-500kHz. Also others. Phone 07812 513 441 Doug, G0NVR

FOR SALE: QRP Sprint 80m Transceiver. Fully operational 80m transceiver constructed from Oakhills Kit. 1.5 - 2watts out, 12v supply, qsk operation. £40.00 ono.
AKD Target receiver compact simple rx, no frills but delight to use. vgc £75.00 ono.
Paul G4VAM member 2451. Tel: 01733 704836

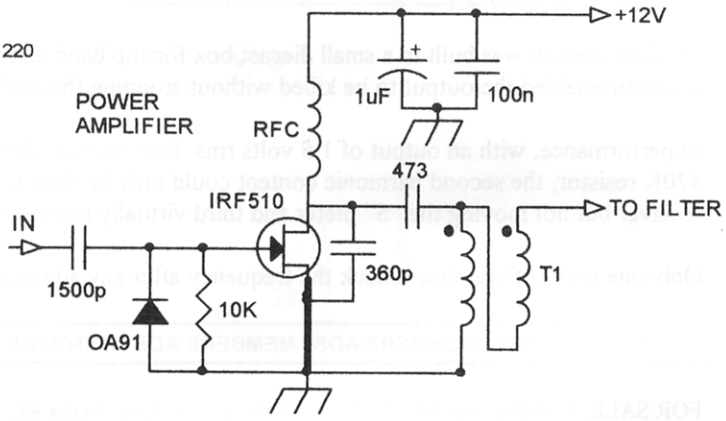
The Marsh Transmitter

Geoff Wooster, G3YVF, Random House, 2 Vicarage Lane, Hoo, Rochester, Kent. ME3 9AZ

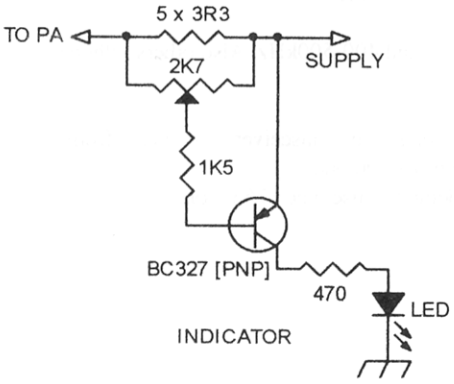
I use a range of simple rigs when out with a kite on the local marshes, most of them are called Marsh TX or Marsh RX. This is the Marsh TXII; a two transistor transmitter which works on 160, 80 and 40m [if you have a crystal]. It only requires the standard 50Ω to be changed for the band in question. At 13.8 volts DC it runs into short or open circuit without damage and give 5 watts output. This version is for CW [key the oscillator and leave the supply on the PA] operation but it works well with AM.



Please note that a short fat lead [solder tag] is fitted to the source lead and a 390pF connects across the drain/source connections at the device. This prevents "unwanteds" in the output and stops the PA taking off. For those who would like to stick to the recommended PA current, use the indictor provided .... Set to 1 amp drain current. Much cheaper than a meter and more robust.

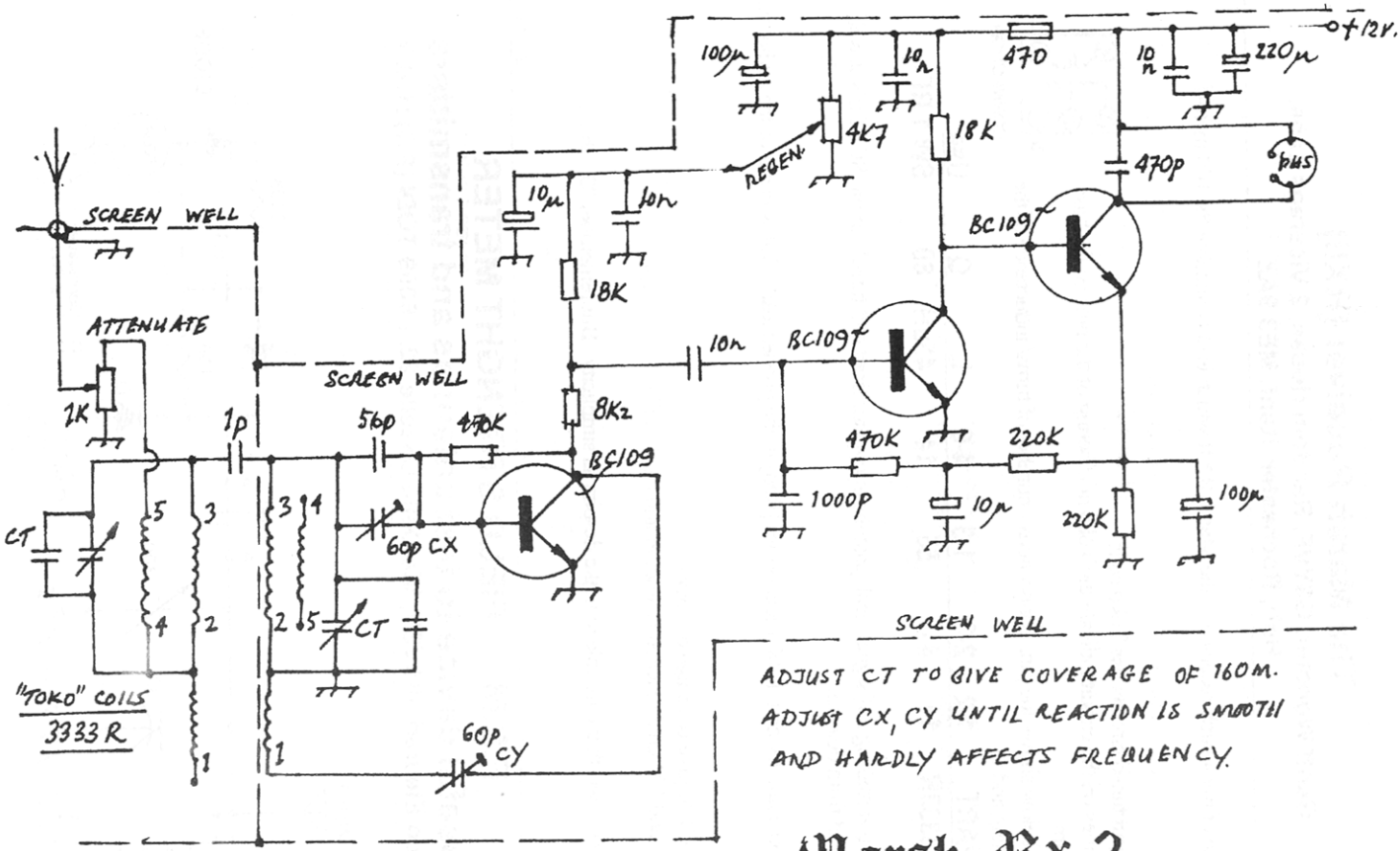


RFC = 15 to 20 turns on a ferrite bead
T1 = 14 turns bifilar on Ferrite ring [1" dia]



Set the indicator to light at 1 amp current flow

THE MARSH RECEIVER WILL BE FEATURED IN THE NEXT ISSUE.



Marsh Rx 2

G3YVF

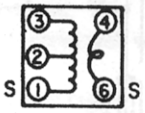
The Marsh Receiver [RXII]

Geoff Wooster, G3YVF, Random House, 2 Vicarage Lane,
Hoo, Rochester, Kent. ME3 9AZ

This is one of my Marsh receivers – the Marsh RXII which is only suitable for 160 metres.

Notes:

1] The input tuned circuits use Toko coils.
The markings on the circuit indicate the Toko numbering of the pins on the base. See diagram.
The chart below shows the pins connections / number of turns/ inductance of the main winding and Q



CONNECTION

TOKO PART	1-2	2-3	1-3	4-6	L	Q	Use
BKANK3333R	14	41	55	14	45uH	60	SW 1 RF

2] It is no use making it if signals leak past the attenuator/front end tuned circuit. SCREEN it well i.e. Front end from detector

3] For more gain, try an LT700 transformer [Red] in the phones lead. But watch it or the audio may take off!

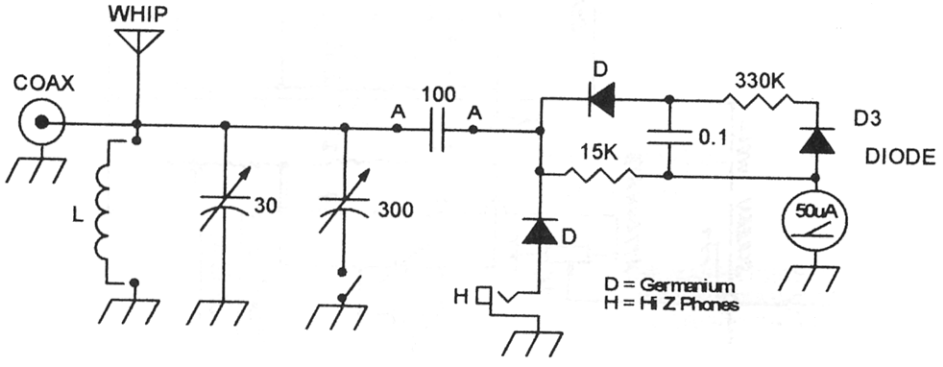
4] Adjust CT to give coverage of 160m
Adjust CX and CY until reaction is smooth and hardly effects frequency.

The receiver is worth the trouble to make despite its simplicity. But remember "3" above

F.S.M. FIELD STRENGHT METER

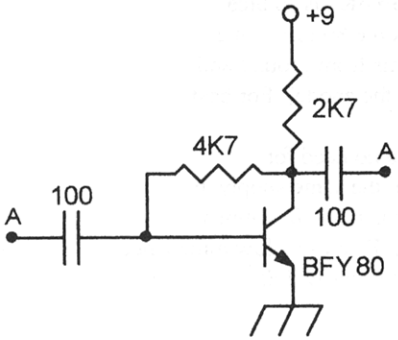
A useful device to test antennas and transmitters

Marco Eleuteri, IK0VSV, Via Della Caselle 22, I-6059 TODI (PG) ITALY



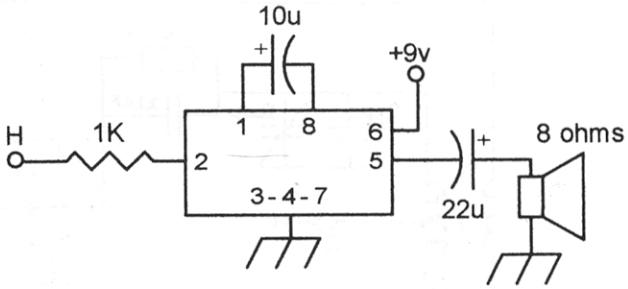
I built this "instrument" some weeks ago during an antenna test.
In my laboratory I did not have a FSM and I could not test transmitters or antennas effectively on the air, especially compared with know values of other devices.
For example I wasn't able to compare an antenna vs a reference antenna or the gain by receiving a standard signal whit two antennas under test.

With this instrument all tests become easy, moreover I can listen an eventual modulated signal via a simple diode detection circuit, the audio can be heard with high impedance headphones or injected to an LM386 standard BF amplifier (circuit shown). An RF amplifier can be added if more sensitivity is requested.



The full HF band and VHF up to 50 MHz can be covered with a set of coils. I used some old Grid dip meter coils but can be easily built.
A micro-switch on the CV permits us to switch HF or VHF ranges by adding a higher capacitance section to the low capacitance section of the CV.

And old analogue tester indicator is used as meter and the large size permits me to see easily some meters away - this is important when testing an antenna.



The pickup circuit is from an old "stornophone" RF test instrument for repeaters field maintenance service very easy to "clone" with the same characteristics.

COIL DATA
1) 80 turns 0.5mm on 20mm insulated core (approx 1-4 MHz)
2) 20 turns as above (approx 4-15 MHz)
3) 10 turns as above (approx 8 to 25 MHz)
4) 5 turns 2 mm spaced (approx 20-50 MHz)

To measure on UHF region or broadband mode, don't connect the Coil.
The sensitivity is less but good.
The schematic is very simple but very sensitive, all diodes must be germanium.

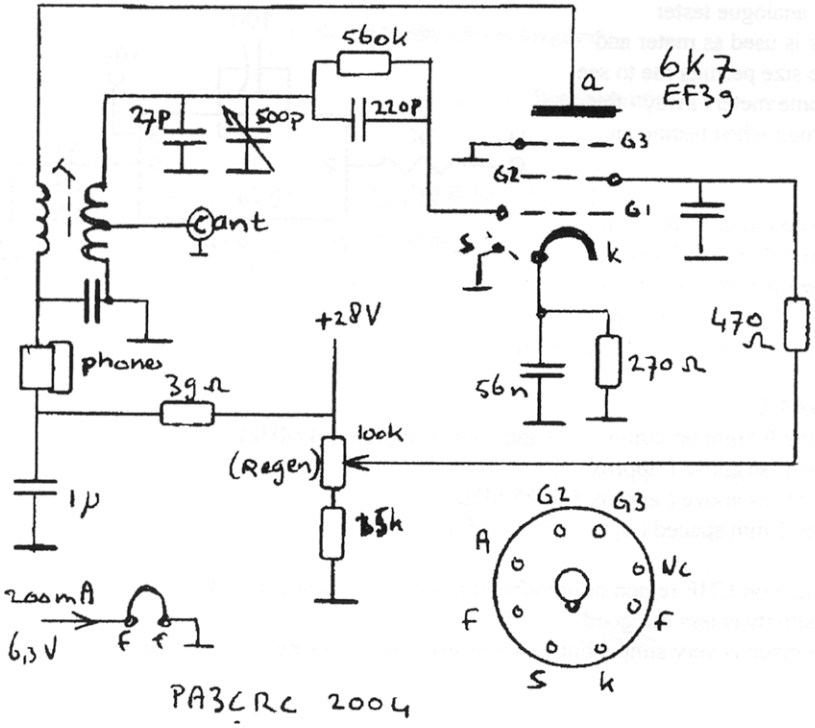
An 0-V-0 Receiver

Gert de Gooijer PA3CRC St. Adrianusstraat 8, 5614 EN EINDHOVE, The Netherlands. gert@lecroy.nl

After some evenings "heating the soldering iron", I made a simple medium wave BCL-receiver, a 0-V-0 with an old 6K7 (=EF39) pentode running at 12....30 volt anode voltage; it will even oscillate down to 10 volt! Brings in a lot of stations. Gave me many nice evenings listening. Do you think readers of Sprat will be interested? I am asking because it is not an amateur-band project and the stations it receives are definitely not qrp... I am pretty sure other valves will also do, but this old 1936 6K7 is so nice to look at. I used a canned 'straight-set' MW-coil, but some 80 turns on a used closed paper roll will do too. Antenna tap at 10 turns from ground and some 10...20 turns for the feedback winding (the one at the anode). For best results the direction of the anode coil should be right.

The power supply can be a simple low voltage supply so no need for dangerously high voltages. The filament can be fed from the same supply, but use a series resistor to set the right voltage/current. This is 6,3V @ 200mA for the 6K7. The headphones should be high impedance. Else use a low impedance type with a transformer. A 'normal' 12 volt mains transformer will do.

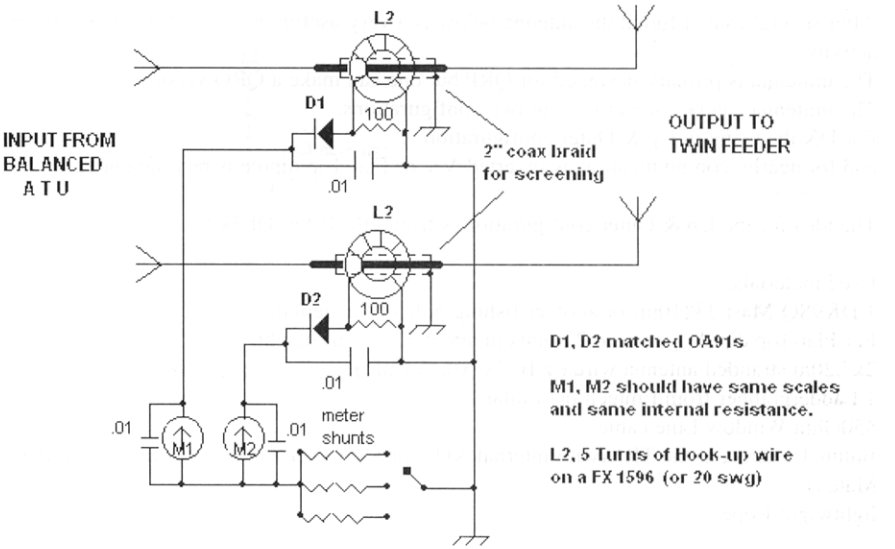
Note: the value of the bypass cap at G2 is 27nF



WIFB MEMORIAL ENTRY

TWIN QRP RF METER

Jimmy Bolton G3HBN 40 Queens Gate Terr.
South Kensington, LONDON. SW7 5PH



CIRCUIT DESCRIPTION The idea is not new. It first came to my notice in Technical Topics, Radcom, October 1999. But what I have tried to do is make a general purpose unit from the basic idea. One need only use half the circuit, if only one meter is required.

The heart of the unit is the transformer. With the values chosen it is easy to calculate what the power should be. If the primary is 1 turn (i.e. one feeder passed through the core) and the secondary is 5 turns, there will be a 1:5 current reduction from primary to secondary. This current can be measured by placing a load across the secondary and measuring the voltage. I have chosen 100ohms which indicates a voltage of 4.5 with 5 watts into 50 ohms passing through the transformer primary. At .5w the measured voltage was 1.5. A 500 micro-amp meter will be more than adequate to read full scale deflection at these low powers. Three different shunts may be necessary to allow for the different ranges of feeder impedance. very much less current will be observed at 600 ohms than at 50 for example. It would be possible to calibrate these meters in RF amperes but it becomes complicated with rms and peak values. I have therefore left them as a rough guide in calibration by comparing them with a known RF ammeter scale and load. (Or you can work out what the current should be with Ohms Law). But the meters do tell me that I have maximum power going into the antenna and that the feeder is balanced at the start. N.B. it is possible to have 1:1 SWR reading with not much RF going into the antenna! Especially with a Z Match.

Values of meter shunts are not given because of the variation of internal meter resistances. This must be left to the builder as to what he might have in the junk box and calculate the shunts accordingly. A simple circuit for measuring meter resistance is given in the ARRL handbook 1984, chapter 16.2.

Unitenna - a universal portable antenna for 40m-10m

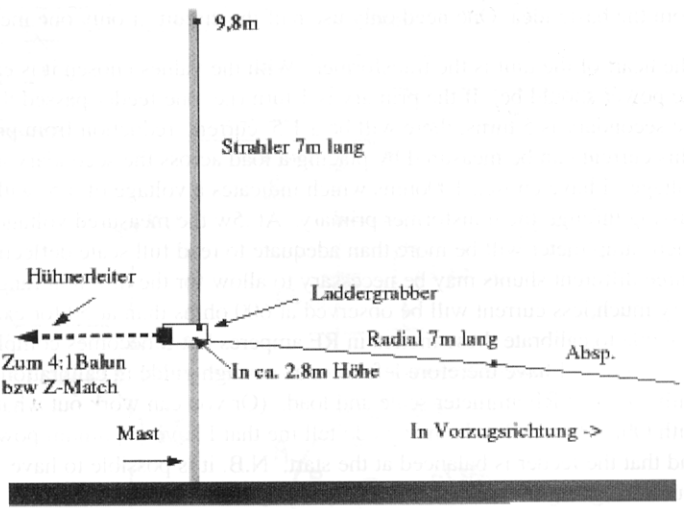
Wolf Juergens DL2WRJ, Strasse der deutschen Einheit 9,
39418 STRASSFURT. GERMANY

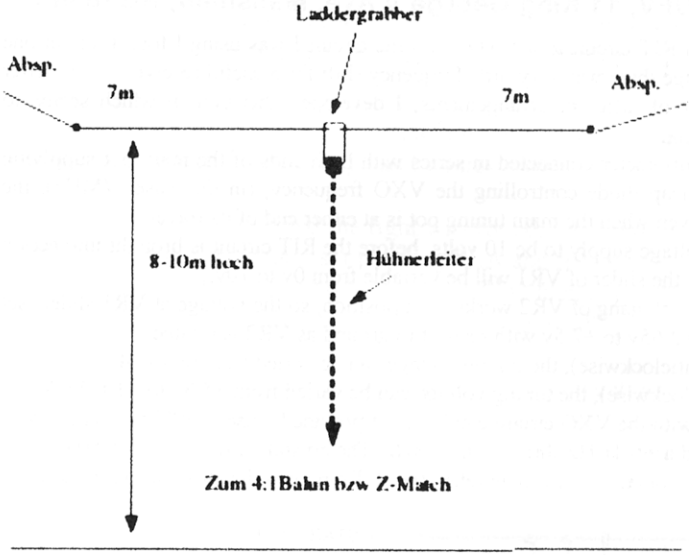
After several trials I found the antenna below is a very useful and powerful antenna for portable activity.
The unitenna is primary designed for QRP but one can make a QRO version too.
The unitenna can be used at least in two configurations.
For DX the using in Up & Outer configuration
and for nearby communication as Inverted-Vee or Flat-Top dipole is recommended.

The idea for the Up & Outer configuration is from OM Peter, DF3KV.

Used materials:
1 DK9SQ-Mast 33'(10m) or another fishing pole of this length
For Flat-Top dipole you need 2 points in about 33' (10m) height.
2x7.20m stranded antenna wire (z.B. 7x7x0,15 CuL)
1 Laddergrabber from Emtech or similar
450Ohm Window Line cable
Balun 4:1 direct at the TRX(with internal ATU) or a symmetrical antenna tuner (like the Match)
lightwight Rope

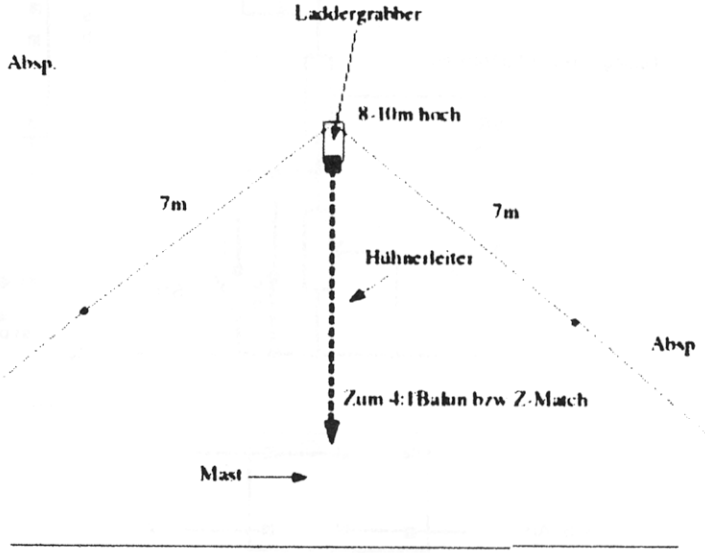
Unitenna as
Up & Outer for DX





Unitenna as dipole

Unitenna as inverted-vee dipole



The Window-Line is held with cable-ties, also the laddergrabber.
Cable-ties are very helpful for erecting an antenna in the free nature.

A Useful RIT Circuit For VXO Use

Duncan Walters,G4DFV, 11 King George V Ave, Mansfield, NG18 4ER

Whilst attempting to apply an RIT circuit to a VXO, with the circuit I was using I found that at one end of the main tuning pot range there was very little frequency shift for a useful receiver offset. After experimenting with a number of different arrangements, I developed this system which seems to overcome the problem somewhat.

By utilising a dual gang potentiometer connected in series with both ends of the main pot supplying the tuning voltage to the varicap diode controlling the VXO frequency, (in this case 7MHz), the tuning voltage can be varied even when the main tuning pot is at either end of its travel.

If we assume the stabilised voltage supply to be 10 volts, before the RIT circuit is brought into action by S1, the voltage available at the slider of VR1 will be variable from 0v to 10v.

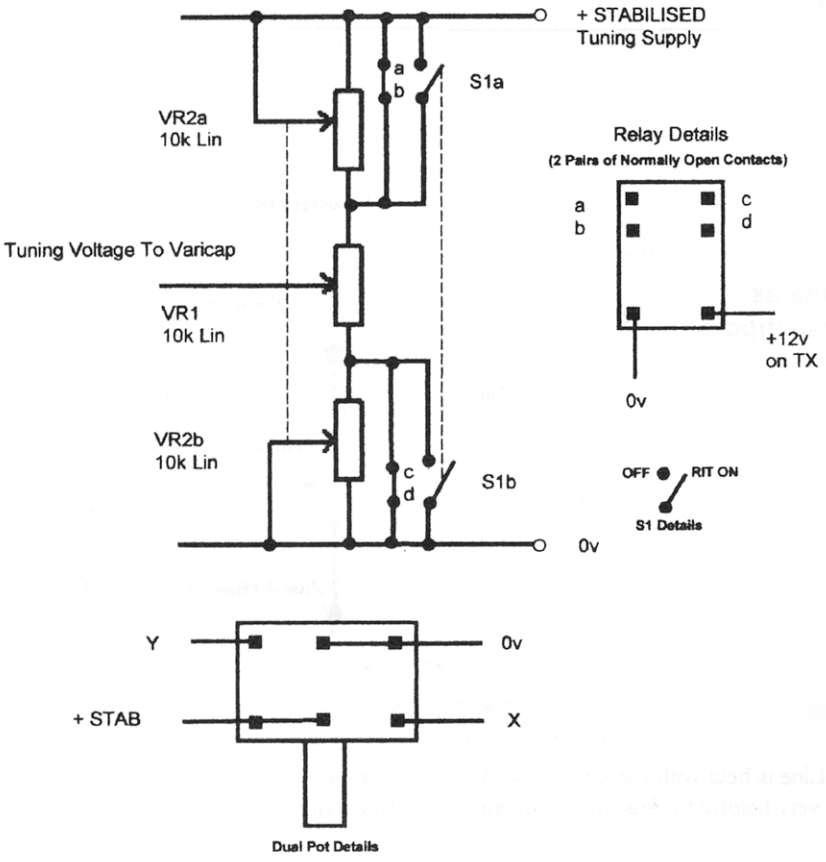
When S1 is open, (RIT ON) each gang of VR2 works in opposition, so the voltage at VR1 slider (set to midpoint), varies between +2.65v to +7.5v with respect to ground as VR2 is rotated.

With VR1 set at its lowest (anticlockwise), the tuning voltage can be varied from 0v to +4.6v by VR2.

With VR1 set to maximum (clockwise), the tuning voltage can be varied from +5.3v to +10v by VR2.

In real terms, this meant that with the VXO circuit employed, it provided a useful RIT frequency shift of +/- 3KHz at 7.025MHz and a +/- 1KHz shift at 7.033MHz. The crystal used was 7.030MHz.

By utilising the normally open contacts of a 2-pole relay, the RIT circuit is disabled during transmit.



Supply Reversal Protection Circuit

Stef Niewiadomski, Saddlestones House,
Faringdon Road, Stanford-in-the-Vale, Oxon.

The effects of connecting an electronic circuit the wrong way round can be dramatic, and expensive. The circuit shown in the diagram protects against this, and doesn't use fuses or a series diode which drops voltage and wastes power.

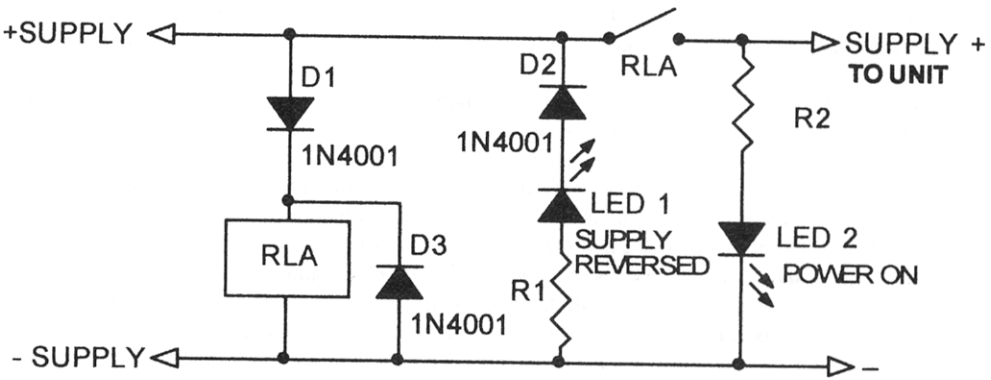
When the supply is connected the right way round, i.e. a positive voltage applied to the +SUPPLY input, D1 conducts, operating RLA and feeding the +SUPPLY voltage to the unit being powered via the relay's contact. LED2 lights, indicating that the unit is powered correctly. D2 is reverse biased, hence LED1 remains off.

If the supply is connected the wrong way round, ie a negative voltage to the +SUPPLY input, D1 is reversed biased, preventing any current from flowing through RLA's coil and hence RLA's contact remains open and no power is supplied to the unit.

D2 is forward biased, allowing LED1 to light, indicating that the supply is reversed. D2 is necessary because the reverse voltage that can be safely applied to an LED is typically only 5 volts.

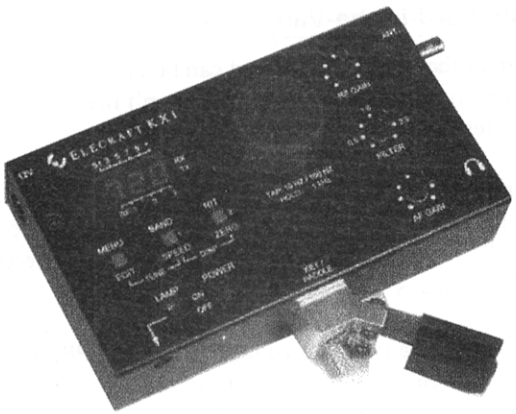
D3 prevents any back-EMF from the relay's coil from damaging any of the other diodes when the +SUPPLY is disconnected.

Maplin supply miniature 12 volt relays with 2 Amp and 6 Amp contacts, the coils taking about 20-30mA to operate. R1 and R2 are chosen for about 10mA through the LEDs. D1, D2 and D3 can be almost any diode, 1N4001s are ideal.



The Elecraft KX1 Ultraportable CW Transceiver

Paul Barlow, M0CDP, All Saints' Vicarage, Queen's Rd. Alton GU34 1HU



I was looking for another kit to build, so the announcement of the KX1 was a Godsend! The additional fact that Peter Hart, G3SJX, is a member of my local radio club gave me the impetus to build and then review the new rig for Sprat readers.

The rig is based around a DDS VFO, using the AD9834 chip. It uses a circuit design developed from the Norcal/Wilderness Sierra and Elecraft K1 using low current devices for field friendly operation. Wayne Burdick, N6KR, lays out his design philosophy in an article in the Adventure Radio Society Sojourner: http://www.arsqrp.com/ars/pages/back_issues/2003_text/1203_text/N6KR.html

Unusually the radio has all the controls on the top panel, to enable easy use in the great outdoors. The tuning knob is also used to control many menu functions as it is connected to a shaft encoder (rather than a real capacitor or potentiometer). The case size is such that six AA cells can be fitted into two holders inside, increasing portability. The overall dimensions are: 14.7 cm long x 8 cm wide x 5 cm deep (including knobs and antenna socket) and mine weighs 360g including the optional auto ATU, 30m module and 6 AA size lithium cells.

The kit comes with an extensive construction manual (over 70 pages long), which gives step-by-step instructions and includes circuit diagrams and troubleshooting notes. The quality of the construction "experience" is good, it's a pleasure to take the bags of components and the board and assemble carefully. I built the basic kit over a couple of afternoons, and the add-on ATU (a 7 element L match which fits neatly inside the case) and 30m boards took an hour or so each. The project is probably not suitable for an absolute beginner because the board is crowded, components are mounted on both sides and care has to be taken to get the components as close to the board as possible to ensure the board will fit in the case. A fine tipped iron is an important investment for this project. All the builder-mounted components are "through hole"; there are a few toroids to wind, it wouldn't be right otherwise.

Details of the specifications, pictures and other information, including manual download, and reviews on the KX1 are available on Elecraft's Website: www.elecraft.com.

The basic radio covers 40m and 20m. Transmit is limited to CW only, and gives around 4W output on a 13.8V supply, and around 1W output on 9V from internal dry cells. The IF bandwidth is variable (the crystal filter is made using varicap diodes, and varying the voltage applied to these effectively varies the bandwidth of the filter) the nominal bandwidth varies from around 300 Hz to 2.5 kHz. This is a clue to one of the particular features of the KX1. The DDS VFO allows receive tuning over a much wider range than just the amateur bands (albeit with reduced sensitivity as one tunes further away). The receiver also tunes in USB/LSB modes, with no offset (CW gives a 600Hz offset). Widening the filter and using one of these modes allows the rig to be used as a shortwave broadcast receiver as well as an amateur band transceiver.

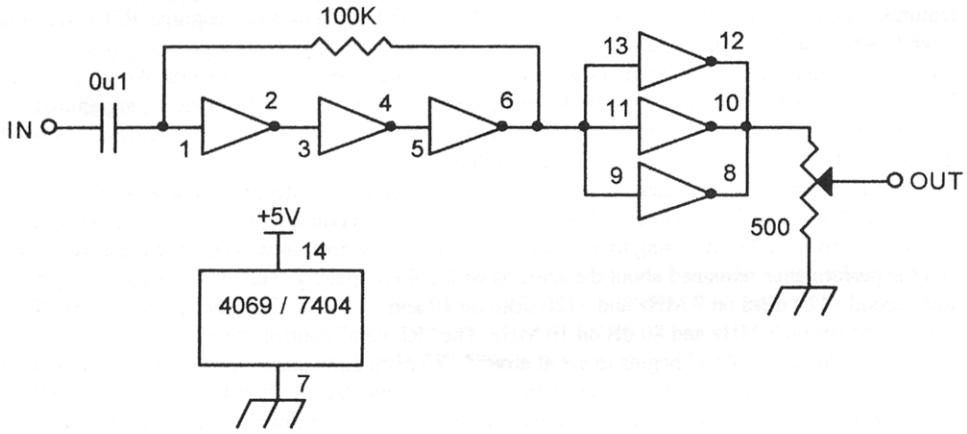
The radio is tuned by means of an 80-step contacting shaft encoder. There is a choice of step size, 1 kHz, 100 Hz or 10 Hz in CW mode; or 5 kHz, 100 Hz and 10 Hz in USB/LSB. The large steps make

for simple tuning of the 5kHz spaced broadcast stations. The small steps give an impression of VFO tuning when operating CW.
Adding the 30m board not only allows operation on that band, but also gives better general coverage receive and improves sensitivity on the 49m broadcast band by switching in some extra inductance and retuning the filters. The 30m board is a bit fiddly to add. It uses very tiny components and fits in a very limited space. It is also "laced" into the main board using bare wires. Once in place it is, however, firmly attached. It was an "afterthought" and there is just no space for the normal plug/socket connections that is part of Elecraft's house style.
The addition of a built-in auto ATU (with band memories) allows the rig to be used with random wire antennas (Elecraft suggest around 28 feet for the antenna and a 16 foot counterpoise). With the suggested length the ATU has no difficulty in making a 1:1 match on the three bands. The standard features also include a built in keyer (modes A and B), with limited memory features, RIT and a small torch (a white LED for reading the log).
The audio output is a bit low (around 600 mV into 8 Ohms before clipping) and the AF gain is non-linear, so it needs to be turned right up! A sensitive pair of "earbud" type headphones is required. Sidetone pitch is variable, but the offset is not, so it makes sense to have the pitch adjusted to 600 Hz, the same as the built in offset (well that's what I think, anyway).
The NE612 mixer could give cause for concern; this low current architecture can lead to poor strong signal handling. Receive current is as low as 43mA to ensure maximum battery life. The measured IP3 was – 2dBm on 7MHz, rising to +2dBm on 14 MHz, the closest in we could measure was 10kHz, and the performance remained about the same as with 50kHz spacing. The overall sensitivity (MDS) was around –129 dBm on 7 MHz and –120 dBm on 10 and 14 MHz. This gave an over all SFDR between 85 dB on 7 MHz and 80 dB on 10 MHz. The "RF gain" control can help in controlling receiver overload. The AGC begins to act at around –75 dBm input signal and is flat from around –65 dBm, the rise time is about 8 ms and decay time about 1.5 ms. Any receiver DDS spurs were better than 90 dB down. All measurements were made with the receiver bandwidth set to 1 kHz. With the 30m option the receiver covers 5 – 16.5 MHz in three bands. The frequency display uses a low current three digit LED, a single press of the "band" button cycles through the whole frequency, from the most to the least significant digits (a double press changes the band), alternatively all the display output can be sent in CW, so you can operate without even looking at the rig!
The transmitter uses the DDS output and amplifies it. The keying shape was good, with about 5ms rise and decay. The second harmonic was suppressed to at least 30 dB down, the third to at least 50 dB down. Other spurii were at least 48 dB down.
Elecraft also produce a pair of iambic paddles, which plugs directly into the KX1. I have borrowed one, and I have to say it takes a bit of getting used to, as there isn't much tactile feedback. I think I prefer my Palm mini-paddle. However it can't be denied that the paddle does make an excellent addition and allows for very convenient portable operation.
Now is a good time to buy from the US as the exchange rate is favourable, but don't forget that you will have to pay VAT on your purchase when it arrives at your door.
Overall the radio was enjoyable to build, is enjoyable to operate, and I hope it will come on holiday with me later in the year and allow me to work some of you "back home". It puts a lot of radio in a small box. I'd like to thank Peter Hart, G3SJX, for his time and for showing me just how he does the figures for all his reviews. When I went along to make these measurements with him he was in the process of reviewing the TenTec Orion for RadCom. The difference in size alone was quite dramatic! The KX1 performance figures were declared to be "respectable"; I think TenTec are hoping for better for their flagship!

74HC04 Oscillator Buffer and Harmonic Generator

Stef Niewiadomski, Saddlestones House,
Faringdon Road, Stanford-in-the-Vale, Oxon.

I needed a harmonic generator to add to an RF signal generator to make marker signals above the range of the signal generator, so I tried the fairly standard arrangement shown below.



The circuit uses three inverters in series, biased by the 100K resistor, acting as a linear amplifier, driving the remaining three inverters in the package connected in parallel. Conventional wisdom says use the 4069UB device, which is known to be well suited to act as an amplifier because of its unbuffered CMOS outputs. This worked reasonably well with inputs up to about 11MHz, and did produce harmonics, though its slow edges on the output stages meant they weren't too strong.

I had a couple of 74HC04s (same pinout as the 4069) so I tried one, not expecting too much. To my surprise, it amplified up to 25MHz and gave sharp ringing edges at the output, generating very strong harmonics. The 74HCT04 worked just as well. I also tried a 74LS04, but this did not work at all.

Note that the 4069UB can be used with supplies up to 20 volts, but the HC/HCT/LS devices must run from 5 volts.

The 'Lambdaette' - A Transformerless AM QRP 160m transmitter

Ian Liston-Smith G4JQT, 48 Swansea Rd. Reading. RG1 8HA

(This article was first published in the October 2000 issue of Radio Active. This abridged version is reproduced in SPRAT with Radio Active's permission.)

The days are long gone when newly licensed amateurs 'cut their teeth' on top band AM. Nevertheless, the band still has plenty of activity, particularly in the form of local nets where amplitude modulation continues to be commonly used. The relatively simple design of this transmitter is ideal for these nets and would be an effective first phone transmitter project for the Novice operator in the 1950 kHz to 2000 kHz section of 160 metres. It contains no 'junk box' parts so is easily reproducible and requires only a multimeter to set up.
I will describe it in its crystal control form as these nets generally work on fixed frequencies but VFO operation with this circuit is possible and will be outlined later.

The Circuit
As you will see from the circuit diagram in fig 1, there are no tuned circuits or modulation transformers in the design. The modulation is accomplished by Q3 which is in the emitter of the RF amplifier Q2, varying the current through it. This method of series modulation is sometimes used in AM CB rigs, and although it is impossible to achieve 100% modulation, 85 to 90% is easily reached. The LM380N provides plenty of audio gain from a crystal microphone, requires very few external components and drives Q3. Other types of microphone can be tried, but some may not give sufficient modulation.
I have omitted PTT type switching as it is hardly justifiable in such a simple project. All antenna switching and receiver muting is taken care of by SW1A, B, C and D.
By only changing the LPF values and crystal (and possibly reducing the value of C3), the transmitter will also work on 80 or 40 metres - although I have not tried it on the latter band. (The BD131 transistor has an Ft of 60 MHz so should operate easily at 7 MHz)
The range is of course difficult to estimate as it depends on both natural and man-made interference at the receiving end, antenna performances, receiver sensitivity, etc. Nevertheless, on a quiet band in daylight with a half decent aerial and earth system at both transmitter and receiver, 15 miles at least should be obtained. The prototype was heard 20 miles away with an S4 signal. It would be interesting to know the distances worked with this rig if anyone wants to write and let me know. (I am in the RSGB Yearbook.)

Special Points
All the transistors are run well within their rated dissipation, but they should be bolted to the chassis via the usual insulating washers, particularly Q3.
Apart from the components used in the LPF (which is designed for a nominal impedance of 50Ω), none of the others are very critical. Theoretically however, R1 and C3 might need slight adjustment in value for maximum output from the crystal oscillator. It will depend upon the crystal and the gain of Q1. Using a small selection of different BD131s and crystals, the values shown all worked equally well giving about 10 volts peak to peak at Q1 collector.
The circuit's use is not restricted to a 12 volt supply, and can be used with up to 22 volts with a corresponding increase in output power. Do not use more than this or you will exceed the maximum voltage rating of the LM380N.
A very simple RF output indicator consists of L5 and D3. (VE7QK used the same arrangement in the 'EP-2' in Sprat number 85 - something else for which I cannot claim originality!) The output from the LPF is threaded through a ferrite bead and one or two turns of thin enamelled copper wire are also passed through it, comprising L5. Twist together the wires connecting L5 and D3.

Depending on the type of the LED, one turn for L5 will enable D3 to flash in rhythm with the modulation while two turns will give near full brightness continuously.
According to the LM380N data sheet, some care is required in the layout of its circuit, but in practice as long as C13, C14 and C15 are all soldered near the associated pins of U1, no problems should be encountered. Use screened audio cable both from the board to the microphone jack, and for the microphone lead, otherwise excessive hum pick-up will result. Pins 9 and 13 of the LM380N are not used. The wire from the emitter of Q1 to SW1A must be no longer than necessary, and keep C4 close to the emitter of Q1 or instability may result.

VFO Operation

The circuit can easily be adapted for use with a VFO by removing the crystal, C2 and VC1. Assuming a suitable VFO is available, unsolder the earthed end of C3 and inject the VFO signal through C3 to the base of Q1. The VFO must have a peak to peak output of at least 0.5 volts to fully drive Q1. As with all VFOs, it should be well buffered and also have a properly stabilised and filtered voltage supply to prevent 'FMing' with the modulation from unwanted RF feedback. This is a common problem with home brew rigs. It won't be too noticeable if the receiving station is listening in AM, but many will be using SSB to demodulate the AM signal, and if your carrier is shifting frequency in sympathy with the modulation it will sound dreadful.
There is an additional problem to overcome when using a VFO; there must be some provision to either shift the frequency out of the receiver's IF pass-band during receive or to reduce the voltage to the VFO to such a low level that it stops oscillating, yet keeps the active devices conducting sufficiently to reduce drift at switch on. But these matters will be left to the individual constructor...

Setting up and using the transmitter

Set VC1 to about half capacity and connect a QRP power meter or SWR bridge and dummy load to the output. *Without* talking into the microphone, adjust RV1 for about 55 to 60% of the supply voltage at Q3 collector (about 6.8 volts with a 12 volt supply and 7.8 volts with a 13.8 volt supply.) RV1 may need slight adjustment to maintain this voltage if the crystal is changed. The power output should now be about 600 mW. There should be at least a dim glow from D3 if two turns were used for L5.
With the help of a nearby station, set the modulation level with RV2 so that it sounds 'full', but without distorting on peaks. The output power will now be approaching 1 watt when fully modulated. Once RV1 is properly set, there should be no audible distortion as modulation quality is almost entirely dependent on the microphone. The exact crystal frequency is adjusted by VC1, but only by a few hundred hertz.
Simple amateur band CW transmitters are legion! Complex SSB transceivers projects can also occasionally be found in the pages of the amateur radio press, but *simple* phone transmitters are much scarcer beasts! And although the power is modest, this transmitter is more than adequate for local 'rag-chewing'. If you have not done it before, I hope you have fun making contact with another phone station with a rig you actually built yourself!

QTY	PART-REFS	VALUE
Resistors		
1	R1	15k
2	R2,R5	100R
1	R3	100k
1	R4	1k5
1	R6	1k
1	RV1	47k
1	RV2	1M
Capacitors		
3	C1,C5,C7	47n
1	C2	6p8
3	C3,C8,C16	10n
2	C4,C13	470n
2	C6,C14	100n
1	C9	47u
2	C10,C12	1n
1	C11	2n2
2	C15,C18	560p
1	C17	470u
1	VC1	68p

Integrated Circuits
1 U1 LM380N
Transistors
3 Q1,Q2,Q3 BD131

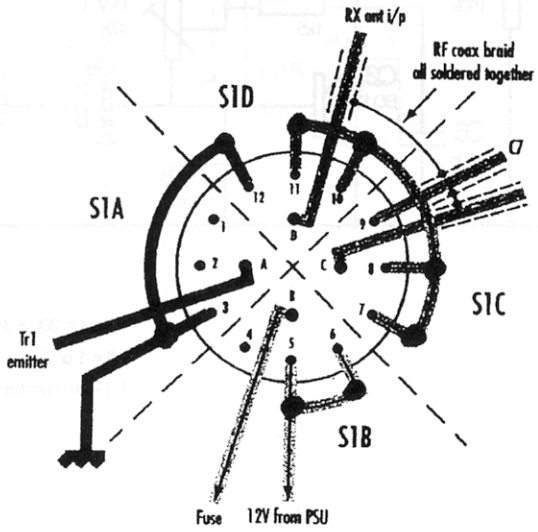
Diodes
2 D1,D3 LED (red, green)
1 D2 1N5408

Miscellaneous
1 crystal mic
1 ferrite bead
1 SW1A,B,C,D 4P3W

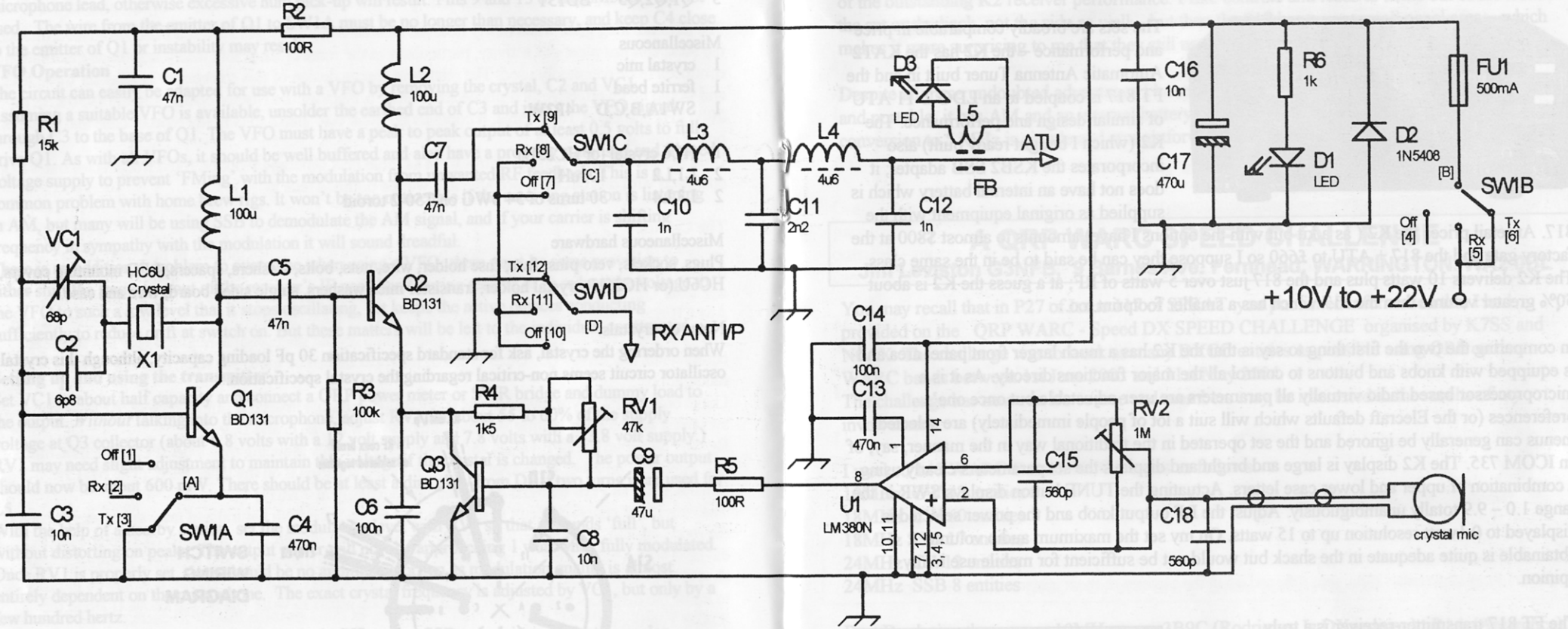
1 HC6 crystal (or HC25U)
2 L1,L2 100uH
2 L3,L4 30 turns of 34 SWG on T50-2 toroid

Miscellaneous hardware
Plugs, sockets, vero pins, fuse, fuse holder, wire, nuts, bolts, washers, spacers, LED mounting covers, HC6U (or HC25U) crystal holder, transistor mica washers, single sided board, wire and case.

Notes on crystals:
When ordering the crystal, ask for standard specification 30 pF loading capacity, although this crystal oscillator circuit seems non-critical regarding the crystal specification.



SWITCH WIRING DIAGRAM



L3, L4 = 30t of 34 SWG on T50-2 toroid

L5 = 1 or 2turns through FB

[ ] = pin numbers marked on SW1

(c) Ian Liston-Smith 7 Jan 99

ham-am.dsn

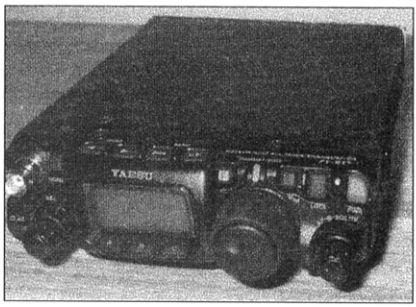
WHICH WOULD YOU CHOOSE – K2 or FT 817 ?

John Teague, G3GTJ, Perrotts, Lydford-on-Fosse, SOMERTON, TA11 7HA

I am in the happy, if temporary, position of having an Elecraft K2 and a Yaesu FT 817 alongside each other in the shack. Temporary because I intend to one only – but which ?

The sets are broadly comparable in price and performance – the K2 has the KAT2 Automatic Antenna Tuner built in and the FT 817 is coupled to an LDG Z-11 ATU of similar design and performance. The K2 (which I bought ready built) also incorporates the KSB2 SSB adapter; it does not have an internal battery which is supplied as original equipment with the 817. At retail prices the K2 (as a kit but with the options I have) amounts to almost $800 at the factory gate and the 817 + ATU to £660 so I suppose they can be said to be in the same class. The K2 delivers 10 watts plus and the 817 just over 5 watts of RF; at a guess the K2 is about 50% greater volume than the 817 which has a smaller footprint too.

In comparing the two the first thing to say is that the K2 has a much larger front panel area and is equipped with knobs and buttons to control all the major functions directly. As it is a microprocessor based radio virtually all parameters are user-adjustable but once one's preferences (or the Elecraft defaults which will suit a lot of people immediately) are selected menus can generally be ignored and the set operated in the traditional way in the manner, say, of an ICOM 735. The K2 display is large and bright and displays the set parameters clearly using a combination of upper and lower case letters. Actuating the TUNE button displays SWR in the range 1.0 – 9.9 totally unambiguously. Adjust the RF output knob and the power selected is displayed to 0.1watt resolution up to 15 watts. On my set the maximum audio volume obtainable is quite adequate in the shack but would not be sufficient for mobile use in my opinion.



The FT 817 transmitter-receiver is a truly remarkable package with a very wide frequency coverage. All operating functions except frequency, RF and AF gain are selected by menu called up by a knob with final button selection. Again there is a very wide range of user selected options but even basic operations such as power output setting and swopping VFOs demand menu selection. Top band is provided (it is an add-on for the K2) and so is amplitude modulation which I use. SWR indication on the 817 is rudimentary and the bar type S meter is just adequate; both functions are done better on the K2. However, if you need memories the K2 has only ten but the 817 has over 200. It also has a general coverage receiver and provides FM broadcast reception. My own interests do not extend to frequencies above 30MHz but the 817appears to have all the necessary facilities for VHF use.

And so we come to the decision: to my taste the ergonomics of the K2 far outshine those of the FT 817. The K2 is easy to learn, instinctive and the buttons are operated by a standard finger with ease. No need to search for a ball point pen to poke the menu button, as on the 817. The tuning rates on the K2 are good with the middle one near ideal. And of course, we have all read of the outstanding K2 receiver performance. I like controls and leads to come out of the front of the set or the back, not the side as well – but then the 817 has a very small panel area – which makes it more surprising to me that they still use the clumsy SO 239 antenna socket . . . .

Despite all these undoubted advantages I have decided to keep the FT 817. It is incredibly small and portable; it has AM and an internal battery of useful capacity. I am also assured that conversion to 5 MHz is simple and straightforward. So there we are.

A QRP WARC SPEED CHALLENGE

Jim Leviston G3NFB, 9 Barnes Ave. Fernhead, WARRINGTON. WA2 0BL

You may recall that in P27 of Issue 117 of SPRAT you published information that I had provided on the QRP WARC - Speed DX SPEED CHALLENGE organised by K7SS and N0AX. The challenge was to work as many DXCC entities as possible using QRP on the WARC bands between 1st June 2003 and 31st May 2004.
The challenge has now run it's course and members may be interested in the results of my involvement.

I worked 140 WARC-Band/DXCC entities as follows:
10MHz CW 43 entities
18MHz CW 60 entities
18MHz SSB 17 entities
24MHz CW12 entities
24MHz SSB 8 entities

Best Dx during the year on 10MHz was 3B9C (Rodrigues Is DXpedition). R1A (Antarctica) was the best on 18MHz. On 24MHz PY (Brazil) was my best DX. All on 5w from an FT817 into an SG239 tuner and 50ft doublet at about 30ft up.

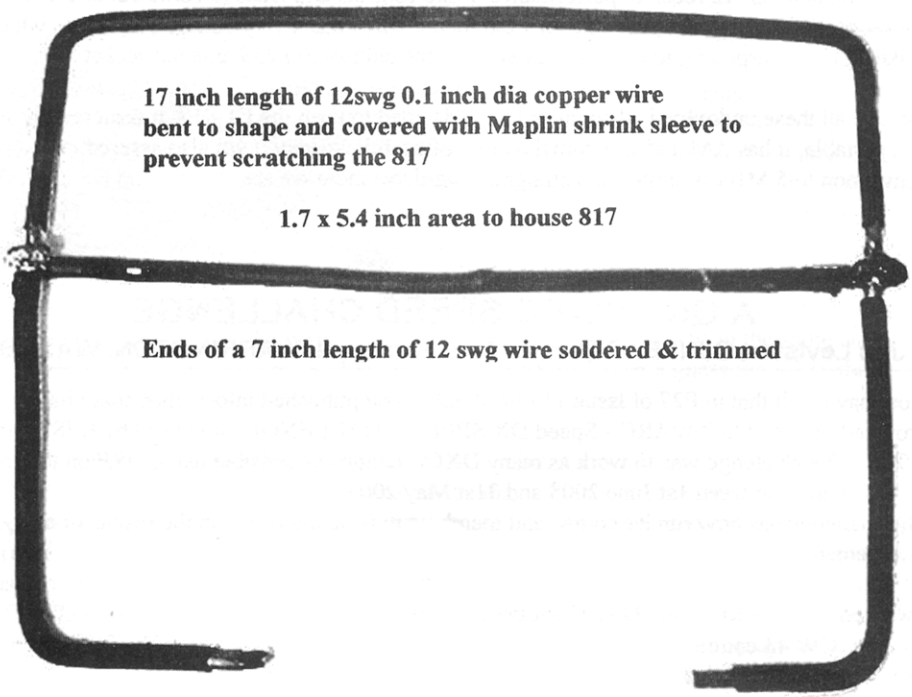
I found the experience very satisfying and confirmed what more experienced QRPers are always saying i.e. "You don't need a lot of power and a big beam to work the world" . I would modify this statement to include "But it helps!!". There were many frustrating times when I called some good DX but was not heard. It was surprising though, just how many pile-ups I was able to get into with a bit of patience.

The next few years will be interesting on the WARC bands as solar activity reaches its minimum. It will be a further challenge to keep working these bands. I am encouraged by the fact that I monitored the beacons on 28 Mhz all the way through the last solar minimum and it was surprising how many times they could be heard on a supposedly flat band. Unfortunately there were very few amateur transmissions to be heard on 10 during those times.

A Simple Cradle for the FT817

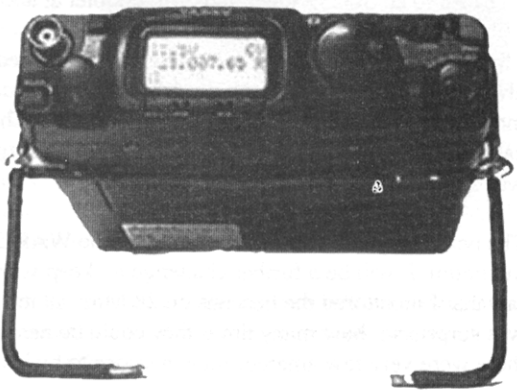
Chas G3TTZ, 70 Calcott Rd. Knowle, Bristol BS4 2HE

Approx 5.7 inches wide x Approx 4.5 inches high



The only difficult aspect of owning an FT 817 has been the inability to read the small front panel display. I found this easier if the unit it tipped up in the manner of most transceivers.

This cradle is simple to make, is lightweight, lies nicely on the 817 when in its box, is easily fixed and costs practically nothing. I have found it useful in all sorts of /P situations.



Making PCBs with Inkjet Printers

David Smith G4COE, 54 Warrington Rd. Leigh, WN7 3EB

A little dodge for using inkjet printers to make PCBs. Using a cad programme (many can be downloaded as trial versions - I prefer Proteus) or you can make the pcb design by longhand in Paintshop pro for example, when the designs been made . The next thing is to make a print....

Using overhead transparency (not tried Ink jet tracing paper - use at least the 90g stuff if you can get it) with my Epson Ink guzzler C62, I use the glossy film setting and make 2 prints, one being a mirror (this can be done either on the printer, or on the actual PCB program) with the printer set on 'Best photo' or whatever, don't forget to print on the rough side and whatever you do leave them to dry for about an hour.... now then and here's the dodge.....

Cut the two prints leaving an healthy border round the design so as not to touch the ink, using paper glue - the liquid stuff (Prit stick if used very lightly) stick the two together ink on the outside's - glossy side back to back, very carefully line all the holes up and Bob's ur' uncle, you can of course use cellotape but this makes alignment harder.

Mount the design on the photo board (need not be absolutely dark, close the curtains, switch off all lights especially fluorescents, ensure that the design is nice n' flat on the pcb by using a small glass plate on the top, or clear plastic in which case it could be 'taped round the edge's to keep it flat. The clue is keeping it nice and flat to the board.

I have tried this method with about 8 minutes of direct sunlight and it works!!!! Mid day to mid afternoon , ' any one tried Moonshine let us know.....Hi.

Receiver to PC audio coupler

Laurie Booth G4XEC 12 Park Cres. Emsworth, Hampshire. PO10 7NT

This system enables a fast and efficient introduction to digital transmissions without overdriving a PC's soundcard or having processor hash feeding back to the receiver.

Remove the insets from a pair of Walkman type headphones - a wide frequency response isn't important.
Bind them face to face with a complete turn of adhesive tape - which will also exclude external noises.
Leave a few centimetres of lead on the 3.5mm stereo plug before cutting it off and joining it to one of the inset leads with the tip and ring commoned.
This becomes the PC's mic input feed.
Provide a connector appropriate to the receiver for the other inset lead.

Working between the receiver's audio output control and the PC's virtual fader will determine optimum audio gain settings for the program in use.

ANTENNAS - ANECDOTES - AWARDS

Gus Taylor G8PG 37 Pickerill Road, Greasby, Merseyside, CH49 3ND

AN EXPERIMENTAL 20 FOOT HIGH VERTICAL ANTENNA FOR 7 MH

Desmong Vance,Gi3XZM, "The Eaves", Comber, Newtonards,BT23 6EN.UK.

The antenna section consists of a 20 foot alloy mast with top loading and base tuning (Fig 1). The base is made from a sloping shoulder wine bottle such as a champagne bottle. The mast is guyed with 4 guys each made from multi-strand polyethylene cord, which is weather resistant and an excellent insulator,attached to the pole by a suitable clamp. The top loading unit is based on a 1 foot length of timber of suitable diameter to fit into the top of the mast. It has holes drilled in it to take three, 5 foot long garden canes which support the top loading windings (Fig 2). These canes are wedged and glued into position. The unit uses 6 turns of 2 foo t radius to provide capacity loading, and 3 turns of 1 foot radius to provide inductive loading (Fig 2).. .The loading coils are wound with 18 swg enamelled copper wire, connetions to the mast being via the screw which secures the 1 foot long wooden centre piece to the mast. This connection must be thoroughly weatherproofed. The antenna is tuned to resonance by means of a variable capacitor of at least 200p, mounted in a weatherproof plastic box attached to the base of the mast. One side of this capacitor is connected to the mast and the other to the live side of a coaxial connector mounted on the box, the other side of this connector going to the earthing system. Once again goodweatherproofing is vital. This co-axial connector provides termination for the cable back to the rig. The antenna is resonated by disconnecting the cable to the rig and replacing it with a single turn loop of wire. A g.d.o can then be coupled to this loop and the variable capacitor adjusted until resonance is obtained in the 7 MHz band. If resonance is not obtained add a single turn to the inductive loading. The more efficient the earth system the better will be the results with this antenna. I use a lot of chicken wire which has been allowed to sink into the ground, but radials, either elevated and/or buried or a combination of radials and earth spikes can also be used. Feeding methods for good swr can use either an electrical half wave of co-ax or an a.t.u can be mounted in the box at the base of the mast.Either gives good results. The loading system raises the feed point impedance (in t this model calculated at around 28 ohms) , which improves radiation efficiency alhough this also depends on how good the earthing system is. This loading can also be adopted to load a range of shortened antennas,both horizontal and vertical . If you try it please let us know your results.(Acknowledgements to Radcom for some design ideas.)

THE LITTLE WIZARD

Alan Troy,G4KRN, 29 Longfellow Street, Liverpool, L8 0QU

This is an indoor or almost invisible outdoor antenna which will fit into a small space. It is fed via a Z-match coupler which covers 7 to 28 MHz. The " Missing Leg" coil , Lc, consists of 25 turns of 18 swg wire or equivalent on a 2½ inch diameter former. Figures 3A and 3B show typical configurations for the antenna. In 3A the 16 foot section forms one leg of the antenna and the "Missing Leg" coil the other, with a short length of 300 ohm feeder to the Z-match. In 3B the antenna wire and coil are at ceiling level and a longer 300 ohm feeder is used. In both configurations if necessary trim the 16 foot section for best swr. 7MHz operation is possible by strapping the ends of the feeder and using a coil of co-ax connected to the Z-match E terminal as a counterpoise Best HF DX VK and W, 7MHz Europe..

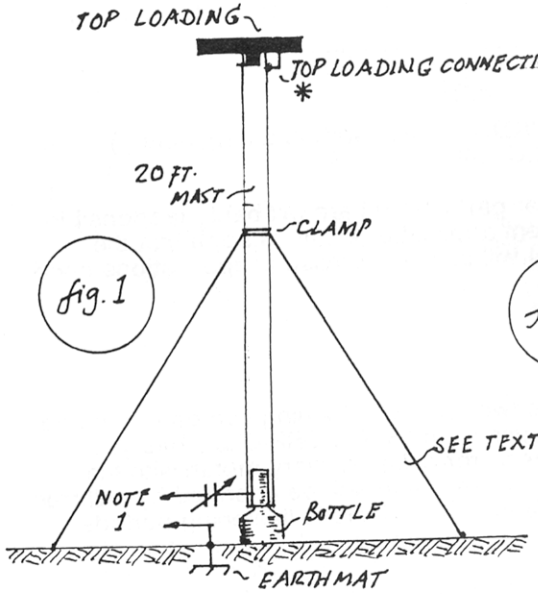


fig. 1

COMPLETE ANTENNA

NOTE 1 - TO G.D.O. LOOP, FEEDER OR A.T.U.

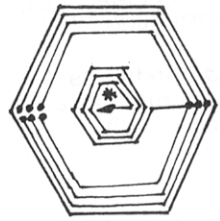


fig. 2

TOP LOADING

* INDICATES THE CONNECTION TO THE MAST.

NOTE. THE OUTER HEXAGON IS THE BORDER OF THE FIGURE.

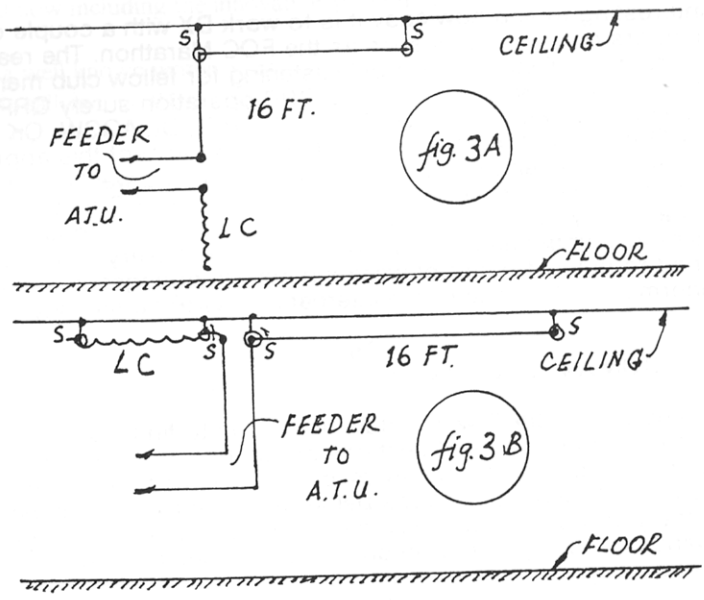


fig. 3A

fig. 3B

S : SUPPORT CORDS

AWARD NEWS

Sincere congratulations to the following on their Endorsements (no new Award issues this time).

QRP COUNTRIES. 150 F6ACC.

WORKED G QRP CLUB. 1480 GM3OXX (That 1 watt is unstopable !)
420 G4PRL; 400 G3ZHE ;220 G3VLU; 140 GM4OSS.

The bad conditions during the latter part of 2003 are probably responsible for the fall off in Award/Endorsement applications. Let us hope that the improved conditions so far in 2004 will see an increase in applications once QSLs come through the system

PLEASE QRX FOR OK5PQK

In SPRAT No.117 we mentioned the two childrens training camps run during the summer of 2003 by our colleagues from the OK QRP Club. This year they will be running a training weekend for children every month with the support of the Eurotel Foundation. These events will be attended by children from all over the Czech Republic. Activities will include lisstening periods, morse training, lessons in prefixes and procedure, pcb construction etc. During these weekends the Special Event callsign OK5PQK will be used, We In G QRP C have a long and fruitful relationship with OK QRP C and congratulate them on this excellent project to bring young people into QRP amateur radio.

THE INTERNATIONAL QRP FREQUENCIES ARE OURS TO USE

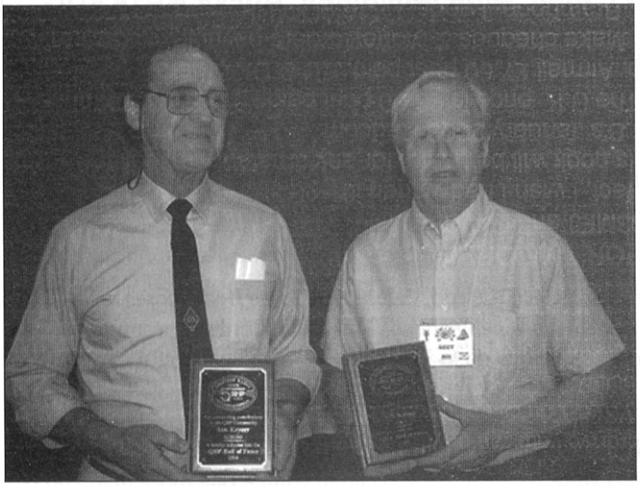
It is very interesting to find how easy it is to work DX with a couple of watts during "members only" contests such as the FOC Marathon. The reason is, of course , that the DX stations are only listening for fellow club members and ignore other calls. When it comes to QRP operation surely QRP operators are a world-wide club with the G QRP C, QRP ARCI, DL AGCW, OK QRP C and all the other QRP Clubs forming its branches . If we accept this approach them surely every weekend should be a family gathering weekend where QRP operators from all over the world use the international QRP frequencies to try and contact as many other QRP operators as possible. Obviously family, work and similar commitments must come first, but if every active QRP operator tried to put in 4 hours of weekend activity duringeach month it woulld make an enormous difference to the international QRP community.

PLASTIC SECTION ANTENNA MASTS

Quite a few years ago G8PG was fortunate enough to find a surplus trader selling 1 metre long plastic mast sections about 3 cm in diameter and designed to plug into each other. He used 7 of them to make a 7m high mast, the joints between the sections being reinforced with metal hose clips. Over the years this mast, which has twosets of guys, has regularly withstood winds of 100 kph, and on one occasion 125 kph. but although it has bent and swayed it has never broken. So if you wish a simple, long lasting wire antenna support it is worth trying plastic section construction.

G QRP CLUB MEMBERS HONOURED AT DAYTON

G3ROO – N8ET – G0BXO - RECEIVE AWARDS



Over the past 10 years, the American QRP ARCI has honoured those who have made a significant contribution to the world of QRP by inducting them into the QRP Hall of Fame. Inductees are honoured at the Dayton Hamvention with a plaque presented at the annual QRP Banquet. The banquet forms part of the Four Days in May QRP event which is attached to the annual Dayton Hamvention in Ohio.

This year two members of the G QRP Club, Bill Kelsey, N8ET, and Ian Keyser, G3ROO joined the QRP Hall of Fame and John Leak, G0BXO, received a QRP Quality Recognition Award

Bill Kelsey has been the G QRP Club representative in the USA for almost 20 years and in his spare time has run Kanga US which sells a range of kits originally based on the UK Kanga Kits and now including the innovative W7ZOI project kits.

Ian Keyser is a well known writer on antenna and QRP subjects for UK magazines and SPRAT. As his callsign, G3ROO, suggests, Ian was a joint founder of Kanga Products, the UK QRP kit company.

John Leak, G0BXO, received a special QRP Quality Recognition Award for his many years of service as G QRP Club Membership Secretary. A behind the scenes officer, John puts in hours of quiet work to ensure the smooth running of the club.

FOR SALE: TENTEC SCOUT 555 mobile/portable TCVR 50w PEP adjustable, NB fitted, complete with 80, 40, 20, 17, 15, 10m modules. Boxed, manuals, circuits, no mods, vgc £350. Please tel: Ipswich (01473) 822330.

FOR SALE: TR2200 2 meter 6 channel, 12 volts £25. IC1050 10m FM £25. Ch9 29.440 – Ch25 29.600 Hi Band Edge. Repeaters can be worked in the USA. SWLA25 Power Amp £20. Philips VHF handheld PR710HSU. No Bat/Antenna. needs programming £15. VHF ICF sim £15. All buyer collects or pay postage. Tom. 07956 060377.

COMMUNICATIONS AND CONTESTS

Peter Barville G3XJS e-mail: g3xjs@gqrp.co.uk
40 Watchet Lane, Holmer Green, High Wycombe, Bucks HP15 6UG.

A slightly shorter column this month – less work for me maybe, but I'd much rather have a greater level of input from members!

CZEBRIS 2004

This event should really attract a higher level of interest, particularly as it helps to foster closer ties with our OK/OM QRP colleagues. However, we have to recognise that current declining sunspots do nothing to help.

So, only two entries this year - from Alex, G4FDC, and Valery, RW3AI.. Both scores were similarly limited, but with RW3AI's entry marginally ahead. This is the third year running he has won CZEBRIS, and so many congratulations go to Valery for another successful entry.

YEOVIL AMATEUR RADIO CLUB FUN RUN 2004

36 QRP stations, in 7 countries took part in the 2004 Fun Run – exactly the same as in 2003! A total of 15 entries (plus one check log) were received by the Yeovil Club – one more than 2003! The winners in each section are as follows:

40 metre section	GW4ALG	478 points.
80 metre section	G4PRL	605 points.
Both bands	GW4ALG	1068 points.

The station using the lowest power was F6GGO, who (once again) used 2 watts throughout the event. YARC thank all participants, and G3MCK for his check log.

Results achieved by the two Bonus Stations are:

G3YMC	40m, 320 points	80m, 450 points	Total 770 points.
PA3CLQ	40m, 308 points	80m, 450 points	Total 758 points.

20th YEOVIL QRP CONVENTION

About 200 people attended this year's event, and the winner of the Construction Contest was G3OFX. During the Convention Bob, G4JFN, presented the G2NJ Trophy to George, G3ICO, who accepted the award on behalf of the Yeovil Club. The lectures were, as in previous years, informative and well attended.

WQF 2004

Valery, RW3AI, has kindly supplied the following information:

WQF Contests are devoted to the revival of The World QRP Federation (WQF). To participation in Contest are invited all QRP Clubs of a World, and also all Amateurs operating on QRP. Contest organiser is RU-QRP Club, Russia.

DATES:

1st Friday of January (7th January 2005)

TIME:

00.00 UTC to 24.00 UTC.

PARTICIPANTS:

All licensed Amateurs QRP only. Single-OP only. QSO between participants only.

BANDS:
160, 80, 40, 20, 15, 10 meters around the International QRP frequencies.

MODES:
CW, SSB, Digital in accordance with license.
CALL:
CQ WQF TEST de CALL QRP
POWER:
Not more than QRP standard: CW/Digital - 5 watts output, SSB - 10 watts PEP
EXCHANGE:
RST (RS)/ your QRP-Club/ your member's number.
Non QRP Club's Members - RST (RS)/Country DXCC/Power.
Example: 579/RUQRP/001 or 599/GQRP/4690 or 589/RUS/5w.
Important! Each participant can represent only a single QRP Club.
SCORING:
QSO the same Continent (DXCC) - 1 point, different Continent - 3 points.
The same station may be worked on different Bands or Modes.
MULTIPLIERS:
1 multiplier point for every QRP Clubs per band.
FINAL SCORE:
Sum of QSO-points multiplied by sum of multiplier points of all bands used
LOGS:
Columns: UTC, Call, exchange sent, exchange received, multiplier points, QSO points.
Separate log sheets for each band are required. Cover sheet: own call, name/address, rigs/antennas and power used in the contest, final score claimed, word of honour to have obeyed this Contest's Rules, operator's signature.
DEADLINE:
Deadline to send Logs - 30 days of Contest date. Checklogs are welcome as well as any comments by participants. Only paper logs and comments are welcome!
ADDRESS:
RU-QRP Club P.O. Box 229, Lipetsk, 398043, Russia.

EUCW 160m CONTEST 2004
Valery has also supplied details of the results from this year's event, which I will be happy to supply to members on receipt of an SSAE, or email.

Please let me have items for inclusion in the next SPRAT by the beginning of August.

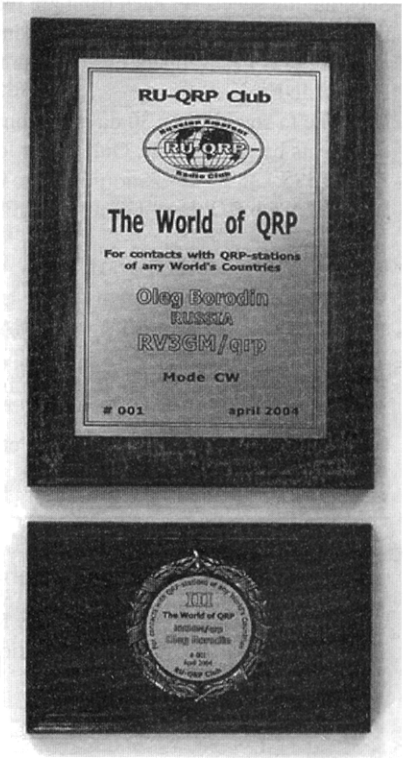
Have plenty of QRP FUN. 72 de QRPeter

FOR SALE: MORSE KEYS £20 each inc postage & packing. First come first served!
Cheques to 'Gary Fisher' 6 Totternhoe Rd. Dunstable. Beds. LU6 7AG.
Tel 01582 661856 for further information.

RU-QRP CLUB "The World of QRP" Trophy

Award is put out for all World's licensed Amateurs and SWL's for QSO (SWL) with QRP-stations of any DXCC countries. For deriving the Trophy each participant should dial 100 points. Each DXCC country on each HF Band = 1 point. The same country may be operated on different bands. Any modes can be used. No date limitation.
"The World of QRP" Trophy has two class:
"GOLD" - participant used QRP only; "SILVER" - participant used QRO and also SWL.
QRP - less than 5 watts output CW and DIGITAL or less than 10 watts PEP SSB.
The special medals: * 125 points = 3rd degree * 150 points = 2nd degree * 175 points = 1st degree
* For QSO on only single of bands (20m, 17m, 15m, 12m, 10m) the sum of points multiplied on 2;
* For QSO on only single of bands 40m or 30m sum of points multiplied on 3;
* For QSO on only 80m band the sum of points multiplied on 4;
* For QSO on only 160m band the sum of points multiplied on 5.
* The same Rules for additional points for deriving medals, as for the base Trophy. Note, that the base Trophy can be executed on one band, but the medals - on all bands, and on the contrary.
* The special endorsement on Trophy for single mode operated (only CW, SSB, Digital).
Application Form:

All QSL's from QRP-stations must be received. Application List in alphabetical order of country (listing from the lowest band).
The QSL-cards are set off, on which is designated output power or printed call-sign/QRP.
Application Forms may be download – see site below
QSL-cards are NOT enclose with application for the base Trophy, but Award Manager can ask for QSL's if he is not sure of any QSO's. QSL's are used with applications for extra points Awards (Medals) necessarily (only for extra QSO-points). QSL-cards must be send only by registered mail.
Participant must operated from only one DXCC country.
For medals application and QSL-cards enclose for QSO with only new countries.



Payment:
"The World of QRP" Trophy - $35 USA.
Medal 3rd degree (with oak base desk for medals) - $15.
Medal 2nd and 1st degree) - $10 USA.
Cost includes post & packing the Trophy.
For payment by IRC: 2 IRC = $ 1.
"Western Union" or "MoneyGram" money transfer must be used only (NOT CASH!) for Award Manager name/address. Inform about Money Transfer Code Number (MTCN) by E-mail at once.

Award Manager:
Alexei V. Rusakov, P.O. Box 5, Volgograd,
400007, RUSSIA
E-mail: ua4arl@dxsoft.com
Additional information: http://ruqrp.narod.ru/index_e.html

SSB & Data Report

Dick Pascoe GØBPS. Seaview, Crete Road East. Folkestone. CT18 7EG
Tel 01303 894390 – Email gØbps@gqrp.com

There have been some atrocious signals seen (and heard on PSK over the past couple of years, many operators seem to think that 40 or even 50 watts (or more) is required. Rather than some operator reports Pete PH1PH has written this guide for us;

Setting up your rig for PSK31 and other soundcard driven modes.

Before even considering using your rig with a computer/soundcard combination, make sure that you have an interface to isolate the audio lines and PTT from the computer. Do NOT think about trying it without, as the consequences for other band users are not nice at all. Admittedly, some people seem to get away with it: but most don't. RF feedback and ground loops can cause havoc - yet are easy to avoid. There are plenty of circuits available to those with an internet connection: there's an especially good Interfacing Guide written by Pete PH1PH and Bas G4TIC available from ftp://www.ham-radio.ch/doc/Interfaces.pdf This contains circuits for CAT and audio interfaces, and even a couple of practical examples.

Setting up the drive levels for PSK is not difficult, but requires care. One problem that we face is that SSB filters have ripples in the band pass, and the drive levels can vary according to the audio frequency used. Most filters attenuate quite strongly under about 800Hz and above 2200Hz, and you should allow for this.

1: Connect your rig to a dummy load and connect the soundcard interface to rig and computer. 2: Start your PSK31 program: 3: Open your mixer window from within the software and set the audio output level to zero. 4: Go to TX idle mode (sometimes called TUNE) and ensure that the rig is properly keyed. 5: Gently advance the audio output level until the rig is producing NO MORE than 25% of its rated output power (we QRPers shouldn't have any problems here) 6: Keeping an eye on the ALC meter, start typing and check that the indicated output power is no more than 50% of the rated output power. THERE MUST BE NO ALC ACTION INDICATED AT ALL! 7: You are ready to go.

If your rig has a variable power output, leave it set to maximum but reduce the drive level to reach the required output. This should ensure better linearity - we hope.

One factor that is often overlooked is the quality of the soundcard used. Many - if not all - on-board sound systems have a very limited dynamic range: most are around only 65-70dB. For serious use with 'soundcard' modes you are better off with an external soundcard, as it picks up much less digital noise from within the computer. A less expensive model is the Creative MP3+, and this seems to work well. If you want an internal card, then the Creative Audigy2 in its various guises is one excellent model: although you should take care to mount it as far away from the video card as possible, and keep all internal cabling well out of the way. External soundcards seem to have noise levels at least 10dB lower than internal cards: but don't let that deter you from getting your feet wet!

There is a plethora of PSK31 software available: some is commercial, some is freeware. Possibly the best (and most sophisticated) is PSK31 Deluxe by Simon Brown HB9DRV and

Peter Halpin PH1PH. This is distributed together with an excellent CAT program that can be used with a wide range of radios from the FT-817 to the IC-756MkIIPro. This prize-winning package can be downloaded from the Ham Radio Deluxe user's community forums at http://www.ham-radio.ch/forums.

Other good (free) software is WinPSKse (http://www.pskse.com) and Digipan (http://www.digipan.net). There's a commercial program called MixW that offers quite a few modes (and costs $50) at http://www.mixw.net. This can also be supplied with a USB interface that requires no soundcard, but I cannot vouch for it, having never been able to play with one.

There are crude ways of estimating what your audio setting ought to be, but these don't really guarantee best results--plus, you have to tune up over and over again as you change audio frequencies, and as you use your computer's sound card for other applications. His solution has been to develop a microprocessor-based RF signal sampler that periodically checks your RF output, computes its IMD locally, and automatically sets the sound card's audio level to provide the highest RF output with minimum distortion. The program can be set to run continuously in the background so that you are free to enjoy transmitting perfect PSK31 signals!

To ensure that you can NEVER overdrive your radio when using PSK31 (or PSK63) I can recommend the PSKMeter by KF6VSG. You can find more details of this very useful gadget at http://www.ssiserver.com/info/pskmeter/
Follow Pete's advice and have a clean signal on the bands (unlike some....)

- -

MEMBERS' NEWS

by Chris Page G4BUE

Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ.
Tel: 01798 815711
E-mail: g4bue@adur-press.co.uk

Congratulations to Ian, **G3ROO**, and Bill, **N8ET**, on being inducted into the QRP Hall of Fame at Dayton in May. G4WIF said, "I'm sure the group will join me in congratulating them for an honour richly deserved. Neither knew about it in advance and the surprise on their faces was a joy to see". Congratulations also to John, GØBXO, who received a special QRP Quality Recognition Award for his many years of service as our club Membership Secretary.

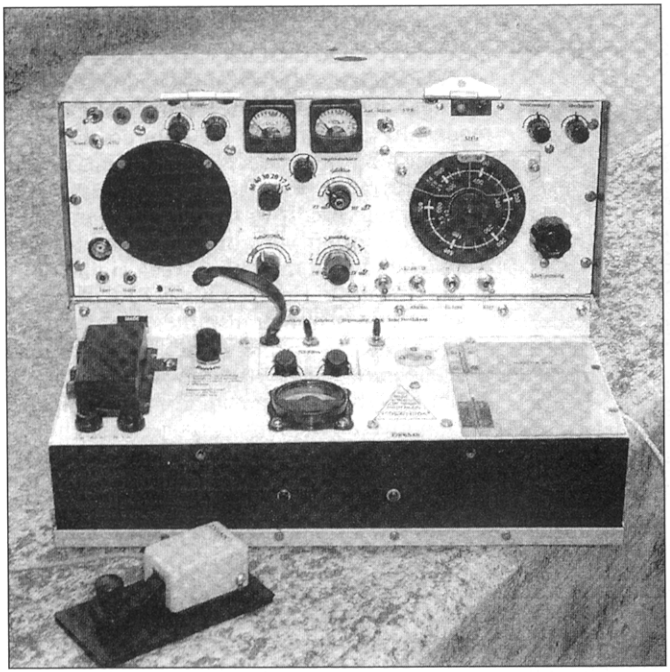
EA5EF invites everyone to Spain as the EA QRP is going to celebrate its 4th Annual Meeting on 5/6 June in Sinarcas (Valencia. Paco writes, "We will set up two HF stations with special callsigns **EF5QRP** (novice operators) and **ED5QRP** running habitual QRP frequencies, with a commemorative QSL of the event".

F1BDP reports that since 15 May F1 and F4 (Class 2 licensees) are allowed on the HF bands and Pierre is QRV on 10 metres SSB with two watts from an old modified CB radio and a Windom antenna. **GM4XQJ** was QRV from Fuerteventura Island (IOTA AF-004) again in May, Brian was using QRP CW with dipoles on 40 and 20 metres - *thanks Daily DX*. S53MA has changed his callsign to S56C. AL7FS is QRV "nearly 100% QRP from my modest station (three element triband beam at 40 feet) and stay on CW 98% of the time". Jim would like to QSO more Club members.

G4PRL was QRV on 20 metres from Portugal during his winter holiday and only made 110 QSOs due to the poor conditions (although 77 were two-way QRP and 50 of those with members). Roy says, "I must give considerable credit to the many operators who under often very difficult conditions, were able to pick my rather weak signal out of the 'mush'". He used his MFJ Cub as a receiver and a new transmitter based on a **W7ZOI** design in the ARRL publication *QRP Classics* (page 10). He added an amplifier (2N3866 driver and 2SC1909 amplifier) to give eight watts output, although he reduced the drive to five watts. Roy uses the **W9SCH** Rockloop antenna (SPRAT 60).

MØDBO received a QSL for a QRP QSO with an Italian station on 40 metres and Nigel said, "What was good about the card was the comments written on it - 'My first QRP QSO almost as exciting as working rare DX', so hopefully we have another convert to QRP". **DL9HCU** was a good signal in Europe on 20 metres for several mornings at the end of March whilst running five watts from **5W1VE**. My newly built K2 worked Udo for a new two-way QRP country. **G3XJS** also worked Udo and Peter had also QSO'd him in March 2000 from ZK1 on two-way QRP. On 1 April **GM3OXX** worked **VK4QC** on 14060kHz. George exchanged RST of 359 with Peter who was running just 450mW to a two element quad and a Rockmite. On 3 April **S56C** (ex **S53MA**) worked **PJ6/N6KD** on 20 metres with two-way QRP.

While operating from his motor-home near Birmingham, **GW7HOC** heard two North American stations discussing a problem with Outlook Express on 17 metres. Darren knew the answer to their problem but only had five watts and a mobile antenna. Nevertheless, he broke in and was heard first time, gave them the answer to their problem and mentioned what he was running. They were amazed". For new users of the oscilloscope, Paul Webb suggests the Internet site <bkprecision.com> where they offer a free download of an instructional manual designed for beginners.



DL2BQD reports on the 2004 QRP Meeting in Pottenstein on 24 April organised by **DJ3KK** and his crew. Dieter writes, "There were lectures on PIC controlled ATU as well as digital radio and its future. All the topics were combined with instructive discussions and an inspiring display of home brew equipment. There were sophisticated rigs together with the classic mini ATU from SPRAT, and ell constructed short antennas as well as a light weight highly effective delta loop phase linked for two bands which was used with the Poseidon TRX by Oliver, **DF6MS**. The photograph above was taken by Hans, **OE3HUS**".

G7ECN reports, "The Ham Radio Deluxe Development Team is pleased to announce the release of Ham Radio Deluxe v1.2 (final release version. More information at <http://www.ham-radio.ch/forums/viewtopic.php?t=45>. **PA3EHP** built the Elecraft K2 with Jan, GØBBL and three of his friends. Guus added the SSB option, 160 metres, ATU, noise blanker and the battery pack. He writes, "So far the longest distance with 7.5 watts is about 3440km in the Ukraine. My antenna is a Fritzel type FD-4 but I'm going to make the antenna on page 28 of SPRAT 114 to be completely portable".

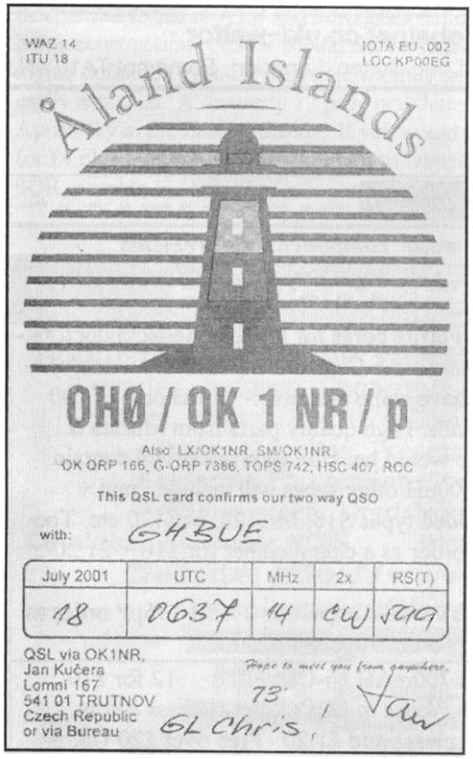
Congratulations to **M1RAL** for receiving a direct QSL from **5N6EAM/7** for a five watts SSB QSO on 7 February. Rick used his FT-817 and Miracle Whip antenna located in his shack indoors to make the QSO! He says, "Although I have yet to crack the 5000 miles per watt with the Miracle Whip, it came in at a fantastic 3257.135 miles, nonetheless with a signal report of 33 (but still every inch a workable QSO! This is the furthest I have covered using this antenna and it is my second furthest DX worked to date as a QRP SSB station".

GW4ALG QSO'd **3B9C** on 40, 30, 17, 15 and 12 metres with five watts CW to a G5RV. Steve has built PIC development kit from Magenta Electronics and says, "The kit is working well, but I still have a lot to learn about programming before I can be productive. I am interested in corresponding with others who are also learning to write programs for the Microchip series of PICs". Steve commends the ARRL book *Experimental Methods in RF Design* which was recommended to him by **G4GXO**. **G3YMC** also worked **3B9C** on five bands on CW. Dave has extended his longwire to 110 feet in the hope it improves his signal on 80 metres.

Congratulations also to **GØSBW** on his two-way pedestrian mobile (/PM) QRP QSO across the Atlantic. Tom writes, "With the A index at 15 and the SFI 99 (average conditions), I put out a call on 20 metres and thought I heard someone come back and as usual I could hear the other station saying my call but it was extremely difficult to make out his call. After many attempts I finally got the full **KA1KAC** callsign. I sug-

gested to Bill that we should call it quits, but I would stay with the frequency and possibly conditions would improve. **EA7/GØWHK**, then called me (a regular) and we had a QSO during which we experimented reducing power in stages and ended up with a very useable SSB signal with just one watt from my 817 to my 14 feet backpack whip. Ian was using a cobweb antenna and was in southern Spain some 1000 miles away. At the end of this QSO I heard Bill, **KA1KAC**, now operating as as a /PM and running QRP from his 817. I called him and then turned off the HL-50B amplifier and had a /PM QRP to /PM QRP QSO. It was hardly 'armchair copy' but it was readable. At the end of the QSO I heard a very clear 'CQ HF Pack' from **N3TLQ**. I called him but he did not hear me. I called Bill again and asked him to call **N3TLQ** which he did, but could not contact him. I then noticed that I still had the amplifier switched off and had been QRP whilst calling **N3TLQ** - my apologies for possibly missing the contact due to poor operating (excitement?). I finished off the walk with a long QSO with **GØWHZ/MM** who was on his sailing boat in a marina in the south of Spain. The moral of the story is that things (propagation) are not always what they seem to be. Don't forget - don't just listen, Call 'CQ HFPack'".

Arnie, CO2KK.



The QSL card of Jan, OK1NR, for his 2001 QRP operation from OHØ.

Writing on the *Topband Reflector* on 1 March **W4ZV** says, "Around 0300z I was listening to Rob, **PA3GVI**, on 1827.5kHz finishing a QSO with Tom, **W8JI**. Then Geoff, **G3XGC**, called Tom but he had moved frequency and I called Rob and Geoff was still on frequency. Using five watts to his Elecraft K2, Geoff was a very solid 569! Rob also went to five watts and was 559. Then Geoff and I moved up 1kHz from Rob's frequency and Geoff further reduced power to one watt. He was a very solid 559! I also reduced my Ten-Tec Orion to four watts (the lowest mine goes) and Geoff copied me fine. Pictures of Geoff's set-up, including the K2 and antennas is at <http://freespace.virgin.net/geoff.cottrell/G3XGC.html>. It is hard to imagine one watt making it across the 'pond' from **G3XGC**'s small city lot (1200 square feet total), but 160 metres is full of surprises for the deserving! I ordered a K2 myself last week and look forward to some QRP fun in the coming years as 160 metre openings like this become more routine. For anyone who thinks you cannot operate 160 metres from a city lot, I hope Geoff is an inspiration for you".

That clears the files once again, many thanks to all the contributors. Please let me know how your summer goes and especially some photographs to include in the column, by 20 August please.

Micro Radio Products

A range of economical easily built projects on Tripad circuit board. This offers advantages on cost. The current range is shown below. -

*** *New Regenerative 80m Rx now available!* ***

RB001 Regenerative SW Broadcast Radio Now upgraded with band switch £10.80
RB002AF Amplifier £5.40
RB003MW Radio WITHDRAWN (RAE Syllabus change)but some kits minus board, Tuning capacitor & ferrite rod available price £6.50 WHILE STOCKS LAST
RB00480m SSB/CW Regenerative Receiver *** *New* *** £11.50
RB005Boosted Short Wave Crystal Set (Approx. 6 - 15 MHz) £9.70

Post & Packing £1.75 for up to 2 kits. If ordering, please note cheques payable toD.Rowlands.
Please allow up to 28 days for delivery.

Other radio and electronics projects kits are being developed. Details will be advertised in SPRAT when they become available. For details, please send SAE to D Rowlands, Micro Radio Products Dept. GQ 7Broomfield Road Swanscombe Kent DA10 0LU Tel 01322 381303 (Ask for David) after 7pm or Email to Microradio@Telco4u.net mentioning SPRAT.

N.B.T.V.A

The Narrow Bandwidth TV Association (founded in 1975) is dedicated to low definition and mechanical forms of ATV and introduces radio amateurs to TV at an inexpensive level based on home construction. NBTV should not be confused with SSTV which produces still pictures at a much higher definition. As TV base bandwidth is only about 7kHz recording of signals on mini cassette is easily achieved. A quarterly 12 page newsletter is produced and an annual exhibition is held in April/May in the East Midlands. If you would like to join, send a crossed cheque / postal order for £5 (or £4 plus a recent SPRAT wrapper) to Dave Gentle, G4RVI, 1 Sunny Hill, Milford, Derbys. DE56 0QR, payable to "NBTVA"

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GQRP Club Sales

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

HW handbook by Mike Brice – new edition. £10 } plus postage per book: UK - £1.35;
GQRP Club Antenna Handbook. £5 } EEC - £3.20; DX - £3.80

6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out **£12** } plus postage: UK - 50p;
6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out **£12** } EEC - 80p; DX - £1

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] **£6 pair** } plus postage
Colour TV crystals – 3.579MHz - **25p each** } (ANY quantity)
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SA602AN - £1.75, MC1350 - £2.00 } 60p EEC,
MAR-4 RF amplifier - £1.50 (limited stock) } 80p (DX)
HC49U crystals for all **CW** calling frequencies – 3,560, 7,030, 10,106, } }
14,060, 18,096, 24,906, & 28,060 - **£2.00** each } All
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 } post
Ceramic resonators – 3.68MHz & 14.30MHz – **50p each** } }
Varicap diodes – MVM109 – 40pF @ 9v, 500pF @ 1v. **75p each** – max of 2 per member } free
CA741 op-amps 8pin DIL – **5 for £1; CA3046** quad transistor array – **5 for £1** } if
IRF510 FETs £1.25 each; Electret mic inserts – 10p each } ordered
2SC536 transistors (npn) T-100MHz, hFE-320, VCBO+40V) - **5 for 50p** } with
BFX29 transistors (pnp) T-100MHz, hFE-125, VCBO-60V) - **5 for 50p** } heavier
MK484 radio on a chip - £1.00 inc postage & circuit diagram. } items

Toroid cores – Priced per pack of 5 – max of 2 packs of each per member
T37-2 – 75p; T37-6 – 75p; T37-7 – 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
Plus postage – up to 5 packs = 35p (UK), 50p (EEC), 75p (DX); 5 – 10 packs = 70p, £1, £1.50 etc.
Please note some more slight price adjustments on these. (The packs may have the old prices on them!)

Sprat on CD (1 to 109) - £10 inc postage.

G-QRP Club mouse mats £3.50 each inc post UK £4.00 EEC & DX

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 – 80p, EEC – £1.50, DX - £2.00. More – add 55p, 80p, £1 each)**

Back issues of SPRAT are still available as previous ads – However, UK Postage now 1st magazine – 45p, each additional magazine add 15p (blame the Post Office – not me!)

NEW ITEMS: **14.30MHz ceramic resonators – 50p each (plus postage)**
MV209 varicaps – (40pF @ 1v, 5pF @ 12v) – 25p each (plus postage)

NB I am temporarily out of stock of the Drew Diamond book, also, I am out of stock of 7.2MHz resonators, Poly-varicon capacitors and NJ Club pad cutters (no more supplies expected), and 14.060 miniature crystals All the DDS kits are gone, but I still have some of the W8DIZ freq ref kits (Sprat 116) - £10. MC1350 back in stock - thanks to Peter 9V1PC (who also obtained the 14MHz resonators for us)

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 Euros are uneconomical to us due to bank exchange charges! Visa/Mastercard. Please quote full card number/expiry date. We can only send the goods to the card owner's registered address. Sorry, we do not accept Debit Cards such as Switch or Connect.

MINIMUM ORDER for cheque or Visa payments is £5 – this will cut down on our bank charges. For orders less than £5 – please use postage stamps (any denomination £1 or less please)

We can also accept cash in GBPound, or US$, or €uros – but please send securely!

You can order via e-mail to g3mfj@gqrp.com and if you wish to send credit card details over e-mail, you can send them, split into two parts (for security), to me, via my two different ISPs – g3mfj@gqrp.com and g3mfj@gqrp.co.uk

You can check availability (or even order) on (+44) (0)113 267 1070 (But please do not expect my family to be able to discuss club sales matters or take orders!!).