SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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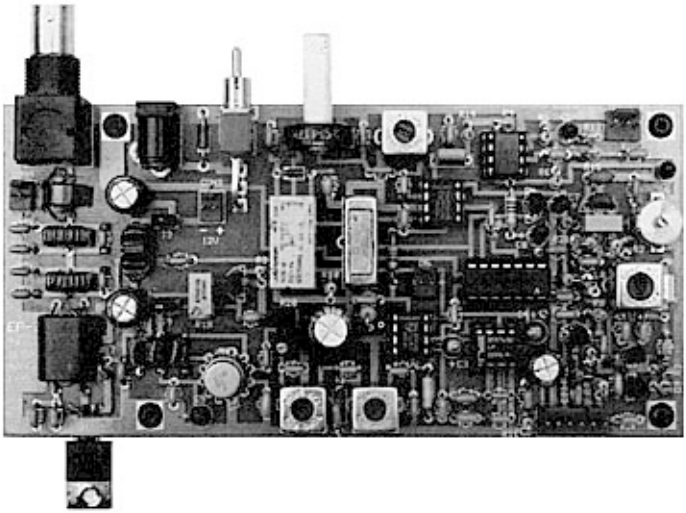

The EP-3 80m SSB Transceiver
by VE7QK – in this issue
[With Club Kit Offer]

MINI-CONVENTION – EXTENDING CRYSTAL PULLING
UR-QRP CLUB EXPEDITION – HOME BREW LADDERLINE
SUBHARMONIC RESONANCES – NOTES ON PSK31 – LIMPY ARNOLD
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VHF NEWS - SSB & DATA COLUMN – MEMBER'S NEWS

JOURNAL OF THE G QRP CLUB

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EDITORIAL

This issue of SPRAT was completed with the kind assistance of Graham, G3MFJ. My visit to the Dayton Hamvention this year was extended to include a retreat at the Abbey of Gethsemani in Kentucky. Unfortunately this will run over the critical time for the submission of SPRAT to the printer, so Graham kindly stepped in to complete this issue from the "raw articles".

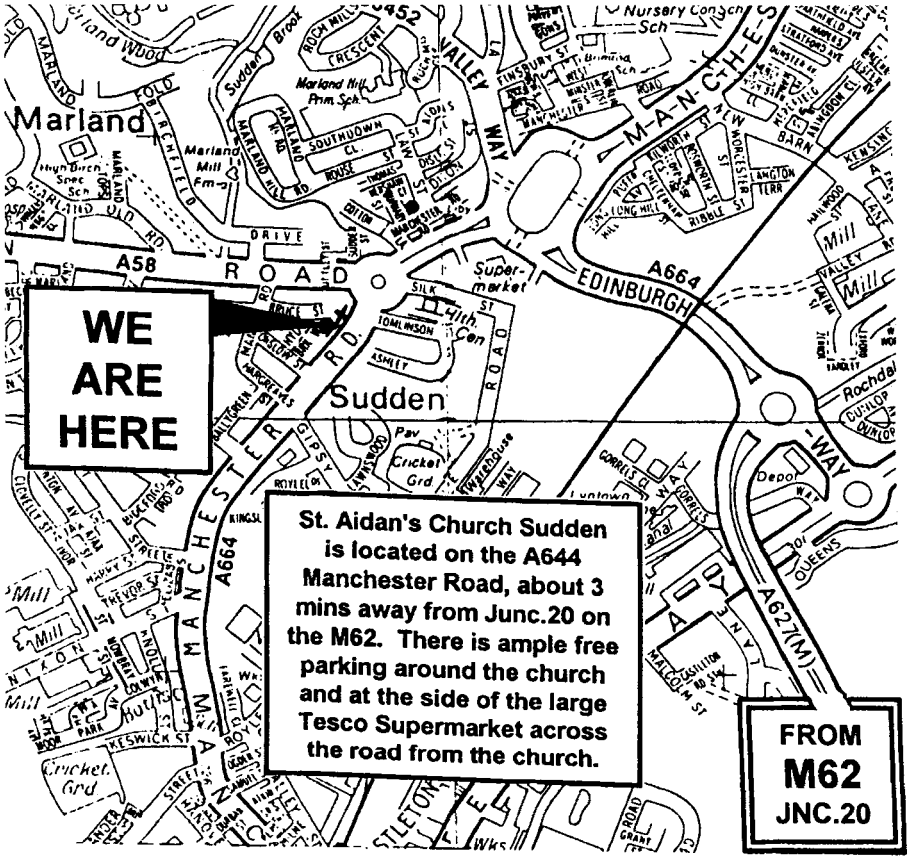
Our congratulations to Duncan, and the team, at the Junction 28 QRP Convention for a good day. The event will be repeated next year. I look forward to seeing many of you at the Rochdale QRP Convention in October. Details may be found in this issue.

72/3

G3RJV

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

THE G QRP CLUB
MINI-CONVENTION
SATURDAY 13th OCTOBER 2000
ST. AIDAN'S HALL SUDDEN ROCHDALE
ADMISSION £1 - DOORS OPEN 10am – TALK-IN 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. Fri/Sat Tariff : £39.95 per room
[This is a group rate – please contact G3RJV for details]
All rooms en-suite each with a double and single bed. Restaurants and Public Bar
Also within close range of the site : The Norton Grange Hotel : 01706 – 630788

Extending Crystal Pulling range

Ian Braithwaite G4COL, 28 Oxford Av. St. Albans. AL1 5NS

Even in these days of direct digital synthesis, the variable crystal oscillator still has its place in relatively simple home-brew gear. Obtaining as wide a pulling range as possible is the main challenge. This short note shows how the pulling range of a single crystal can be extended by using it in two oscillator circuits.

Most variable crystal oscillator (VXO) or voltage-controlled crystal oscillator (VCXO) circuits use the crystal as a series device in a single transistor circuit. Good behaviour and pulling range can both be obtained quite easily, though the pulling range depends crucially on the parameters of the crystal itself. Criteria for good behaviour are:

The circuit shouldn't oscillate without the crystal in circuit. Oscillation should always be controlled by the crystal. Badly-behaved oscillators become free-running, losing stability, or oscillate at some remote frequency. The circuit should oscillate over the whole of the control range.

My favourite circuit is shown in figure 1. The crystal is a series device, and there is insufficient gain for oscillation without the crystal. A low-Q collector tuned circuit prevents oscillation at remote frequencies while giving enough gain at the crystal frequency to keep oscillation going over a good pulling range. Using a series inductor, the frequency can be pulled both below and above the series resonance. However, as the frequency is pulled upwards, towards the parallel resonance, which requires a very small capacitance in series with the crystal, the oscillator loop gain falls and oscillation ceases.

This means that there is still "unexplored territory" around the parallel resonance. Access to this can be gained by a second oscillator which uses the crystal as a parallel element. A suitable circuit is shown in figure 2.

Two transistors are used to give the required gain and phase shift for oscillation, with very small (2p2) capacitors next to the crystal. The aim is to keep capacitance in parallel with the crystal to a minimum, so as to reach as high a maximum frequency as possible.

The gain of the circuit, which can be set by the emitter and source feedback resistors, must not be made too large, or the circuit will oscillate without the crystal, risking losing crystal control. I modelled the circuit using the TINA circuit analysis software, using a representative crystal equivalent circuit, and when built, it worked perfectly first time.

With a 10.106MHz QRP frequency crystal, the series oscillator gave a range of 10.09910 to 10.10940MHz (10.3kHz range). The parallel oscillator covered 10.10842 to 10.11208MHz (3.66kHz range). Both used a control range of 0 to 13V. This could have been made greater, but since there is overlap, there is no point. So, the total in-band coverage from the two oscillators is over 12kHz, not bad for a crystal not specially designed for pulling. In theory, the crystal could be pulled above its parallel resonance frequency, by using an inductor in parallel with the crystal. However, this runs the risk of oscillation without the crystal present, and has not been tried.

To make full use of the technique, the crystal must be swapped between oscillator circuits. This could be done by transferring it between sockets, or by using a switch or relay. This is left to the ingenuity of the reader. The variable capacitance diodes can share a common control voltage.

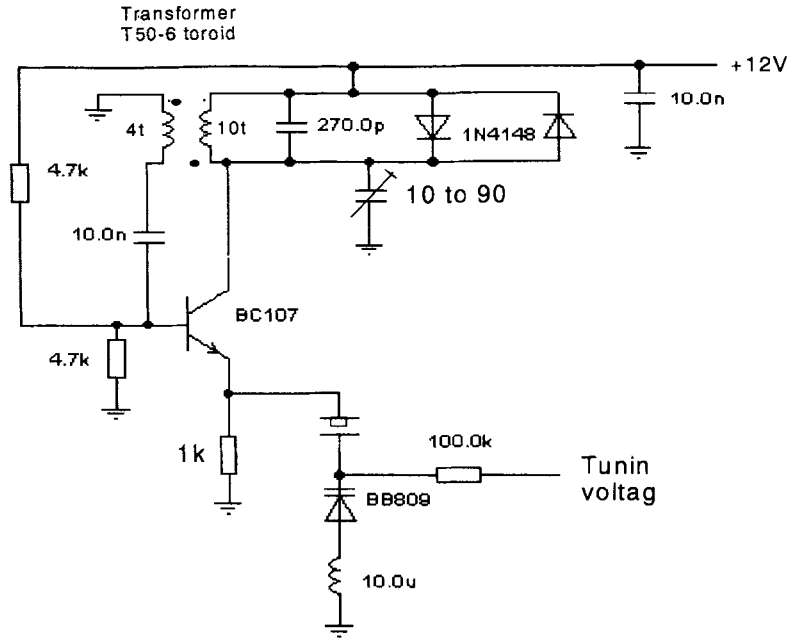


Figure 1: VCXO using thc crystal as a series device

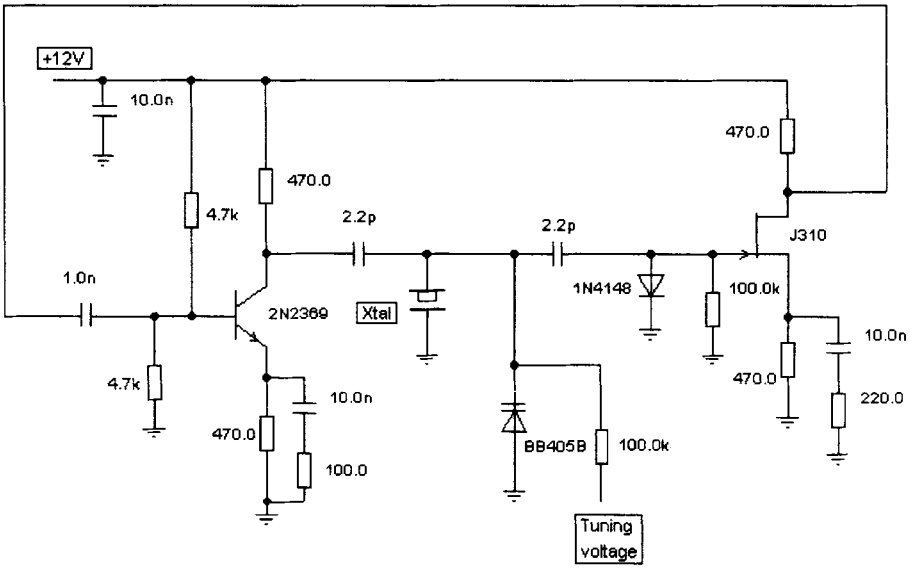


Figure 2: VCXO using the crystal as a parallel device

UR-QRP club expedition

Peter P Grytsay US1REO E-mail us1reo@urqrp.ne.cq.ukrtel.net

Between 4 and 11 of May 2001 the Ukrainian QRP Club held its first Radio expedition to the Crimean Mountains. Special call - EM5QRP.
It was arranged in 2 stages:
I - (4-8 May). Mountain Ai-Petri, 1200m above sea level.
II - (9-11 May). The suburbs of the town of Bachchisarai.
Members of the Crimean QRP-pedition: RK3ZK, UR6IRL, UR7IRL, US1RCH, US1REO, UU4JCQ, US-I-555, UA3WX. 562 QRP QSO were held with 45 countries of the world. Among them DX: JY, 4S7, JA, N8, 9H, EA9, HL & UA0.
Two antennas: GP and GPA-30, one LW - 41 meters were set, the latter with Antenna tuner. We worked in some shifts on 80, 40, 30, 20m bands taking into account propagation. Home-made transceivers were used on 80 and 40m bands. Unfortunately they were out of order some of the time because of a high humidity due to the clouds which covered the mountain most of the time. In WX-reports we often said: "We are in the clouds" or "above the clouds". Only a military QRP TRX worked without any problems from the very beginning to the end. Portable FM transceivers with the output power of about 1 Watt were used for work on a 2m band. We had some RTTY QSOs on the 20m band. For this we used an old Notebook IBM 486SLC-50, software HamComm 3.1 and a home-made radiomodem.
Software JVFAX 7.0 was used for receiving weather charts (7880 kHz), but we didn't manage to have any SSTV QRP QSO. The members of the expedition greatly enjoyed working on QRP bands. They also could admire the unique nature and the view of the plateau Ai-Petri. Unforgettable also, is a delicious Crimean wine. We hope new QRP-expeditions, meetings with new friends, fresh impressions are awaiting us in future.
All our QRP-expedition contacts will get special QSL-cards.

72/73! Peter Grytsay, US1REO
President of the UR-QRP Club

In the right hand picture, left to right, front row – Dima UU4JCQ and Igor RK3ZK, back row – Sergey US-I-555, Nick UA3WX, Vlad UR7IRL, Pavel UR6IRL, Victor US1RCH, and Peter (the author) - US1REO

Home Brew Ladderline

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E-mail: sslyon@megalink.net

Having experimented with various forms of twinlead, ladderline and other commercial balanced feeder, the need for economical and robust line drove the effort to home brew my own. It seemed that most twinlead lacked strength and suffered fatally from wind-whipping. 450-ohm "window line", while more robust, still suffered from wind and ice loading. Both de-tuned significantly with rain and ice, esp. with high SWR antennas like the Lazy-H. The cost of commercial spreaders for 600-ohm (and higher) "open" line put them out of reach since I was making antennas like Sterba Curtains for instance, and feeding them from 250' down the hill. A real drain on the feeder/frustration budget.

Most articles on the subject suggested spreaders of waxed or lacquered wood, PVC pipe, lucite (perspex) blocks, even plastic forks. All were big in terms of weight and ice loading, not to mention fabrication problems. Considering the needs of robust ladderline, it occurred to me that there really isn't a great deal of lateral force on the conductors, so all I have to worry about is keeping them from ripping apart.

The nylon inspiration struck one hot afternoon while re-loading my weed-wacker*. The line is strong, durable, - and cheap! After trying several variants the following version seems to provide the combination of performance, reliability and economy that fits my needs. Note that while I chose 600-ohm line, you can follow the guidelines in the ARRL Handbook to make any other impedance you'd like.

Materials and techniques described here represent a lot of trial-and-error and variations should be carefully considered. You may be able to improve on this, (and I hope you do), so treat this as a starting point rather than the ultimate solution. By all means share your knowledge and experience.

Twelve-Step-Program to 600-ohm (nominal) balanced feedline:

1.) #16 or #18 wire, bare or insulated. (0.051/0.040 inch, 18/19SWG, 1.27/1.01mm – G3MFJ)
2.) Roll of 95 mil round weed-wacker line.
3.) Cut wacker line to 4" lengths while enjoying libation, snacks, TV.
4.) Bend nylon ends around a small hot solder iron tip. Make ½" hooks with i.d. to fit your line conductors. Use gloves, more libation, etc.
5.) Make two 4' stakes with plywood "T" near top, with notches 3.5" apart.
6.) Pound the stakes into the ground, about 30' apart.
7.) Unwind the spool of wire & double it. Stretch it through stake slots.
8.) Tension the wire with concrete blocks on ground outside of the stakes.
9.) Hook spreaders on the wire 12-18" apart, then hot melt glue in place, using a "saddle-blob" over both sides of the loops and wire.
10) Use hot air gun to remove glue stringers and melt glue to wire.
11) Advance your ladderline to the next segment. Roll up made section.
12) Happily apply your 250' of prime, lo-loss feeder/phasing line!

*(Note by G3MFJ – a 'weed-wacker' is the US term for a petrol engine driven grass/weed trimmer – sometimes known in the UK as a 'strimmer'. This uses thicker line than a domestic electric-motor driven model – US grass is probably tougher than the UK equivalent!)

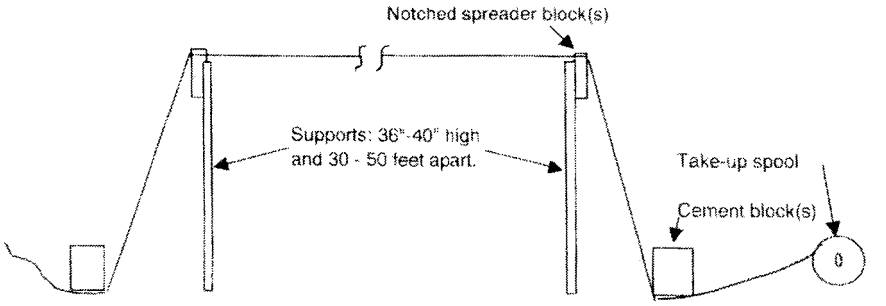

Fig. 1. Tensioning Fixture for Ladder-Line fabrication.
Keeping line under tension helps keep spreaders in place while gluing. Notches in blocks are wider than spreaders to maintain width tension.

Fig. 2. Spreaders are hooked over the wire, then hot-melted to it.
Spreaders are spaced 12"-18" depending on amount of twist anticipated. Hook all the spreaders on first, adjust the spacing, then glue them. Ensure that glue bonds securely to at least 1/4" of wire and fills the spreader loops.

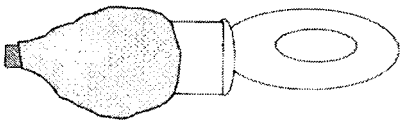

Fig. 3 Robust Wire Terminations
Ring Lugs are crimped, soldered, then blobbed with hot-melt glue to reduce flex fatigue failures.

Notes: (practice, practice, practice)
Melting/smoking nylon won't ruin solder tips, but your marriage... hmmm.
Stranded wire for low-stress segments, solid for higher-stress.
Use "heavy-duty" (if available) hot melt glue for best cold wx & U-V tolerance.
"Batch-process" spacers, etc. for efficiency. (~170 for 250' of line)
Blob more hot melt glue on the end terminations to prevent flex failures.

Application Hint:
I pre-cut 1/2 wave sections of it as well as 1/4 & ½-wave single wires (for a couple of bands) and crimp/solder ring lugs on the ends. That enables spur-of-the-moment-bolt-together assembly of an amazing assortment of antenna types. It brings great joy to lift an idea from such green pastures as W4RNL's web page and actually build a killer antenna in an afternoon – even on windy, freezing, rainy days! Balanced Tuners have become objects of great interest thanks again to L.B. Cebik's remarkable body of work on his now-famous web page.

Destroy Subharmonic Resonances in Transistor PA Circuits – Part II - or Help for TenTec 1320/30/40?

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email: dj1zb@darc.de

In SPRAT Nr. 91 (Summer 1997) the author had reported on problems encountered in multi section low-pass filter tank circuits in QRP transmitters and how they can be solved. No comments were received so far, and QRP groups and even companies continued to employ such filters in PA circuits. Just recently, however, it became evident that these problems are still existing, not just under the surface.

This became apparent on the Internet server of the German DL-QRP-AG www.dl-qrp-ag.de founded in May 1997 by Peter Zenker, DL2FI. On this server (usually in German), anybody can raise almost any question on any technical problem, any kit or any equipment on the market, just as on similar servers of this kind. Due to the variety of subscribers and their specific knowledge, in most cases a practical answer and solution will be given.

With the beginning of this year some of the problems which were addressed had common symptoms. The rigs mentioned were showing normal behaviour on a dummy load, but it was impossible to tune a matchbox between these rigs and an aerial, some even did not operate properly on an aerial with had been tuned for low VSWR employing another rig. A cross-needle" VSWR meter may show equal readings on both forward and reflected power, and the CW monitoring tone sounds bad. I asked the owners of these rigs to send me the circuit diagram, containing at least the driver and PA sections up to the aerial output. The rigs were mainly TenTecs, and one Norcal 40, and what was common to them: All these rigs were using a double section low-pass filter (Z = 50 Ohms) in the transmitter output!

As outlined in the first article, this kind of PA output filters will pass not only the wanted frequency to the output but also subharmonics which may be generated when the PA transistor is driven hard, as usual in class C amplifiers. The insertion of a series resonant circuit of a recommended operational Q of about 5 into the first low-pass filter section (converting it to a peaked low-pass filter) eliminates this problem. Speaking independently of frequency, the solution is as follows: The usual inductance of the low-pass filter has a reactance of 50 Ohms. For a Q of 5 an additional reactance of 250 ohms is needed. Both reactances can be combined into a single coil with a reactance of 300 ohms. The tuning capacitor in series will also have a reactance of 250 ohms.

The practical cure for all rigs is simple, as shown in Fig. 1: Replace the coil in the first low-pass filter section (L8 in TenTecs, L7 in Norcal 40) by a coil of higher inductivity in series with a foil trimmer of 90 pF. It is even possible to use the removed toroid and rewind it for this higher inductivity. For a 20-m-rig about 3 uH is needed, for a 30-m-rig 4,2 uH, and for a 40 m rig 6 uH. For 40 m rigs, a fixed NPO capacitor of 47 pF will also be needed in parallel to the trimmer.

For tuning the foil capacitor, the rig is connected to either a dummy load or an aerial with low VSWR for the desired band, and the trimmer is tuned for maximum power output or maximum forward indication of a VSWR meter. After this modification the TenTecs 1320 and 1330 modified so far could immediately be used for QSOs. No loss in power output has been reported.

The owner of one of the rigs modified, a TenTec 1320, reported, that before the modification his rig usually had been quiet when connected to a well tuned aerial, but could not be used in combination with an ATU. Furthermore he had observed that sometimes during keying the VSWR meter suddenly showed high reflection for a short moment (triggering the generation of a subharmonic?). But now these problems have disappeared completely, he now can tune his ATU behind the rig, and even during tune the CW monitoring tone is good.

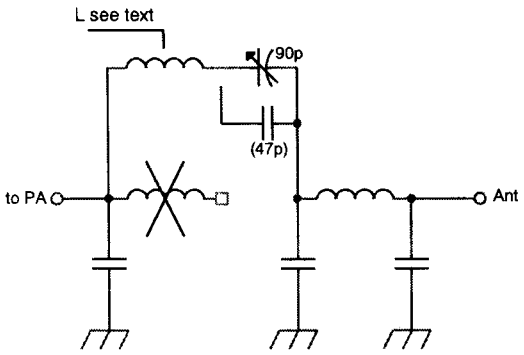


Fig.1: Modified PA output filter

The single Norcal 40 mentioned needed further treatment and now has a tuned driver circuit corresponding to those in the author's FO Transmitters (SPRAT 64, Autumn 1990, see Fig. 3), with L2 = 6 uH). This has a coupling capacitor Ck to the PA transistor (2SC799 in this case) of 220 pF. The 100 ohms resistor from the PA base to ground has been retained to avoid using a choke. The resistor between driver collector and resonant circuit shown in Fig 3 should be at least 27 ohms but DL5FDW who has tried out these modifications has even increased it to 100 ohms without any loss of output power. This resistor is needed to suppress parametric oscillations (showing up when the driver resonant circuit is detuned towards smaller capacitance only).

On the DL-QRP-AG server, however, two other Norcal 40 owners have expressed their concern on the amendments done to the Norcal 40, arguing that those problems mentioned and cured were well known for TenTecs but not for the Norcal 40. The author cannot judge this, he is using his own homebrew QRP equipment and has little information on the behaviour of QRP rigs on the market. DL5FDW, however, has found these modifications necessary and now is also very fond of this rig.

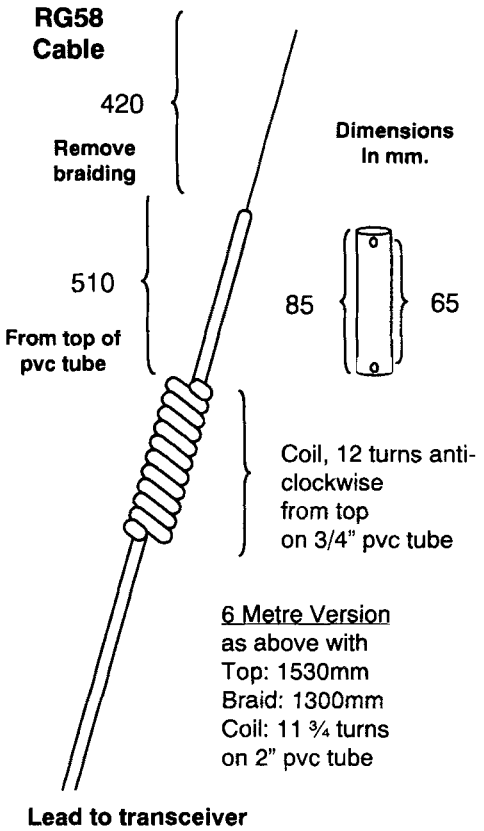
The author would be pleased if any of these rigs mentioned (and similar) showing these symptoms could be put to normal operation by these modifications. Comments would be welcome to either SPRAT or email: dj1zb@darc.de

Notes on PSK31 – Tom Sorbie GM3MXN

The article in Sprat 106 on PSK31 will encourage readers to have a go at this new mode, which is amazing, as Richard says, my contacts at 4 watts affirm this statement. Regarding the isolation transformers, I am using 88mh cores connected as a transformer - 2 x 44mh,they give good isolation and transfer of audio. The Macros [or prepared files] make it easy for poor typists like myself, in fact I had a QSO last week without touching the keyboard.
For those who do not have a P.C., Small Wonder Labs have a TRX kit at $100 where the input is by a cw key and the received PSK is seen on an LCD display.
[Note by G3MFJ – 88mH (actually 2 x 22mH – as there are two windings on a common toroid, which, when they are series connected, makes them 88mH) toroids are available from club sales – see p27]

The True Story of Limpy Arnold

Geert, G/PE3GRT/MM on board the Dutch flagged vessel *Sarai*
Pe3grt@amsat.org



The brother in law of our radioclub secretary in Amstelveen, came home to Holland a month ago after emigrating to New Zealand in the fifties. So far not remarkable.
His first name in Holland was Jan translated in New Zealand into Rib and he also is a Ham. Anyway he brought with him an antenna for the 2 metre band and with the following story.

Somebody, working for the same consultancy as Rib, brought with him an antenna that he had found somewhere. Since the antenna was unknown and covered with tape and cable jacket, Rib suggested making an X ray photo of the antenna; there was a possibility to do this with almost no cost.
As the photo was developing besides the antenna there appeared also some letters forming a name: ARNOLD.
There was no explanation how this name came on this picture. Magic?
There is more in Heaven and Earth... .....
Rib made a drawing that you will find by this story. The prefix "Limpy" came because this is a hanging whip antenna. On board my boat I taped a piece of bamboo along Arnold so that he can look proudly over the top of the mast. The top of Arnold I made 2 cm longer to tune by cutting to the proper frequency. I measured in free hanging position, a SWR of 1.03 : 1.

What I like is the KISS principle of this antenna: no extra connectors, ready within 10 minutes, no expensive material (could be Dutch) other a some length of RG 58 and if you cut to much off the top when tuning to the frequency, by pushing and pulling the "coil" you can start again with cutting the top after removing also some of the braiding material and cable jacket. For outdoor use I used self vulcanising rubber tape and cable jacket to make Arnold water tight. The Big Surprise came on the Isle of Wight on the River Medina near Folly Inn, when I had a QSO with an OM in Southhampton on... ...70 cm!!

See also the ARRL Handbook 20.17 *(Resonant Feed-line Dipole)* and RadCom, March 2000, over *Feedline Verticals for 2m & 6m* by Rolf Brevig, LA1IC.

A QRP FREQUENCY COUNTER

Olivier ERNST F5LVG 2 rue de la Philanthropie,
F-59700 MARCQ-EN-BAROEUL, FRANCE

This frequency meter is inspired by the Frequency Adam of G4SGF (SPRAT 68). Its functioning is simple (figure 1). One transistor is used as an RF amplifier and adapts the dc voltage to the dc input (1.4 V) of a 74HCT4020 IC. This IC converts the sinusoidal wave into a square wave and divided its frequency by 1024. A CR circuit (680 pF, 1 KOhm x 2, 4.7 KOhm, 100 Ohm) converts the square wave into a series of positive and negative pulses (differentiation).

A second transistor converts the series of positive and negative pulses into a series of positive pulses (detection) that feed a RC circuit (100 Ohm, 100 nF). This RC circuit is an integrator, therefore, the higher is the pulse frequency, the higher is the output voltage. This voltage feeds a digital voltmeter and you obtain a digital frequency meter !

Set up

1 Adjust the 100 KΩ adjustable resistor to obtain 1.4 V on the collector of the BC549C.
2 Put the switch on the calibration position. The first transistor is a 18 MHz Pierce oscillator.
2 Adjust the 1 KΩ and the 100 Ω adjustable resistors to read approximately 180.0 mV on the digital voltmeter.
3 Adjust carefully the 4.7 KΩ potentiometer to read exactly 180.0 mV.
4 Put the switch on the other position to do the measurement.

The 680 pF capacitor must be a good quality ceramic capacitor. The 100 nF capacitor is a polyester capacitor (mylar*, MKT). If there is a thermal drift, exchange the 100 nF capacitor by a mixing of ceramic (negative temperature coefficient) and polyester (positive temperature coefficient) capacitors. For a 2000 point voltmeter, the last digit corresponds to 10 KHz up to 200.0 mV (20 MHz) and to 100 KHz from 200 mV up to 500 mV (50 MHz).

This frequency counter can be used for a superheterodyne receiver. All you have to do is to modify the output circuit. The modification for an oscillator with a frequency lower than the received frequency is described figure 2A while the modification for the opposite case is described figure 2B. In both cases, you have to adjust the 100 KΩ resistor to read the value of the FI on the digital voltmeter while the emitter of the BD137 is connected to the ground.

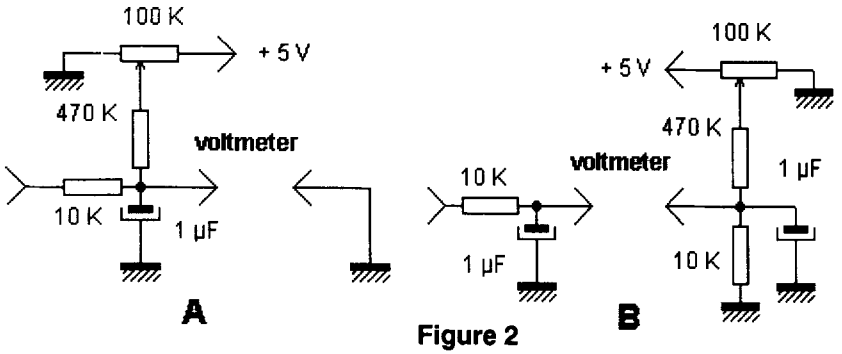


Figure 2

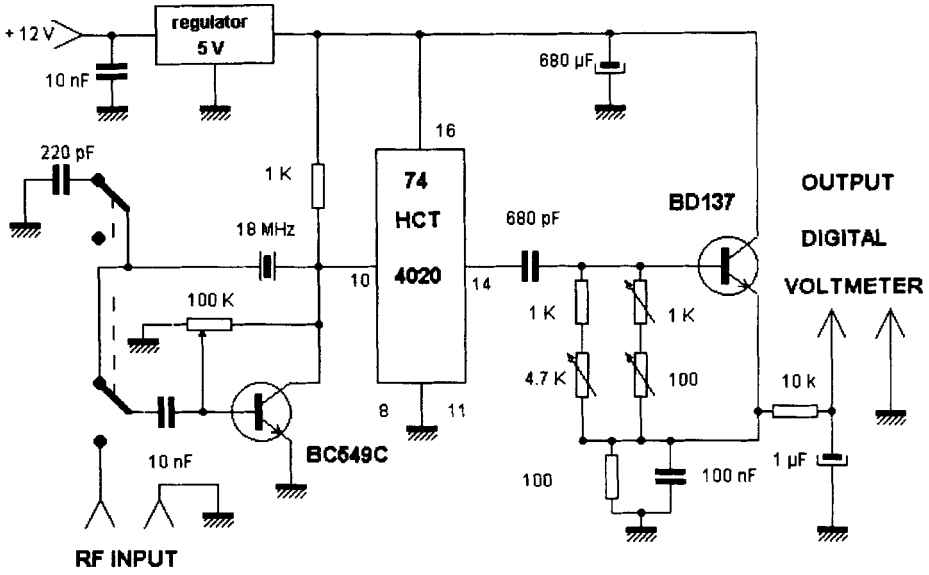


Figure 1

Radio-controlled Clocks

These clocks feature 24hr readout, offset to GMT with continuous seconds and date display.
Dual alarm with snooze facility.
Ideal for the shack or for Field Day.
£14.95 each + £1 p&p any quantity.
Cheques payable to Martin Peters,
11 Filbert drive, Reading. RG31 5DZ
Check into:
http:// freespace.virgin.net/ martin.peters1
or SSAE for more details.
Email - radio.clocks@virgin.net (G4EFE/ GQRP 1176)

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

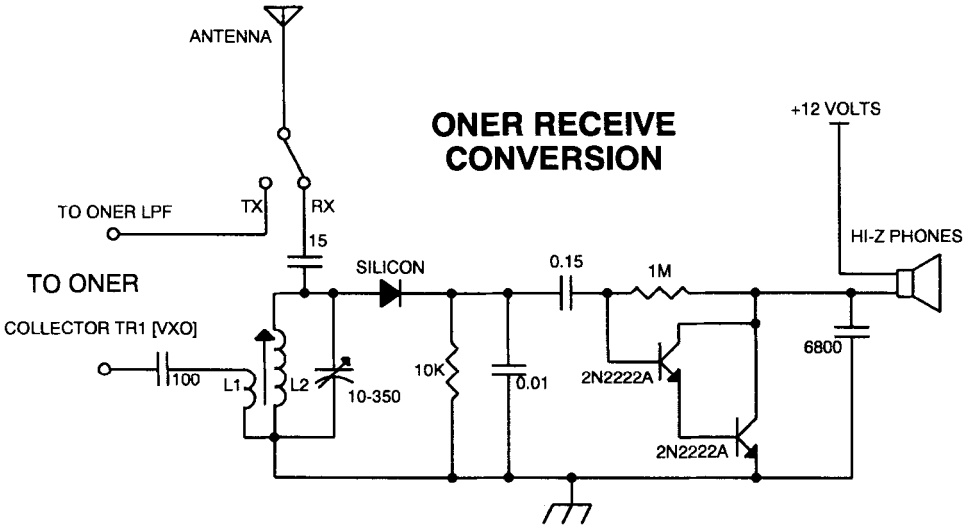
FOR SALE: MFJ-9020 (5w 20m cw) with PSU and CTU-3 atu. This rig has worked VK ! £130 (plus p & p). Richard Limebear G3RWL (QTHR), 020 8366 4297 (eves) or e-mail g3rwl@amsat.org

YAESU FT707 H.F. transceiver + 20 amp switch mode p.s.u. Both excellent condition and working order. Offers around £200 for both, will split. A.S.Bowmaker Tel: 01282 774878

FOR SALE: Drake R4 – C Manual, 500KHz filter, has just been checked over - £230 CFX-514 Triplexer 6-42 - £25 Twin TSA6001 - £15, Pye power unit, 12v 4Amp with speaker - £7.50. Bill GM0KMG 0141-562-4571

ONER Receive Conversion

Oleg V. Borodin, RV3GM, Cosmonaut street 19 – 74, Lipetsk, 398043
E-mail: master72@lipetsk.ru



I have built this receiver board for the ONER transmitter of GM3OXX. My version was for 40m with L1 [18 turns of .33wire] and L2 [6 turns] on 8mm core with a ferrite core. I have had QSOs with Ukraine, Poland, and Germany etc.
(Note by G3RJV – Try 35 turns on a T50-2 with a 350pF variable capacitor – this should tune from 80-20m.)

NOTE by G3RJV: Oleg has recently written to me about the problems he had with the Micro-80 and "Froggy" kits of some years ago. Several members wrote to him with orders, which were not fulfilled. In was in the days of the old Russian regime and Oleg had problems with the authorities because of receiving US currency in the mail. He invites disappointed members to contact him.

Space Junk (or how to get useful radio bits out of old computers)

Tim Ostley, M5TIM, 16 Oldfield, LITTLE MILTON, Oxfordshire, OX44 7PY

A recent discussion on the GQRP email reflector highlighted the difficulty we will have in the future obtaining leaded components. This discussion coincided with having a shuffle round' in the shack (tidy really wasn't the word). Amongst the nuggets unearthed was a heap of old computer boards extracted from a defunct 386. What a cornucopia of useful bits! It is not an obvious link from defunct computer to radio construction but read on...

One of the most useful things to start with is the power supply. Extract the power supply module from the computer case (saving the screws / nuts / bolts as you go) - usual precautions apply. Undo the case and extract the PCB. You will find that the power supply case itself is good for recycling - typically 8x6x4 inches in metal. It usually has at least one IEC mains connector plus a switch and sundry bits of cabling of a reasonable thickness. The PCB will have a wide variety of useful leaded components - capacitors, transistors, resistors, coils and toroids - the list is endless (sneaky thought, since the IRF5xx transistors are designed as switching transistors for power supplies maybe those fitted in the power supply being dismantled would be ok for a bit of RF?) There were even two 200v electrolytics in the ones I dismantled (be careful – they may still be holding a lethal charge!) - must dig out those old valves ...

The computer motherboard is also worth a look. There will be at least one crystal / crystal oscillator module, loads of decoupling and electrolytic capacitors plus sundry resistors, transistors and sometimes a voltage regulator. A serial or multi I/O card has many useful bits including one or two crystals, but the best of all is an old sound card. This is chock full of ordinary leaded components, a crystal as well as at least three PCB mount jack sockets and usually an edge mount variable resistor (volume control).

Old printers can provide some useful bits, however the electronics is typically fairly simple and may only yield a few capacitors and maybe the odd connector. What they do offer is a supply of stepper motors (sometimes two per printer) and an optical encoder together with a toothed belt designed to give high precision positioning information. Some ink jet printers also have a separate mains power supply.

I also have a very old 1200 baud modem which I haven't had chance to investigate yet but it should provide sundry LEDs and a line interface transformer at the very least. Disk drives don't provide many useful bits - they have used surface mount components for many years. It is worth a quick glance but unless you want to recycle smd resistors and capacitors ....

A couple of general points, the components you extract will usually have very short leads, enough to solder to but not much longer. Either a solder sucker or solder braid is a must for extracting the components.

So next time you find someone throwing out an old computer, stand over the bin - you can always throw away the bits you don't want later!

101 things to do with a Dead Mouse

Part of an occasional series

Roy Walker G0TAK, 3 Elderberry Cl. THORNTON-CLEVELEYS, FY5 2ZB

Take one dead Mouse, it is preferable to use a two button mouse if available. Cut off the plug/socket from its tail, leaving enough tail to reach from mouse to rig. Take out the working parts, carefully preserving them, except the ball, (this can be saved to make up your set of rubber covered marbles). Isolate the micro switches (which lie underneath the buttons) from the rest of the circuitry, by cutting the tracks around them, retaining sufficient track to make connections later.

Carefully cut the "works" down the middle from front to back. Carefully cut the case down the middle from front to back, retaining the switches.. Solder pairs of wires from the tail to the tracks leading to the switches. Identify the wires at the other end of the tail. re insert and secure the two halves of the works in their respective half shells.

Attach the two halves base to base with suitable glue (polystyrene) with the two switch buttons at the same end, but now vertically polarised. (You may have to provide a suitable base for the unit mine has a magnetic material sheet under it, which matches a similar one on the operating bench) Attach a suitable three connection jack plug to the end of the tail. You are now the proud owner of a "Mobile Morse Mouse" which will last for years, which is light ON the pocket and IN the pocket, whose' calibration will not become "mal-adjusted" in transit, and which will, if you are lucky, sport one of the "Big Names" , mine is called Compaq (tm)

Two Way QRP QSL Labels and Blank G-QRP QSL Cards

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Cheques: "M.L. Prickett" [The G QRP Club benefits from each order]

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 £4 (or £3 plus a recent SPRAT wrapper) to Dave Gentle, G4RVI, 1 Sunny Hill, Milford, Derbys. DE56 0QR, payable to "NBTVA"

QRP BESIDE THE SEASIDE

September 22nd 2001 - Opening at 1400hrs. at the United Reformed Church, Back Lane, Gorleston, Nr. Great Yarmouth Further information: David Buddery G3OEP, 33 Addison Rd. Gorleston, Great Yarmouth. NR31 0PA

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Stan Yarema, K7SY, 3457 12th Ave West, Seattle, WA 98119. USA. Tel: (206)285-8941

QRP MASTERS CORRECTIONS:

Some errors crept into the list of QRP Masters in the last issue:
QRP Master 14 should be G3IQF and QRP Master 86 should be G3ICO

Amateur Radio Design Assistant – This is a many faceted calculation program – which is Windows 95/98 compatible, and was written by an ex-member. It was reviewed in Sprat some time ago, and is still available. Tony Edwards has now changed his address – he is now at 4 Shearwater Drive, Bradwell, Great Yarmouth, Norfolk. NR31 9UL. There is a web page about the program at www.members.aol.com/agegraphics/index.htm

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FUN ON 'LONG WAVE' – BUT IS IT QRP?

Steve Rawlings GW4ALG, 14 The Paddock, Chepstow, NP16 5BW, UK

Yippeeee! We did it! We did it! - Such was the excitement of making my first QSO on 136 kHz!

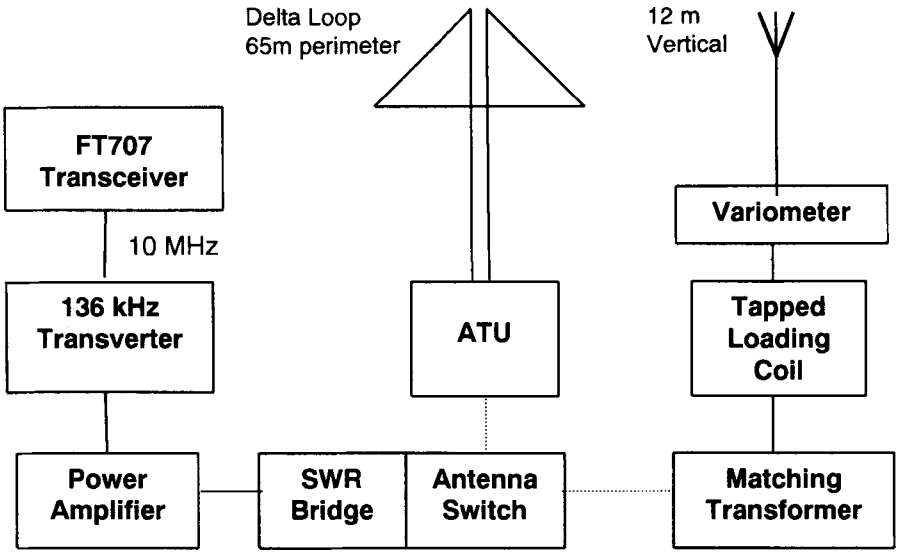
That was back in March 1998 when I worked Graham, G3XTZ for my first QSO on 'long wave', over a distance of 157 km (100 miles). Not very far, perhaps, but after weeks of experimentation and construction, that CW QSO with Graham was every bit as exciting as my very first contact, almost 30 years earlier.

The contact with Graham confirmed that - even from a small plot - it *is* possible to make low frequency (LF) contacts over an appreciable distance, using simple equipment. At the time of the contact, I was running 15 watts to a small delta loop of 65 m perimeter. [See *'Adapting a G5RV for 136 kHz'*, Pat Hawker G3VA; 'Technical Topics', RadCom, May 1998.] What's really amazing is that, at 136 kHz (a wavelength of 2200 km), I was probably only generating one or two milliwatts effective radiated power (ERP). Dealing with antenna efficiencies in the range 0.0001 to 0.001 is all part of the fun of experimenting with electrically-small antennas. On 136, you're doing *really* well if you manage to generate the maximum permitted power of one watt ERP! In practice, many stations find that they need to generate about 100 watts to realise an ERP of, say, 50 milliwatts.

But let's not be too concerned with the numbers: the important thing is that we can get out on 136 kHz, using antennas similar in size to those we might use on, say, 80 m.

As there is very little commercial gear available, home-brewers will find lots of like-minded constructors on 136 kHz. Indeed, I have already contacted many fellow members of the G-QRP Club on 136 kHz, including: EI0CF; G0UPU; G0VXG; G3BDQ; G3CCH; G3KZU; G3LCB; G3LDO; G3OLB; G6RO; G8PX; GI3PDN; and M0AYF, all on 2-way CW. Of these, Peter Dodd G3LDO, the well-known experimenter and author, deserves special mention. Peter has written several articles on LF topics and is also editor of *'The Low Frequency Experimenter's Handbook'*, (available from the RSGB) - essential reading for anyone thinking of joining the growing band of LF experimenters.

Every constructor has his or her own unique approach to designing and building their LF station to cover the 135.7 to 137.8 kHz allocation. My solution was to build a 15 watt transverter using junk box components (and using many circuit elements that will be familiar to regular readers of *SPRAT* !) With three NPN output transistors connected in parallel, the design provided enough power for my first 'barefoot' QSOs; and enough drive for use with a succession of external power amplifiers. Further details about my LF station can be found on my web-site at: http://www.alg.demon.co.uk/radio/136/intro.htm From this site you will find links to many other sources of information.
The external connections available on the FT707 make it ideal for transverter operation. Also, with an allocation of only 2.1 kHz, the digital readout and built-in CW filter were very welcome. Using this set-up (plus the occasional use of a balloon-supported vertical), I have worked 16 countries on 2-way CW.



Getting Started

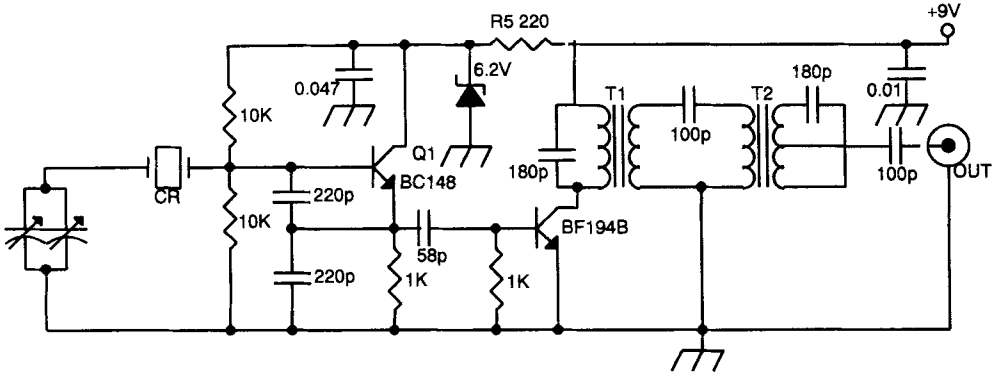
A common mistake made by newcomers to LF is trying to listen on 136 kHz without using a tuned antenna. The results are always disappointing! A good start is to resonate your existing station antenna with one or more series-connected loading coils. Tuning will be quite sharp, so at least one of the coils should be a variable inductor: a ferrite rod partially inserted in a broadcast band long wave coil is ideal. The strong carrier close to 138.8 kHz can be used as an initial signal source. Once you've got the antenna tuned, try listening for amateur signals on Saturday and Sunday mornings in the CW segment, 136.0 to 137.4 kHz.

But is it QRP?

As most LF operators often need to run several watts to realise a few tens of milliwatts ERP, many QRP operators may not be so keen to use so much electrical energy to deliver so little radiated power. While 5 watts at 136 kHz may enable you to make QSOs up to a distance of, say, 200 km, many newcomers to LF, having only an average-sized back garden, find that the task of sending their first CW signal across town is enough of a challenge! Most of the LF operators I've met are enthusiastic home-brewers, who have embraced the challenge of QRP (or, at least, 'QERP') operation. Nevertheless, LF operators do tend to have slightly higher electricity bills than their HF QRP colleagues!

A Resonator VXO

T.T. Mani, VU2ITI, Mod Eng College, Thrikkakara, BMC PO, KOCHI, 682021, INDIA



The circuit described here is actually a modification of a circuit from SPRAT. It was observed that the oscillating frequency of a ceramic resonator can be pulled considerably. This property is used in this circuit. It was found that the ceramic resonator for 3.58 MHz is able to operate from 3.5MHz to well above 3.6MHz. This ceramic resonator is commonly used for telephone dialer circuits, low cost clock modules etc. Hence ceramic crystal for the above frequency is easily available in the local electronic markets. A Colpitts oscillator configuration is selected and was also noticed that the amplitude of oscillations decreases as the frequency CRO and was found perfect. This circuit gives an output frequency from 6.99 MHz to 7.125 MHz. This range may slightly vary from resonator to resonator and can be adjusted by changing the value of the feed back capacitors C6 and C7. The output voltage was also found constant at about 1.2 volts pep on no load and more than 500 mV when a load of 100 ohms was connected across the output.

The frequency stability is very good compared to the I.C. tuned VFO, but don't expect a crystal stability from this VFO. The output frequency slightly varies with the supply voltage, hence a stabilised power supply for the VFO is recommended. A zener diode regulated power supply is a low cost solution. The current taken by the circuit is less that 10 mA.

ALIGNMENT

Testing and alignment of the circuit is very simple if you have a frequency counter and an RF probe. Switch on the device and connect the RF probe to the emitter of BC 148 transistor. Place the tuning of variable capacitor midway and observe for the deflection in the meter. If there is deflection in meter, measure the frequency at that point by connecting the frequency counter. The counter should indicate a frequency in the range 3.5 to 3.6 MHz. Observe for a while and check for stability.

The next step is to tune the transformers; connect the RF probe to the secondary of T1 and tune the coil for maximum deflection. Then check the frequency of signal at that point. The counter should read the doubled frequency. If not check the coil and the disc capacitor connected across the secondary. Repeat the same procedure for T2.

CR = 3.58MHz Ceramic Resonator
T1 = P: 11t. 34swg. S: 4t. 34swg. T2 = P: 4t. 34swg. S: 4+6t. 34swg
Both wound on standard IF core

The Epiphyte-3 80 Metre SSB Transceiver

Derry Spittle VE7QK, jds@vcn.bc.ca 1241 Mount Crown Road, North Vancouver, BC, Canada, V7R 1R9 jds@vcn.bc.ca

The original Epiphyte was a simple SSB transceiver with a power output of one watt and very limited frequency coverage. Construction articles for it were published in both SPRAT and QRPp. The EP-2 which followed included a VFO and 5 watt power amplifier. Hundreds of both transceivers have been built worldwide and they have served to introduce many amateurs to both single sideband and QRP operation. The interest they have generated has undoubtedly resulted from the simplicity of the design and the large readership of these journals. But "scratch building" even the simplest SSB transceiver from a circuit diagram is a laborious task for most amateurs. Many of us do, of course, make our own circuit boards but my hat goes off to the French amateur who built an EP-2 on perf board wire-wrapping all the connections!

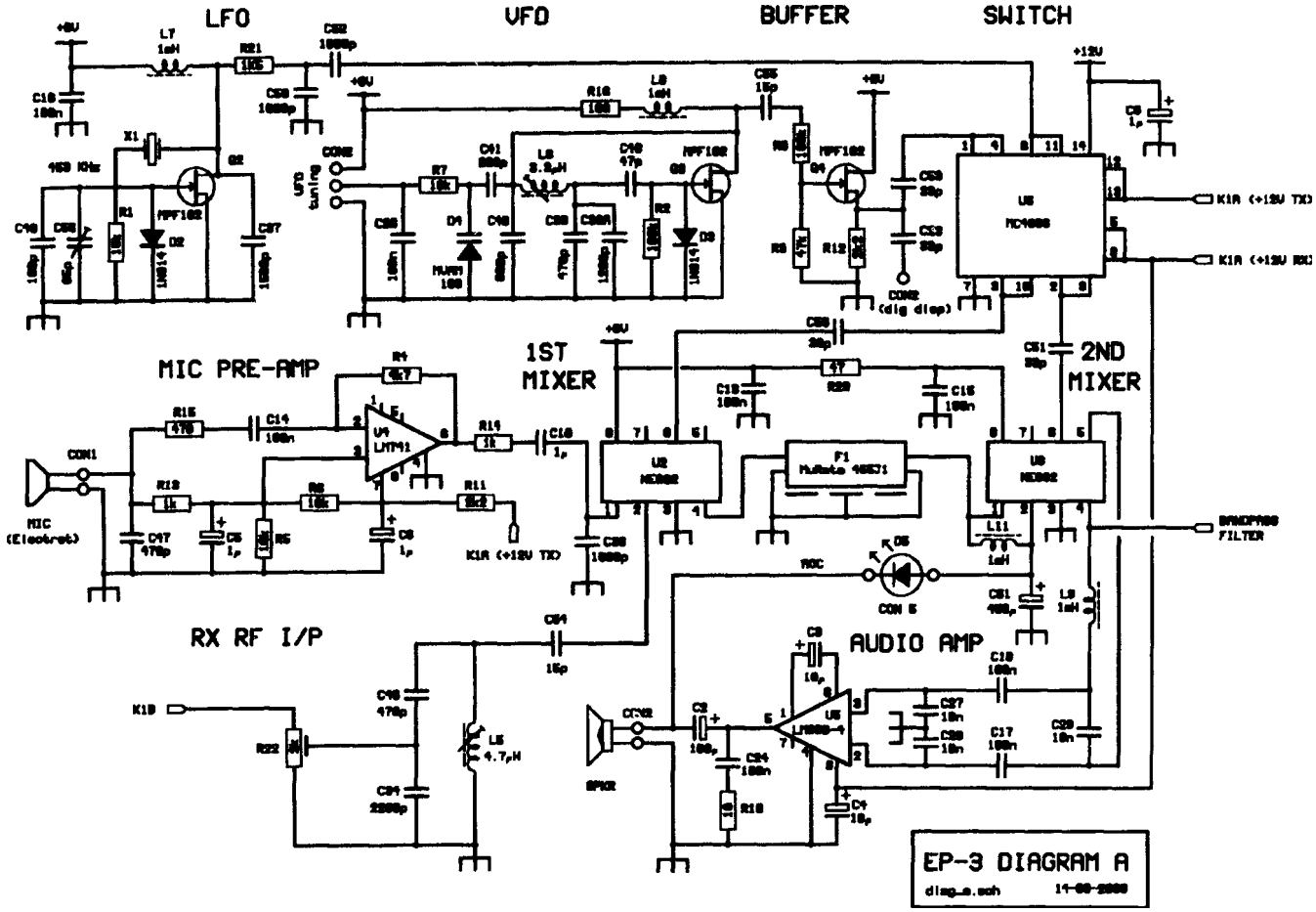
In 1998 Doug Hendricks, KI6DS decided to make the EP-2 a "NorCal Kit" project and asked me to update the design. So how does the EP-3 differ from the EP-2?

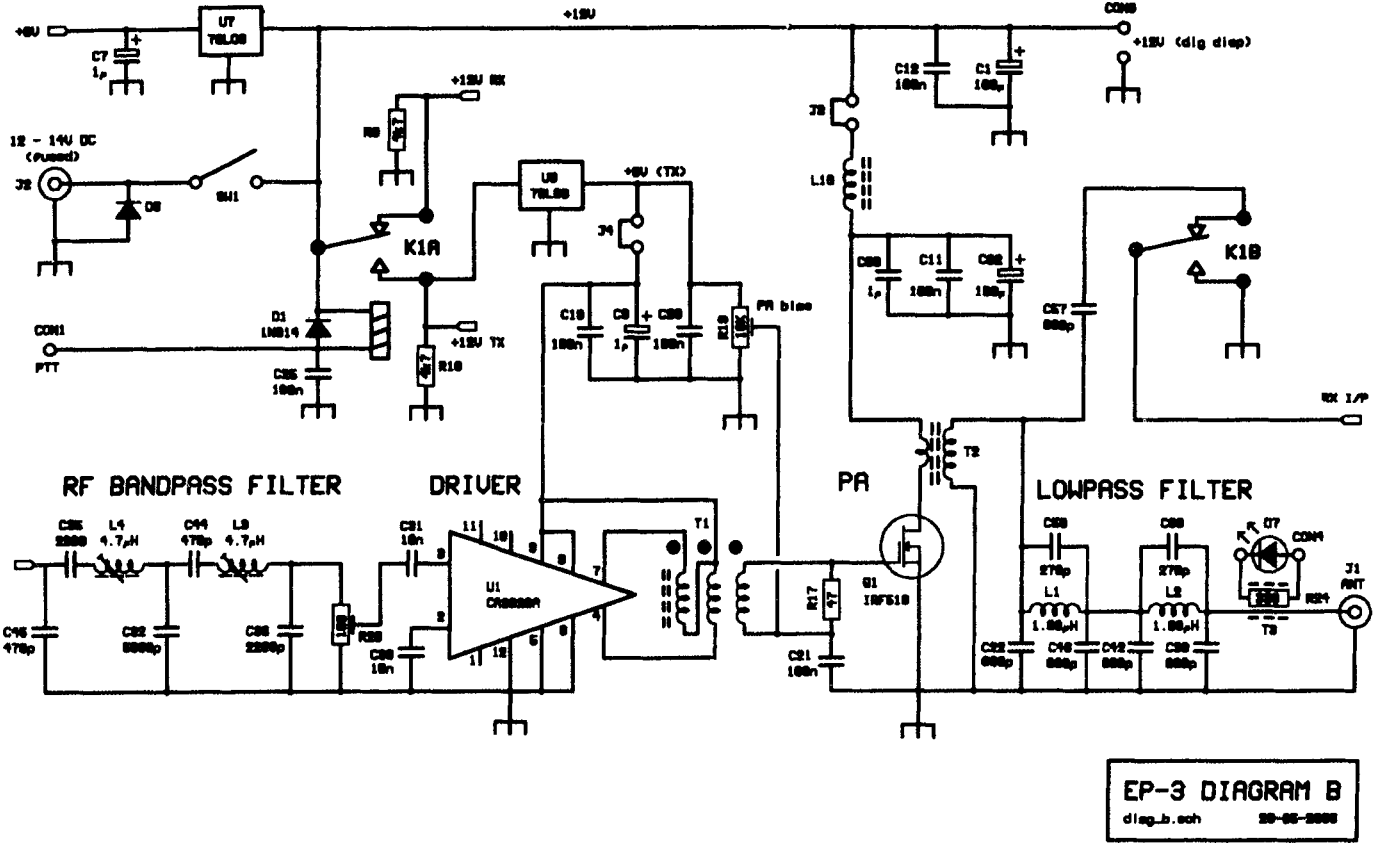
- The circuit board has been completely re-designed and professionally manufactured with plated-through holes, solder resist and screened parts overlay.
- The antenna connector, power connector, switch, RF gain control and lowpass filter are now installed on the circuit board thereby reducing the number of external connections to be made.
- A simple audio-derived AGC has been added to the receiver.
- Polystyrene capacitors have been replaced with smaller and more readily available NPO/COG ceramic capacitors.
- The PA has now been mounted horizontally and heat sinked directly to the base of the enclosure significantly improving the heat dissipation and permitting higher power output.

Some of you may have already seen the prototype EP-3 I brought with me to Rochdale in 1999 and have possibly been wondering what became of it. The best laid plans do not always progress on schedule due to unforeseen circumstances. But in the Fall of 2000 NorCal was pleased to announce that one hundred EP-3 kits were now available. They sold out in less than 48 hours! Credit for their popularity goes to NorCal, the QRP Club of Northern California, which throughout has funded the cost of producing both the prototypes and the final printed circuit boards.

At PACIFICON 2000, Doug Hendricks, KI6DS generously donated 50 EP-3 PC Boards to the G QRP Club with the proviso that any profits derived from the sale of these be donated to St. Aidan's Church, Rochdale. Some of the components have been difficult to obtain but the Club has now [with the help Peter Thomas of JAB Electronics] assembled 50 kits for sale to members. A photograph of the completed board is shown on the front cover, and a block diagram together with the full circuit diagrams is on the following pages.

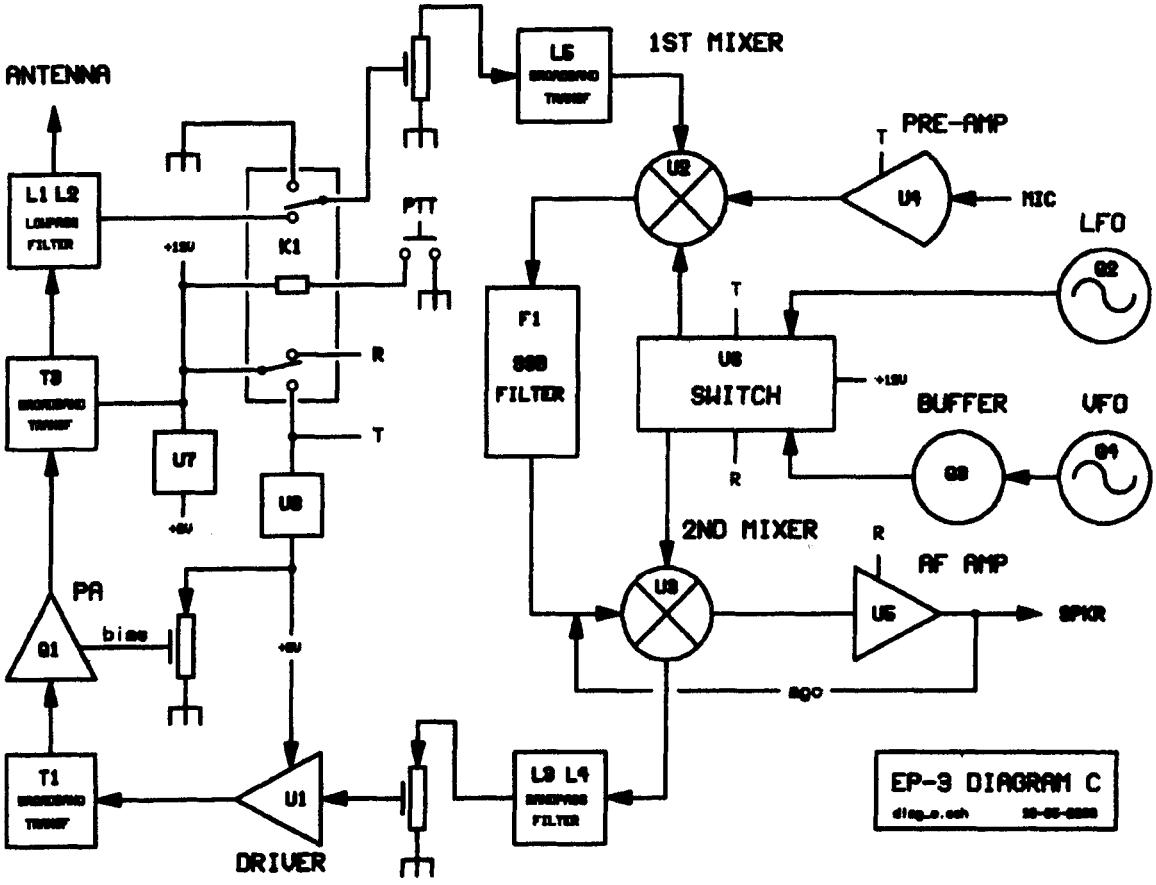
Now that there are some kits available for members of the G QRP Club I hope you will will have as much fun with them as I have. The kits are available from Graham Firth G3MFJ, 13 Wynmore Drive, Bramhope, LEEDS. LS16 9DQ. Cheques to "GQRP Club" The cost is £80 including postage. As there are limited numbers, Graham asks that, if you are ordering anything else, that you send a separate cheque for the kit, then this can be returned if the kit is sold out. The kits include the PCB, all components mounted thereon including connectors and the 10-turn tuning pot, together with the full assembly manual.


LFO
VFO
BUFFER
SWITCH
MIC PRE-AMP
1ST MIXER
2ND MIXER
RX RF I/P
AUDIO AMP
EP-3 DIAGRAM A



EP-3 DIAGRAM B

diag_b.sch 30-05-2000

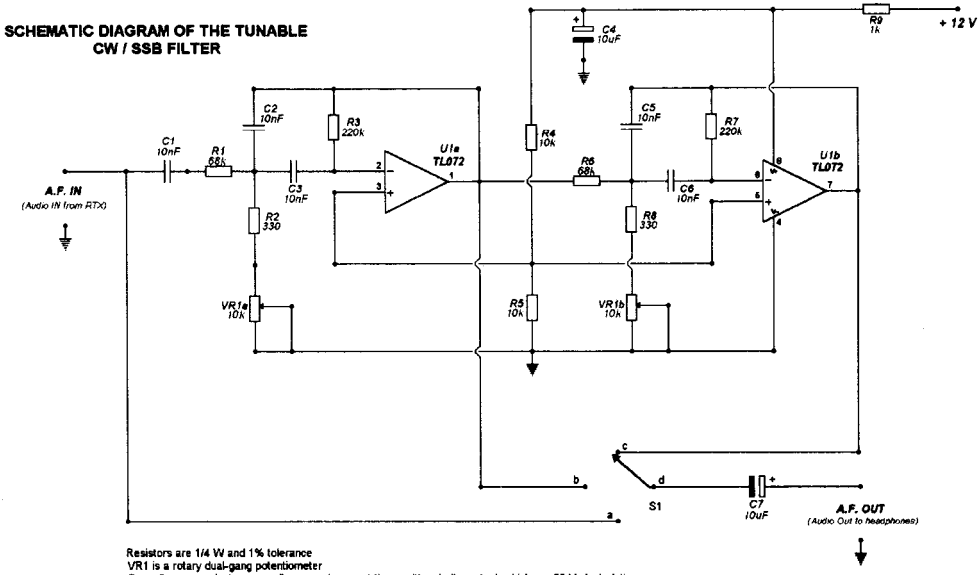

ANTENNA
L1 L2
FILTER
T0
U7
U8
PA
Q1
bias
T1
U1
DRIVER
L9 L4
FILTER
F1
FILTER
L5
1ST MIXER
U2
PRE-AMP
U4
MIC
PTT
K1
+15V
R
T
U6
SWITCH
LFO
Q2
BUFFER
Q3
VFO
Q4
2ND MIXER
U3
AF AMP
U5
SPKR
agc
EP-3 DIAGRAM C

A TUNABLE CW / SSB FILTER

Daniela Vignudelli IK4NPC, via Turati 43/2, 40134 Bologna. Italy

Some time ago I needed a very selective CW audio-filter, so I built some circuits taken from several books or magazines and, among them, the N1AL "Tuneable band-pass filter" (published on QRP CLASSICS, page 192), that was a single-pole tuneable RC active filter.
The fact that it was a single-pole means that its selectivity was suitable for SSB only, but I realized this design was very interesting and I decided to add it a second pole (for improving its selectivity), achieving a great result: a very selective tuneable CW filter! (More than I needed)
Then I also realized that, adding a rotary switch (S1) it was possible to by-pass this filter ("a" way), to hear the SSB signals, using one pole only ("b" way), or hearing the CW signals, using both poles of this filter ("c" way).

SCHEMATIC DIAGRAM OF THE TUNABLE CW / SSB FILTER



Resistors are 1/4 W and 1% tolerance
VR1 is a rotary dual-gang potentiometer
Capacitors are polystyrene or disc ceramic except those with polarity maked, which are 25 V electrolytic.
S1 is a rotary switch 4 pole 3 way

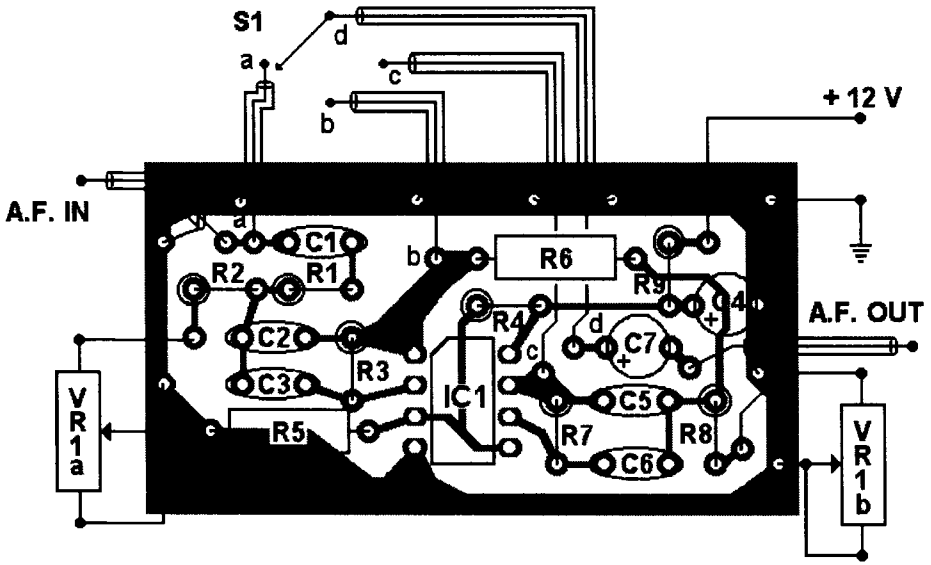
This tuneable CW/SSB filter is a two-pole RC active audio filter with a gain of 1.5 and with the property of tuning its centre frequency (f0) from 350 to 2000 Hz by varying the dual-gang potentiometer VR1. This operation doesn't change the gain of the two amplifiers U1a and U1b or the filter Bandwidth (B), because the Quality factor (Q) increases with the frequency (f0).
I used a dual-gang potentiometer because a two poles audio filter works excellently only when the first pole is identical to the second one. This means that VR1a and VR1b must always have the same value for avoiding that a signal pass the first pole and have a great attenuation in the second one.

In fact the secret to make a good two-poles audio filter is to use, in the second pole, electronics components having exactly the same values of the components used in the first pole so, R1=R6, R2=R8, R3=R7 and C2=C3=C5=C6. For example, if R1 is 68372Ω R6 must be 68372Ω if R2 is 334Ω, R8 must be 334Ω and so on.

For this reason I advise to use 1% tolerance resistors (so it is easy to find two resistors with the same value) and to use 4 capacitors with the same value (or very similar values), otherwise an attenuation of the A.F. signal may happen.
Anyway, this problem can be resolved adding a 1W audio power amplifier, like those with LM380, LM386, TDA7052, and so on. U1 is the op-amp TL072 because it works very well in this filter, but also other op-amps like the TL082, the LS4558 and the MC1458 work equally good.

The resistive divider R4 and R5 creates a "synthetic ground", so U1 can operate with a single supply voltage. At last, place this filter inside a metal box then connect the dual-gang potentiometer, the rotary switch and the IN / OUT jacks to the PCB using screened cables only.
The input signal must be taken from the earphone jack of a receiver (or a transceiver) and the output signal must be sent to earphones or to an audio power amplifier.

COMPONENT SIDE OF THE TUNABLE CW /SSB FILTER



WARNING :
If this filter is connected to an RTX may happen that, during the transmission operations, the CW tone be poor; this means that the filter is not tuned on the sidetone signal, so there is a difference between the filter centre frequency (f0) and the sidetone oscillator frequency.
This problem can be solved turning the rotary switch (for by-passing the filter manually) or putting a small switch circuit (for by-passing the filter automatically).

Editor's note – the PCB etching layout diagram is on page 32

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ANTENNAS - ANECDOTES - AWARDS

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

THE GIBRALTAR SPECIAL

Captain G. Smith, M.N. Retired, ZB2GS. P.O. Box 211, Gibraltar

Figurs 1 shows the dimensions for a 145 MHz version of this antenna. It consists of a full wavelength of wire which is fitted to a centre mast with spreaders so that it forms four diamond shapes. The wire is a continuous length which starts at (a) on the diagram and is then routed via (b),(c),(d) etc until it is terminated at (I). At (b),(d),(f) etc the wire fits into grooves cut in the ends of the spreaders, and at (c) and (g) it is passed through suitable metal hooks. The spreaders are passed through holes drilled in the mast, one above the other, and are glued into place (securing screws would be necessary in a larger, hf version). End (a) of the wire is connected to a terminal block which is in turn connected to a second block and thence to the outer of the co-ax feeder. End (I) is connected to a 50 pf trimmer wired between the two terminal blocks and terminated on the inner of the co-ax feeder. This trimmer is connected in circuit to allow adjustment for lowest swr. The antenna is directional, maximum signal being transmitted from a point half way between (f) and (h) in Figure 1. If mounted outdoors the terminal blocks, 50 pf trimmer and co-ax connection should be made fully waterproof . Using the information given in Figure 1 the dimensions can be scaled up for hf frequency bands. It is also possible, by using a spreader length suitable for the lowest frequency,to nest antennas for several bands one inside the other, and excite them from the common co-ax feeder. As far as results are concerned, using the version shown hung outside his window and fed with 25 MILLIWATTS of rf ZB2GS had no problems in working through the Canary Islands repeaters situated some 800 miles away.

ANNUAL AWARDS OF OUR MAJOR TROPHIES

THE G2NJ TROPHY is awarded to Bill Kelsey, N8ET, G QRP Club American Representative. Bill has looked after our U.S. affairs for many years, dealing with subscriptions, queries and sales. He also holds our Dayton stand materials and sets up the stand each year. He has been a truly international link between our two continents.

THE SUFFOLK TROPHY is awarded to Andreas Seereiner, OE6EIF, for his excellent "NAXOS" 20 meter cw transceiver published in SPRAT No.104. The design shows good technical merit and also a very high standard of home construction.

****

The PARTRIDGE TROPHY is awarded to the late Ghislain DE SMEDT, ON5NO, for his home brew mobile antenna design published in SPRAT No. 105. Sadly Ghislain suffered a fatal heart attack at the beginning of September, 2000. The Trophy plaque is being sent to his family, to whom all Members extend their sympathy in their tragic loss.

****

ERRORS WE APOLOGISE FOR

In the diagram on page 26 of SPRAT 105 the wire sizes for the coils were given in cm not mm. Actually 16 swg for the 15m coil and 22 swg for the other bands should be fine. On page 27 of SPRAT 106 the last word in the 3rd line should rea "halved" not "doubled". Thanks to readers for reporting the above.

AWARD NEWS

QRP MASTER. PAoBRO,PA9RZ,G4NBI and DJ3LR are welcomed to the Worshipful Company.Well done gentlemen !

QRP COUNTRIES. 100 F6BLK; 75 PAoRZ,DJ3LR; 25 G4UNL, MoCDP.

WORKED G QRP CLUB. 1100 G2DAN (FB!), 560 G4NBI;260 GM4OSS,G3BPM; 220 GoUTF; 200 GWoMYY,DJ3LR; 140 GWoVSW; 80 G3CQR,MoCDP; 60 G4YNU.

TWO-WAY QRP. 40 G3BPM; 30 PA9RZ; 10 G3CQR, MoCDP.

Conratulations to all the above.

G3ZOF ADDITIONS TO THE L-NETWORK

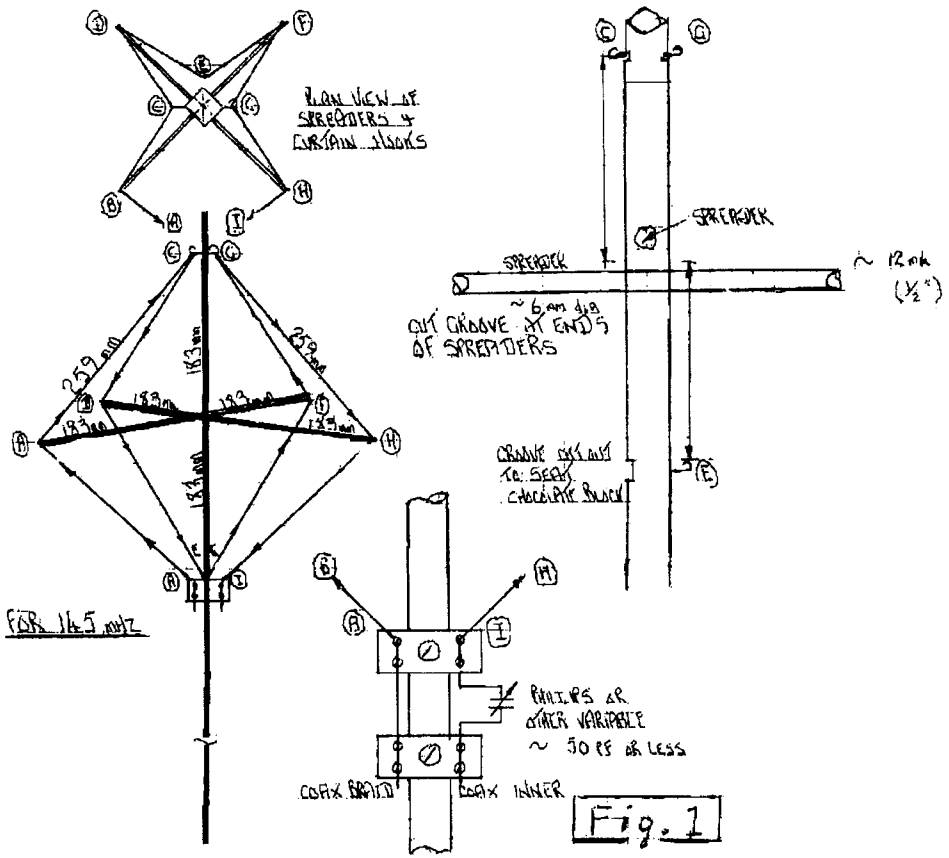
G3ZOF has made some useful additions to the L-network circuit described on page 28 of SPRAT 104. Firstly he has connected a 250p variable capacitor between the coil and the antenna terminal with a switch across it which allows it to be shorted out if not required. The capacitor provides an additional matching element for very awkward antenna lengths. Secondly he has fitted a double throw switch to the ground side of the co-axial output socket which allows connection either to ground for normal co-ax feed or to the inner of the co-ax , allowing the inner and outer of the feeder to be connected together and the antenna to be tuned as a random length wire. He has also increased coil sizes to cover 80 and 160m, and says he can even match a wire 2.7m long on the latter band [

MAKE THE MOST OF WHAT YOU ALREADY HAVE !

Jack, G3KKP recently sought our advice on improving his 160m results. He was using a 132ft doublet with tuned feeders, but only 15 feet high because of local restrictions.Our suggestion was to add 66 feet of wire to each end of the antenna in the shape of a series of Us, say 6ft long and 2ft wide. The thinking behind thie suggestion was that this would (a) increase the radiation resistance of the antenna and (b) get much more current in the centre, straight portion thus further increasing efficiency. Jack reports much improved results with this set-up. The moral is plain - if you cannot change your existing set-up try and think of ways to improve its efficiency.

POWER - DATA MODES ETC AND TWO-WAY QRP

To count as QRP maximum power on data modes should not exceed FIVE WATTS R.F. Please also note that to count as a two-way QRP QSO the whole contact, including initial calls, must be made with both stations using laid down QRP power levels. Contacts where either station uses power above the laid down levels at any time during the QSO cannot count as two-way QRP. The above is in line with our long-accepted practice, and also falls into line with the wishes of our new Data Manager.



The assembly resembles 8 right angled triangles where the hypotenuse (259mm) is the wire, and the other two sides are 183mm.

Examples -

Measurements for 2m (144MHz):
300/145MHz = 2.069m
Length of hypotenuse = 2.069/8 = 259mm
Spreader length = 2 x 183mm = 366mm

Measurements for 6m (51MHz):
300/51MHZ= 5.88m
Length of hypotenuse = 5.88/8 = 735mm
Spreader length = 2 x 260mm = 520mm

FREE SOFTWARE - **HAMCALC version 48**, with many new programs and upgrades of existing programs. Over 250 Painless Math and Design Programs for Radio Amateurs and Professionals, used worldwide as a design, reference and learning tool since its introduction in 1993. Most programs can be run in either metric or Imperial/USA units of measure. Contains much information not readily found in current Amateur handbooks and literature. Easy to use by non-technical hobbyists.
How to order:
For a free HAMCALC CD-ROM send US$7.00 check or money order (no stamps or IRC's please) to cover cost of materials and airmail anywhere in the world, to George Murphy VE3ERP, 77 McKenzie St., Orillia ON L3V 6A6, Canada (e-mail ve3erp@encode. corn).

COMMUNICATIONS AND CONTESTS

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

The last few months has seen me nearly snowed under with logs for the various recent G-QRP events. Don't get me wrong - the more the merrier (the postman may not agree!), but this copy of SPRAT sees the backlog of result details cleared.

CHELMSLEY TROPHY

Few entries were received, but it's true to say that **Y2K** rather overshadowed the event this time. Following his outstanding efforts during the year, Valery RW3AI is the **Chelmsley 2000** winner.

SOMERSET HOMEBREW CONTEST

I failed in my efforts this year to organise this event on an otherwise contest free day. Consequently, participants had more than their fair share of qrm to contend with, but it seems "a good time was had by all". Tim Walford's generous first prize (£50 voucher towards any Walford Electronics product) goes to Alan, G4GLV, who used his home made Bruton rig to good effect, with 5 watts of cw and ssb to score 47 points. He commented that he finished last in 1999, and was hoping to do better in 2000. You certainly managed that Alan, congratulations!

With details of the homebrew equipment used, and points scored, here are the other entries received: G3VAJ (8w H/Brew ssb) 35, RW3AI (5w H/Brew valve) 35, G0OTE (5w Taunton) 27, G4MRH (5w Howes 2000) 25.

This event is one of very few to actively support (and encourage) the use of home built equipment. I suppose this particular entry requirement excludes many other potential entries, but I hope most view it as I do - a positive attraction, and benefit to our hobby.

YEOVIL AMATEUR RADIO CLUB FUN RUN

41 QRP stations took part in this year's event, with 11 entries received. Results were as follows:

Call	80m points	40m points	Total
G3GC	490	470	960
G4DDX	480	380	860
G3BPM	465	355	820
G4PRL	335	270	605
G4MRH	250	340	590
PA3CLQ	370	135	505
OK1FVD	355	135	490
G3NVG	365	10	375
DL2BQD	-	320	320
DK5RY	105	135	240
G4EVI	70	30	100

Eric, G3GC, is therefore the winner of all three sections. The lowest power used award went to G4EVI, who used 2 watts for all contacts. Although other stations were active using lower power (eg GW0KZW 500mW), none of them submitted an entry. Check logs were received from F6GGO and G4JBL.

The Challenge Contest was won by Peter Welch, G3OFX. The distance he achieved was 21cms, and the frequency he measured was within 60khz of the resonant frequency of the test circuit.

The Yeovil Amateur Radio Club extend their thanks to everybody who helped to make the event a success. Next year's Convention (the 18th) will be held on **Sunday April 21st. 2002**, with the dinner taking place the evening before.

CZEBRIS 2000

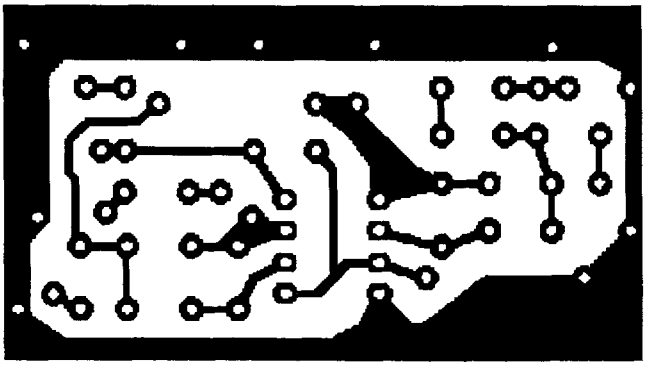
Congratulations to Ron, G4MRH, who scored a total of 137 points in his winning entry. Once again the boys from OK and OM seem to have been a little thin on the ground (except maybe on 20m), but Ron certainly found plenty of QRP activity from elsewhere to fill the log sheets. You may be interested to see a break down of his points per band: 80m: 10, 40m: 20, 20m: 92, 15m: 8, 10m: 7. The equipment used was a TenTec Argosy (5 watts) and Carolina Windom antenna at 7m.

My thanks to the following stations for their support during the event, and entries: G4FDC (76 points), GM4XQJ (40), G3ESP (40), G4GSA (38), F6UIG (36), G0DJA (28), M0ANQ (8), G8PG (Check).

That's it for now. Items for inclusion in SPRAT 108 should reach me by the beginning of August please. In the meantime, even if conditions have been disappointing of late, let's fill the bands with QRP activity! Have fun ..

72 de QRPeter

Tuneable CW/SSB filter – layout of the copper side of PCB. Not to scale!



NOVICE NEWS

Steve Ortmayer G4RAW
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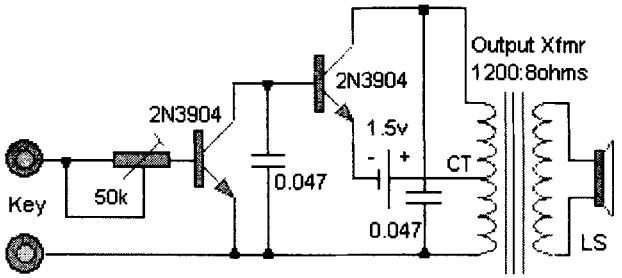
email: G4RAW@GQRP.COM

No news from members this time. Please let me know what you are up to. DX worked or projects you have undertaken are always of interest.

Why not try this Morse oscillator, it has a nice tone. It is from the web site of VE6GC.

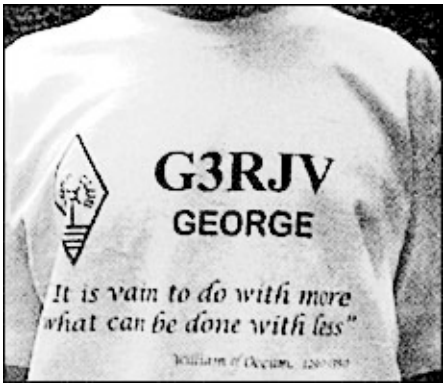


INTERNATIONAL QRP WORKING FREQUENCIES

CW: 1843, 3560, 7030, 10106, 14060, 21060, 28060 kHz
SSB: 3690, 7090, 14285, 21285, 28360 kHz

KEEP THESE FREQUENCIES SPECIAL FOR QRP - CALL "CQ QRP" OFTEN!

G QRP CLUB LOGO SHIRTS



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+ William of Occum Quotation
(Callsign added as option)
Tee-Shirts [in white or grey - heavy quality] - Logo+Quotation £8.50
with your callsign added £9.95
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[white or grey - heavy quality]
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Postage and packing on any item £2.95
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Quote: Visa or Mastercard, Full name & Address, Card Number, Expire date

VHF MANAGER'S REPORT

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Continuing with the alternative energy theme, this quarter's article is about wind power. In the past I have experimented with all of the designs shown, with varying degrees of success. If you watched the TV programme "Scrapheap" you would have seen an H-Rotor type (fig 1) and a Fan-type horizontal axis mill (Fig 3). The H-rotor is very efficient but will not self start, but could be combined with a Savonious rotor (Fig 2) to make it self starting. Both of these designs have the advantage of accepting wind from any direction.

The fan type will start at very low wind speeds (4 mph) and is the type often seen being used as water pumps on farms. I made one of these with a 4 ft diameter fan driving a 50 watt permenant magnet motorcycle alternator. The current one I am working on is like the one in Fig 4. This is basically similar to the fan type but is more efficient, (2-blades are the most efficient, but 4 blades give more starting torque.) It uses an 8 ft diam. propellor and a 600 W car alternator. This should start producing power at 8 mph and full power at 20 mph.

The bevel gear box increases alternator speed by a factor of six and also allows the fin to steer it into wind. If a long drive shaft is used the alternator can be mounted at the bottom of the tower, reducing the elevated weight. Not shown on any of the designs is the overspeed brake. I have incorporated the centrifugal clutch from a lawn mower on mine. It is also a good idea to use electric braking -- switch the output of the alternator to a water heater when not charging a battery.

All the above designs need some sort of gearing to increase alternator speed. I have successfully used pulleys and belts as well as bicycle chains for this. If you don't fancy doing the engineering work yourselves then there are several firms which can supply ready made units.

A very low power wind turbine (3W) can be made by attaching vanes to a bicycle wheel with a hub dynamo. It is possible to make the vanes from aluminium with tabs on so they clip onto the spokes at about the right angle (approx 30 deg.)

Try these websites: http://solarsales.com.au/soma.html & www.dse.com.au
Also KEYSOLAR SYSTEMS as advertised in SPRAT do wind & solar power.

73 de John G8SEQ

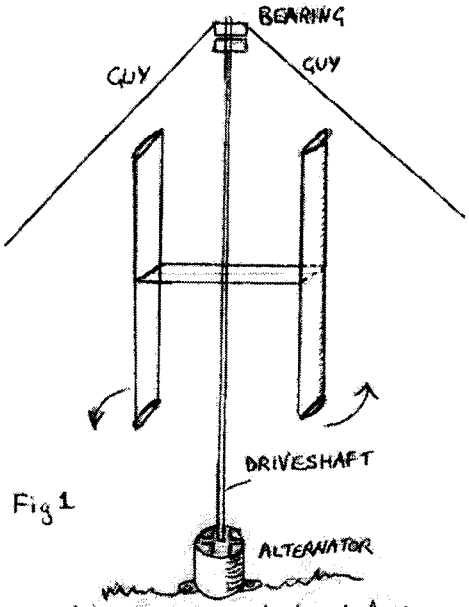
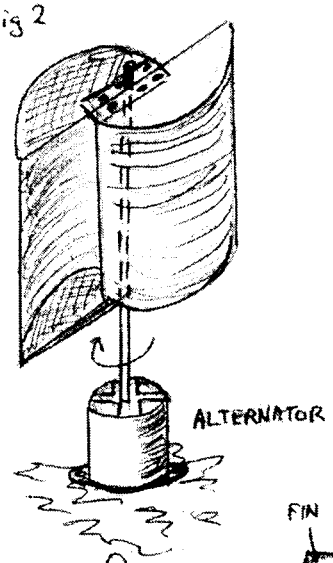


Fig 1

H-ROTOR - Vertical Axis

SAVONIUS ROTOR

Fig 2



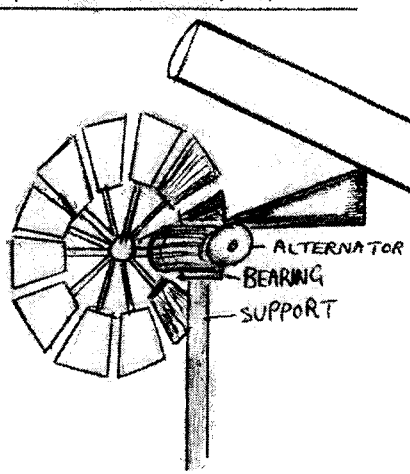


Fig 3

FAN Type Horizontal Axis

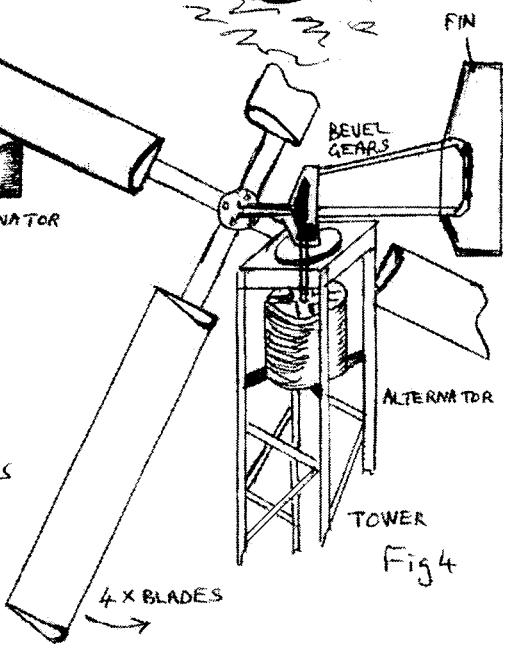


Fig 4

SSB & DATA REPORT

Dick Pascoe G0BPS, Seaview, Crete Road East. Folkestone. CT18 7EG
Tel 01303 894390 - Email: g0bps@gqrp.com

Roger G3XBM went on 70cms SSB in a contest for a few minutes and managed his first ever SSB QSO on that band using his FT817 on a ¼ wave whip indoors at 2.5W. On 15m SSB he was heard in Siberia by UA0AV using the FT817on internal NiCads with just the loaded whip.

Sheldon MW0ELR writes: QRP ssb seems to work well with HC1AJQ and then ZP6VT at 59 both ways on 18MHz. On 21Mhz I got a 59 from PY5EG and LU4FXI and a 57 from HR1RMG. CP6XE was nice signal I came into the shack to find JA7BEW booming in on ssb calling "CQ Contest", surprisingly he came back with the standard 59 but with a request for a callsign repeat! Good fun this HF lark, beats the hell out of listening to white noise on VHF.

Tim G0TYM writes; I worked D68C on four bands, they were quite easy to contact and congratulations to them for having such a prolific station set-up. Another **Tim - M5TIM**. One night had a G – GW PSK31 QSO on 80M each QRP. **Martin G4EFE** worked a WJ4 station during the week, best dx so far on PSK31 - on 10metres using 5 watts to a dipole. First thought he was Florida - until he announced Puerto Rico - hurrah! Relying on the laptop's on-board mic picking up the rig's speaker output and then just using the rig's mic to pick up the laptop's speaker for the transmit side. An Email from **Pete PE1MHO** it seems that the Es season is off to a good start: LZ, I, 9A, S5, SV, 4X and 5B4 one morning, all with 10W PEP.

Operating time has been somewhat restricted over the last year of **Dan GW0EGH** by arrival of child No. 2, but he switched on rig & worked JT1BV in Mongolia and shortly afterwards D68C. Both contacts were 10w SSB with TS120V into 23metre end fed wire and ATU. **Rod G3TXAG** has been using PSK3, RTTY and MFSK at a level of 10watts or less for well over a year now and like others are finding they are modes well suited to low power levels. **Brian GM4XQJ** sent in an impressive list of contacts and writes; "I must admit that as a cw operator I find PSK-31 is an excellent QRP mode".

As I mention power levels there are moves afoot in the USA to round off all QRP power levels to 5 watts. All modes would be limited to this power level. It could make things easier in some ways. Before putting this to the 'committee' I would like your thoughts on the matter. Please write or email me. Readers may not be aware that I am also on the Board of Directors of the American ARCI so able to link thoughts on this.

News and views on SSB or Data to me please by August 15th.

MEMBERS' NEWS

by Chris Page G4BUE

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E-mail: g4bue@adur-press.co.uk
Packet: GB7DXS on UK DX PacketCluster

It never ceases to amaze me what QRPers achieve. When I first became interested in QRP in the early 1970s, our ambition was to make two-way QRP QSOs across the Atlantic with our five watts. Not only did this quickly become common place, but two-way QRP QSOs with stations in VK and ZL soon became the norm. We then started reducing our power and 'milliwatting' became very popular. I was amazed to find it was possible to make QSOs across the Atlantic not only with milliwatts, but with microwatts! All that pales into insignificance with what **SV1UY** and **ZL1BK** have recently achieved. Read on.

SV1UY describes some two-way *Pedestrian Mobile QRP* QSOs he has made with ZL1BK on 20 metres. Demetre submitted the QSO to Bonnie, **KQ6XA**, <hfpack @ yahoogroups.com> who runs the HFpack Hall of Fame, <http://groups.yahoo.com/group/hfpack/database> and this was the reply he received: *It has just been VERIFIED and listed in the HFpack Hall of Fame that Demetre, **SV1UY/PM**, of Athens Greece and Max, **ZL1BK/PM**, of Auckland New Zealand established a new Distance Record of 17549 kilometres for Pedestrian-to-Pedestrian contact on 14MHz via CW at 06:25 UTC and SSB at 06:45 UTC on 28 FEB 2001. Both operators complied with all guidelines of the 5 Watt Pedestrian Mobile Category 2 of the HFpack Hall of Fame, exchanged signal reports and provided QSLs. In addition, the operators have repeated their contacts on other days since the initial QSOs. These QSOs are now the longest distance record for all categories in the HFpack Hall of Fame.*

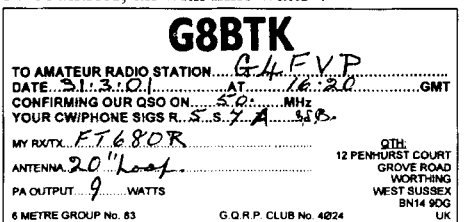
Demetre says, "We were both using portable antennas and we were walking while we did these fantastic QSOs". He used a five watts multi-band transceiver with a centre loaded 2 metre tall whip bolted on the heatsink of the radio with four triple radials each about 3 metres long, " I just left the radials trailing behind me when I was walking" at Mount Ymittos, east of Athens. **ZL1BK** also used a five watts multi-band transceiver with a half size hand-held dipole antenna with centre loading coils on a mast about three metres high. Max was walking in a park near his home during the QSOs. Demetre doesn't give the make of transceiver that was used "in case anyone thinks I am advertising" but says he will be pleased to provide further information to anyone interested, <sv1uy@ sv1uy.ampr.org>.

G3XBM has been using the FT817 for *Pedestrian Portable* and for others wanting to use it for pedestrian work, Roger says "I recommend buying an ATX15 15 metres telescopic antenna on the rig's top BNC connector and *using it also* on 12 and 10 metres. Using a counterpoise wire cut for 15 metres, the antenna works well on the higher two bands by pushing the telescopic whip in until the SWR is near 1:1 on each band. Using this I managed a 55 report from across Europe this morning on 10 metres SSB using the rig hand-held indoors with no effort at all. Although an ATX12 or ATX15 might be a dB or so more efficient, the ATX15 works well and is much lighter than the ATX Walkabout, which is unsuitable for set-top use due to the weight".

Writing later in May, Roger says "Now this is what I call enjoying ham radio: Bright, warm English Spring sunshine with the birds singing and a nice glass of wine in the hand sitting on a chair in the garden relaxing. Take the FT817 in hand, attach the 15 metre ATX whip and small counterpoise and a gell cell, tune to 21393kHz SSB and hear **OX3NUK** calling CQ. Call him, and immediately get a RS52 solid report back. Then follows a solid five minute QSO chatting about this and that. Say 73s, put the rig down and continue to sunbathe for a little while longer, then the XYL brings out a cup of tea. What a truly lovely May day this has been in Cambridge today!"

PE1MHO says the "Es season is off to a good start on 6 metres". On 13 May Peter worked LZ, I, 9A, S5, SV, 4X and 5B4 with 10 watts PEP. Writing in his regular *What's on Six* news column of the UK Six Metre Group's *Six News* magazine, under the heading of *The Magic Band - what you make of it*, **G4FVP** writes "I am reminded from time to time that what is DX for one operator may not be for another. Since I try to write this column with all operators in mind, hopefully you will enjoy reading a personal example of 'The

Magic Band' at work. In northern Europe there were terrific auroral conditions during March and April and during one of these on 31 March, I made a QSO with **G8BTK** in West Sussex IO90TT. Perhaps there is nothing unusual in this until you find out that Colen, **G8BTK** is operating with just nine watts from an FT680R to a 50cms loop inside his flat. Despite this, the signals were 57A/53A. Colen is greatly restricted with aerials and is not allowed to put up an external aerial or even one in the loft. It was really nice to make this QSO and give Colen, a new grid square. Even with this extremely modest station Colen has over 400 contacts and worked 37 countries, all with nine watts".


G8BTK

TO AMATEUR RADIO STATION G4FVP
DATE 31.3.01 AT 16.20 GMT
CONFIRMING OUR QSO ON 50 MHz
YOUR CW/PHONE SIGS R 5S 7A 5S
MY RX/TX FT680R
ANTENNA 20" Loop
PA OUTPUT 9 WATTS
QTH: 12 PENHURST COURT GROVE ROAD WORTHING WEST SUSSEX BN14 9QG UK
6 METRE GROUP No. 83
G.Q.R.P. CLUB No. 4024
QRA IO90TT
WAB TQ10
PLEASE QSL
MANY THANKS FOR THE CONTACT good DX COLEN W. HARLOW
Colen.

LZ2RS used his K2 at 5 watts in the ARRL DX Contest and made 448 QSOs with 124 multipliers on 20, 15 and 10 metres in 22 hours of operating. Rumi has completed a WAS using just one watt all CW. On 3 March **G3XBM** achieved "one of my long-time ambitions - a hand-held QSO across the pond using 15 metres SSB". Roger used a FT817 and an ATX whip and counterpoise while sitting on his bed indoors! He made QSOs with stations in New York and New Hampshire and three QSOs with European stations. He says, " I can't wait to try HF hand-held from a cliff-top in Devon".

G3XBM made his first PSK31 on 24 February on 15 metres using Digispan software on a PC. Although Roger used 20 watts to make the QSO, he says, "It is certainly an amazing mode. This evening signals I could hardly hear were workable. All the stateside stations worked were running 40-50 watts rather than the usual kWs. I can recommend this to those who have yet to try it. Tomorrow I'm going to give it a serious go with QRP". Within a space of 45 minutes on 5 May, **G3XJS** worked **VK9CXJ** (**G3MXJ** on Cocos-Keeling Island) on 15 metres, and then **9V1PC** on 21060kHz and on 28060kHz, both on two-way QRP. The following morning Peter had a two-way QRP QSO with **JA6PA** on 21060kHz and then ten minutes later found him on 28060kHz and then again on 7 May on 14060kHz to complete a hat-trick of QSOs!

Congratulations to **PAØRDT** who QSO'd **D68C** on 40 metres with just four watts into a 22 metre doublet 12 metres high. There have been many **D68C** QRP stories, but here is Roelof's, which confirms that patience is still the main quality to work DX with QRP. "It took me four evenings to work them and I even considered getting up in the middle of the night for the morning grey-line peak at the Comoros. Saturday night the signals were quite good around 1730z, but there was a large pile-up, so I had dinner, watched Dalglieish and got back at the radio at 2030z. Conditions were very poor. **D68C** was just S3-4 and there was a contest going on with very strong signals. But the pile-up had disappeared. He even started to call CQ! I tried to work him, but conditions were too bad. Gradually his signals got stronger and stronger and when he was S-6 I made the QSO. Never thought I would make it! Best DX for years". **G3JNB** was delighted to QSO **D68C** on two bands at under one watt, plus three SSB, four CW and one RTTY band/modes with five watts, all on a sloping 40 metre extended doublet. Victor says he is gradually nearing the 100 country mark.

G4ELZ was planning to be QRV as **CT1/G4ELZ/P** at the end of March with his four watts of CW. While using a "telescopic whip out of the window", Carl, **GWØTQM**, used two watts CW to make a QSO as **EA7/GWØTQM/M** with Claude, **EA6/HB9MX**, who was also using two watts to a whip. RK3ZK, UR6IRL, UR7IRL, US1RCH, US1REO, UU4JCQ, UY1AW and UZ8RR of the UR-QRP Club were planning the first *QRP Pedition* to Ai-Petri Mountain in the Crimea between 4 and 11 May as **EM5QRP** using homebrew QRP transceivers. **F5MOG** was planning to be QRV 28 April/7 May from castles in Corsica, including Giraglia Island (EU-164), with his K2 as **TK/F5MOG**.

GMØNWI will be QRV 30 October/24 January from New Zealand, mostly CW with some SSB on 20 and 40 metres. Andy will use a K2 (if he has finished building it) or an IC-706 and dipoles. **GØSWC** will be QRV from 15 May from East Falkland as **VP8DBR** with QRP SSB 40 - 6 metres and "Possibly 80 and 160 metres if I can find something to stop the wire being blown away in the wind". Roger may try QRS CW and some PSK31 with a kit that he intends to build down there (either the Hands DAT-20 or the PSK-20 from Small Wonder Labs in the USA).

GM3MXN and **G3MYZ** made a QRP SSTV on 40 metres recently "pictures received were very good at both ends". Congratulations to Tom and Peter. Is this a first? **9V1PC** is planning to be QRV again on 15 metres in May, June and July with a homebrew three watts transceiver and

long wire antenna. Peter will be QRV at 1600-1700z at weekends on 21060kHz. GØAYD, <davedixon@lineone.net>, has just acquired a HW8 as his "trusty old **G3TSO** has finally curled up its toes in big style". Dave says, "If anyone has any information on the HW8, I will answer all e-mails and letters. If anyone has a non-working model then I would be interested in that".

G4GTU is QRV again "after a decade practically QRT" with five watts from a IC-735 to a Carolina Windom 20 "which tunes beautifully 20-10 metres (including 30)". Steve initially had the old PL259 braid connection problem, with dry joints and snapped off braiding. He switched to the new style connectors which compress the braid onto the body and don't need soldering. He says. "A cinch to wire up and a perfect connection every time". If you want to reduce the IC-735's (or the IC-728) output to QRP, then **N2TO** describes how to do it. Kevin says, "My IC-728 was very similar to the IC-735, and there should be two pots on the motherboard. My IC-728 only tuned down to about ten watts output on 20 metres from the front panel pot but by adjusting the low power pot on the motherboard I was able to get the front panel pot to go down to one watt out as a minimum, giving me 1 to 100 watts".

GW3TMP mentions the New Zealand beacon on 28200kHz located near Masterton being a good propagation indicator. On 21 April Howarth heard the beacon at the one watt power level with his 160 metre doublet. After the beacon transmits its call about 20WPM, it send a one second tone at reducing power levels, 100, 10, 1 and 0.1 watt. **N2CQR** is now QRV 0530-0730z daily as **CU2JL**. Bill says, "I have moved to the Azores and QRV on 14060kHz with QRP. I am building a QRP DSB rig for 17 metres and have more information on my web site at <http://planeta.clix.pt/n2cqr>". **ZL1ABB** has regularly been making two-way QRP QSOs with Europe, including **LZ2RS** and **CT1DRE**. Bryce is QRV 0700-0800z Monday to Thursdays on 14060kHz.

MWØELR tested a RDX109MP that he had just built and found it worked well on QRP SSB with QSOs to HC1AJQ and **ZP6VT** at 59 both ways on 17 metres. Sheldon then tried 15 metres and worked **PY5EG**, **LU4FX1** and **HR1RMG** with it. **MØCDP** worked **VQ9IO** on 15 metres on 8 May but "didn't manage to break the bigger pile-up for **3B6RF**". Paul <paul_barlow @compuserve.com> will be QRV from Italy at the end of June from his hotel room with his Sierra (two watts) and ZM-2 ATU. He is wondering what antenna he should try from the hotel balcony, perhaps an ATX vertical? N5AF has worked lots of DX stations on 30 metres with four watts from Texas this spring, including and **VP8SDX**, **JA7DLE** (to complete his 30 metres CW QRP WAC), **3GØY**, **EA8WH** (several times), **TS7N**, **ZL2CD** and lots of European stations. Sam uses a dipole antenna.

For those wanting more information on the Slinky antenna described in my column in SPRAT 106 (page 38), **KA7ZVW** has kindly sent me a copy of an article on page 22 from the October 1974 *QST* called *Apartment Dweller's Slinky Junior Antenna* written by W7CZB. I will be pleased to send anyone a copy of the article on receipt of a SAE. Doug also mentions the Antenna's West Website at <http://www.Antennas West.com> under the heading "Heltrix' as a good source of information about the Slinky and variants of it.

(l to r) G4RVW, Mike, ZL2CC and Phil, ZL2ANQ.

In January **G4RVW** visited **ZL2CC** and was QRV from Mike's QTH in Gisborne for eight days. Phil worked 25 DXCC but only one two-way QRP QSO, with **HB9OU** on CW. He met club member Phil, **ZL2ANQ**, and came home with a new portable rig and several new keys given to him by members of the Gisborne club.

If you are planning to be QRV from somewhere other than home, then please let me know in good time so I can mention it in this column and allow other members keep an ear open for you. Please remember that the lead-in time for SPRAT is several weeks and my deadline for this column is the 20th of the month prior to publication, ie 20 August for the Autumn edition (108) to be published on 30 September. (This column is being written on 22 May). I also need more photographs for this column please, they can always be returned afterwards. Let me know how your Summer goes.

73 de Chris.

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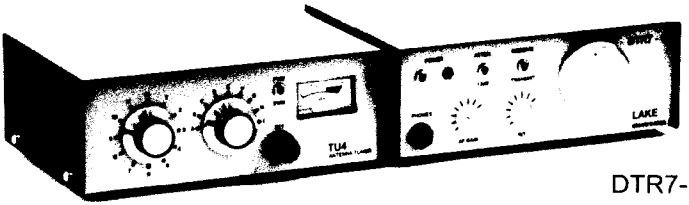

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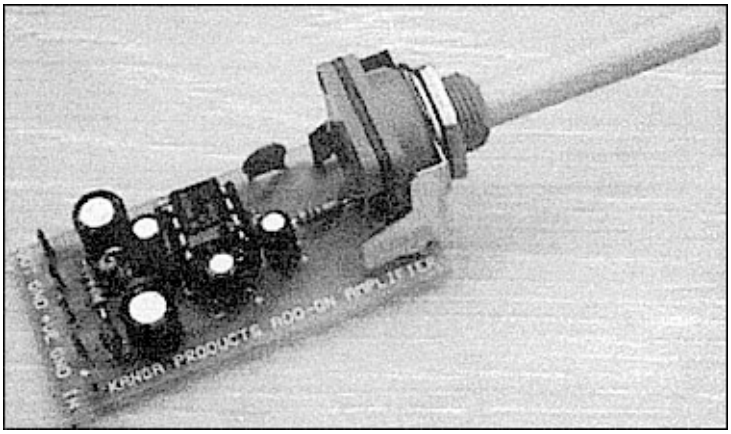

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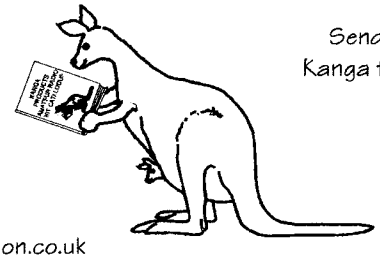

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