SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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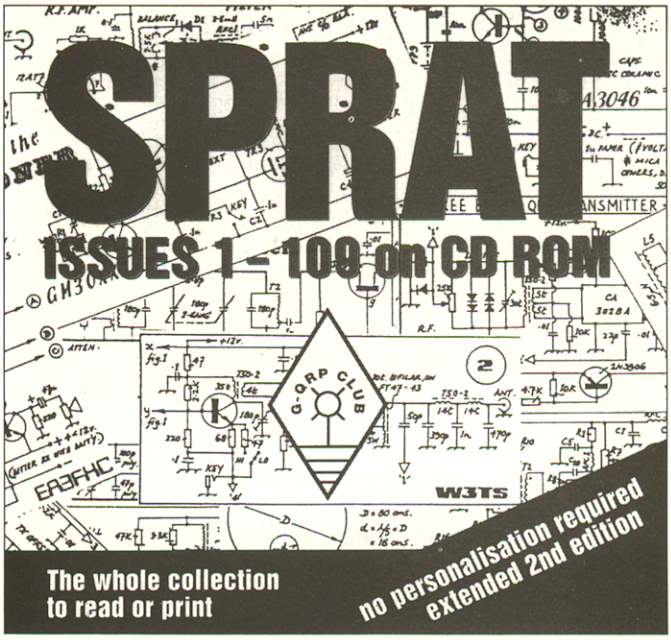

THE LATEST SPRAT-ON-CDROM - Issues 1 to 109
Now available to members – see inside

Mini-Convention ~ Lambda Oscillator ~ Two-Tube Regen Receiver
A Watt On 10 Metres ~ Multiband Loft Antenna ~ Versatile Test Oscillator
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Hepping up the NE612 and LM386 ~ The Heyphone
Palm Mini-Paddle Support ~ The Re-Pete Tuner ~ Club Sales
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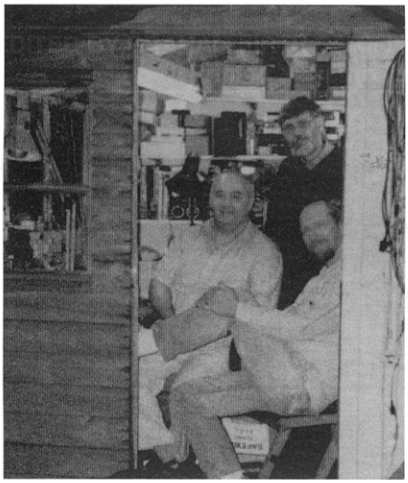

G3RJV, W7EL & G3MFJ
(in the G3MFJ shack)

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GUEST EDITORIAL!

Some of you may know that George is away in the USA, combining his usual visit to Dayton, with a retreat to the Abbey of Gethsemani in Kentucky – this time leading a party of pilgrims from St Aidan's. He left the raw articles with me just before he left for the colonies.

As you will have seen from the front cover, we now have the latest Sprat-on-CD available. I'm sure that this will please members who have a PC (and Windows 95 or later). See the ad on page 5 for details. We also have obtained a selection of Amidon toroid cores for members. With the demise of the one of the UK suppliers of these, they have been getting harder to find. The third new item is the MK484 radio on a chip, for which we thank Dennis KK5PY. See the Club Sales advert in this issue.

As this issue was going to press, I heard that George has obtained some crystals for QRP calling frequencies at Dayton - more news in the next issue. Finally, we hope to be able to offer capacitor kits of useful values, but these will not be available until the Rochdale Mini-convention. Watch Sprat (and the club website) for further information.

The winner of the W1FB Memorial Award for 2001 is 9A9RA – congratulations to Milan.

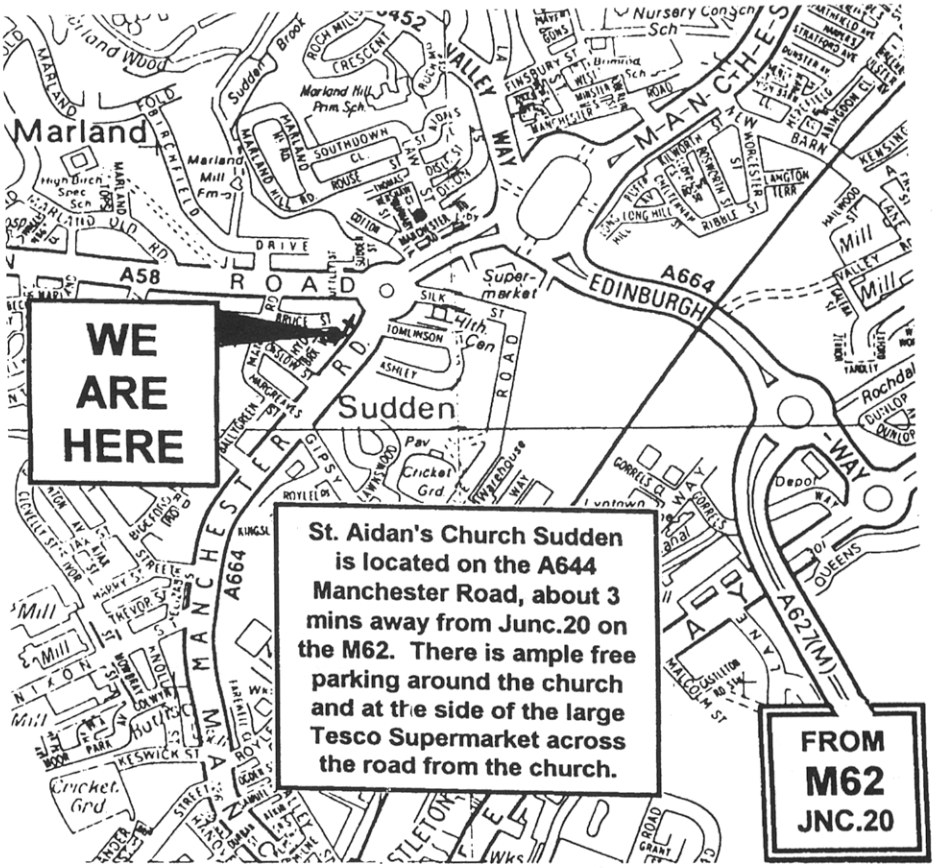
72/3

Graham

G3MFJ

EDITED BY GRAHAM FIRTH G3MFJ ARTWORK BY A.W. (MAC) McNEILL G3FCK
Printed & Distributed by G QRP Postal Mailing

THE G QRP CLUB
MINI-CONVENTION
SATURDAY 12th OCTOBER 2002
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



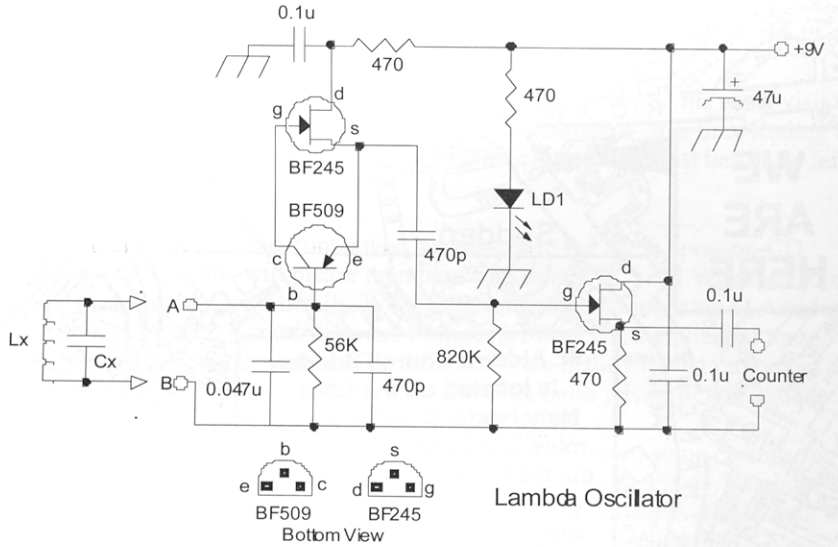
LOCAL ACCOMMODATION: The Royal Toby Lodge - Tel: 01706 - 861861.
Also within close range of the site : Oakenrod House : 01706 - 642115
The Norton Grange Hotel : 01706 - 630788

Lambda Oscillator as a Simple Substitute for Dip Meter

Bozidar Pasaric 9A2HL, Kataliniceva Str. #6, 51000 Rijeka Croatia

I have been using this simple gadget for ten or more years. I found it in some Italian electronic magazine, but today I cannot remember which one it was. You can see the electric diagram in fig. 1. This is an equivalent for a tunnel diode which is typical for its negative electric resistance. Being connected as shown, the transistors Tl and T2 produce the same negative resistance between points A and B. Their common U/l characteristic looks like the Greek letter K (lambda). Hence, the lambda oscillator'.

Now, if we connect Lx and Cx resonant circuit between points A and B, the whole thing will oscillate at the resonant frequency – without any visible feedback (or "tickler") coil. A sample of that frequency is taken from the source of T2 and routed to T3 which works as a source follower. Its output is connected to a frequency counter where you can read the resonant frequency of LxCx. That is all. This small instrument works fine up to 30 MHz or more, which is exactly what I need for my HF experiments.



Tl is any PNP RF transistor (like BF509) and T2 is a FET transistor BF245, or similar. T3 is another BF245. Its output is connected to the attached counter. The whole device is soldered on a piece of perf-board 3 cm x 4 cm or smaller. The points A and B are ended with two small crocodile clips on about 4 cm of insulated lead each. Lead A is red, and lead B is green. The counter is connected with about 5 cm of insulated double lead and a connector - fitting to the counter. (In fact, the length of this lead depends on the sensitivity of the counter. The frequency must be shown on 30 MHz, as well. My counter needs 1 V of RF input at least.) LD1 is any light emitting diode indicating that the oscillator is ready.

The oscillator is supplied with a small 9V battery. There is no ON-OFF switch because I connect and disconnect the battery when necessary. I am using this device without any box because it is small and sturdy enough.

Besides resonant frequencies I also measure inductances and capacitances - by using a pocket calculator and the following formulas:

$$L_{(\_H)} = \frac{25330}{f^2_{(MHz)} \times C_{(pF)}} \quad ; C_{(pF)} = \frac{25330}{f^2_{(MHz)} \times L_{(\_H)}} \quad ; \quad f_{(MHz)} = \frac{159}{\sqrt{L_{(\_H)} \times C_{(pF)}}}$$

For this purpose I have several 1% capacitors (which I bought) and several 1% inductors - which I wound and measured myself, using this lambda oscillator and the above formulas. A few hours of work will give you years of satisfaction.

PEP meter. The G3ROO article in the Spring Sprat said a kit will be available. Kits are now available for this module at £16 including postage and packing.
Coming shortly... control module PCB for FT817, full circuit details in next Sprat
Contact...Ian, G3ROO, Rosemount, Church Whitfield, Dover, Kent CT16 3HZ.
email g3roo@gqrp.com

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

FOR SALE: Roller Coaster [ceramic] 70 turns by 45mm, 165mm.x 75mm Good condition £20, plus post. GM3MXN 01698 330248 gm3mxn@thersgb.net.

CAR TO ROCHDALE? Would any member like to share their car (or van) with me from Sussex to the next mini-convention to Rochdale in 2002? Terry Belton, M1DTB & M3DTB. G-QRP #11001 Home: 01273 733155 Mobile: 07973 750427

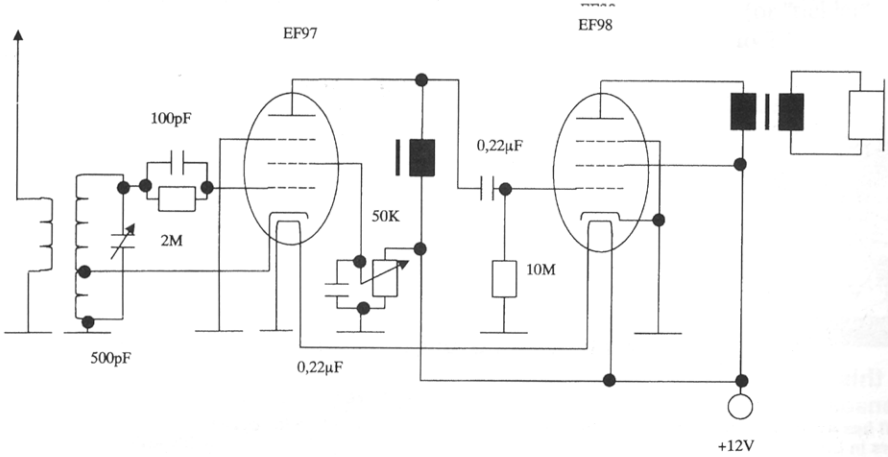
FOR SALE: Alinco DX70TH. Never used. £450 Bill, GM0KMG. 0141-562-4571

Two-Tube Regenerative Receiver for Low Voltage Operation

Rudolf Seibert DC8KP, 15 Ammerseestr,
D-85551 KIRCHHEIM 6 MU, GERMANY

The well-known military receiver *R392* was operated from a 28V power supply, including the plate voltage. It used ordinary vacuum tubes in carefully designed circuits. About 1960 the industry designed tubes for car radios using a plate voltage of 6V, since transistors had not yet been developed for high frequencies.

This regenerative receiver uses two of these car radio tubes: the EF97 and EF98. Both are pentodes with a separate cap for the suppressor grid. Both use 6.3V at 0.3A for the filament. In this receiver the filaments are connected in series to run off a 12V battery. This 12V battery is used for the plate supply too.



The detector with the EF97 uses the ECO (Electron Coupled Oscillator) circuit; this means that the cathode is connected to a tap on the coil and carries HF potential and the suppressor grid must be connected to ground. The voltage on the screen grid controls regeneration.

The plate voltage is fed through the primary winding of a small AF transformer as load for the AF. The AF signal is coupled through a capacitor to the grid of the EF98. A small transformer matches the impedance of the Walkman® earphone to the output impedance of the EF98. In this stage the EF98 develops about 10mW output power with a 12V plate voltage.

The coil is wound on a 20mm (0.79") plastic tube having 12 turns with a tap at 4 turns above ground. The 49m (6MHz) band can be tuned in with a 500pF variable capacitor, and shortwave broadcast stations can be heard. An antenna consisting of a radiator, or about a 10m (33 ft.) length of wire, is sufficient for this purpose. A battery power supply is recommended, since this circuit is very sensitive to 50Hz or 60 Hz power line interference.

A Watt on 10 Metres – A Simple QRP Rig

Rev Keith Ranger G0KJK, 144 Newton St. MACCLESFIELD. SK11 6RW

Ten metres open as I get ready this article, JA after JA pouring in and going into the log book of my HF9 simple TRF receiver ("Sprat" 82). Few articles on a simple rig for this superb band seem to appear in "Sprat", hence this humble offering!

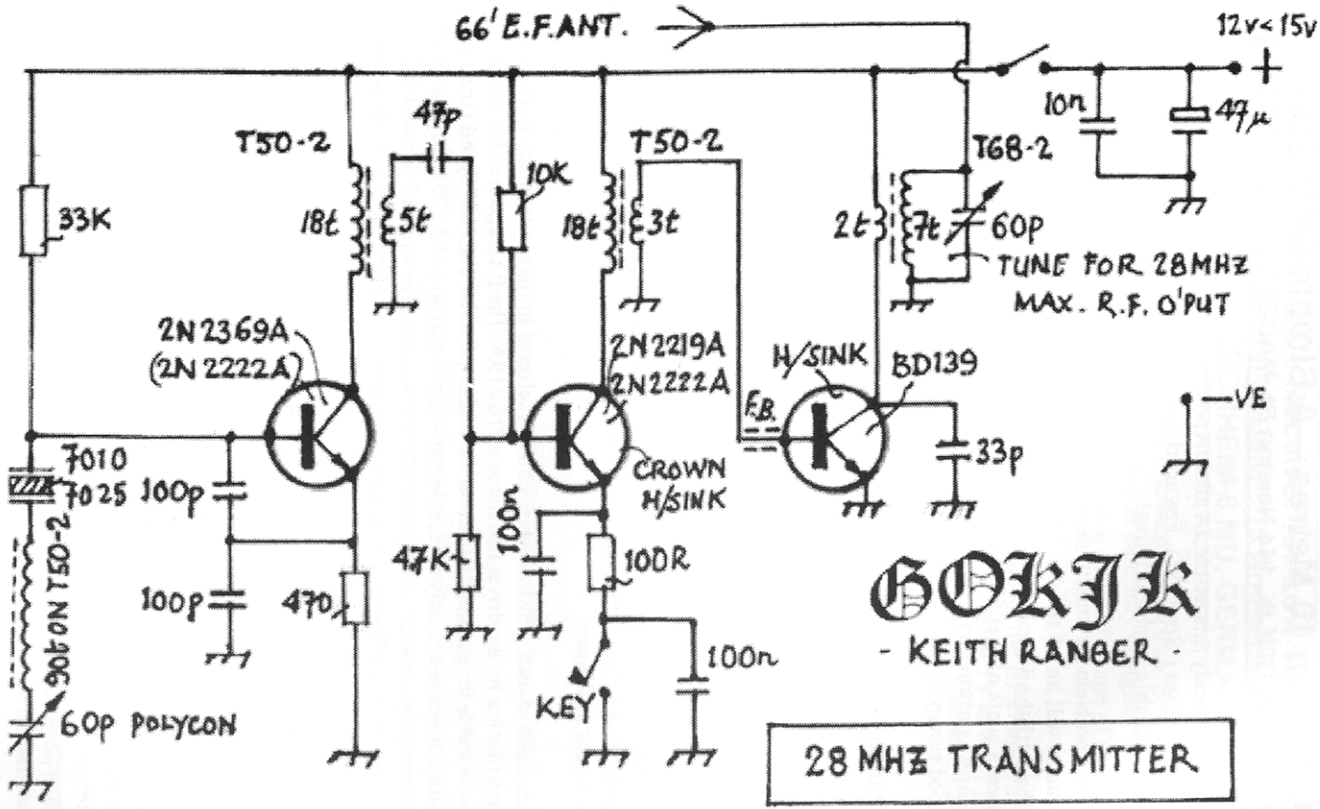
A major off-putting problem for amateur designers of 28MHz QRP CW transmitters is that of chirp. Circuits that perform well on 3.5 to 14 or 21MHz often play up if adapted for the exciting 20 metre band. Couple that with the difficulty of dinging fundamental frequency crystals for 28060 kHz at a reasonable price (a quote of over £13 was given for one custom made- and it is hardly surprising that most homebrew constructors keep well clear of 10! This is a shame because its DX potential, especially in good sunspot years, it tremendous.

To generate a frequency stable signal on 10m, I decided to go the way of the fourth harmonic. Crystals in the frequency range of 7010/7025 kHz may well await use in club members' junk boxes – or can be bought more cheaply that the above 28060 kHz quote. They can be pulled up to 10 kHz in frequency by using a series inductance of 90 turns of narrow-gauge wire in three 30 turn piles scramble-wound on a T50-2 toroid core. With a 7010 crystal in position in my "Mongrel" transmitter (Sprat 82), a 10 metre CQ from ES0HD in Estonia was answered by the not to be recommended method of tuning the rig's ATU to radiate a signal on the crystal's fourth harmonic of 28040 kHz. He came straight back with a 579 report but the rig did not appreciate the crude method employed and the PA transistor (on the occasion a 2SC2078) soon began to overheat and the undesirable result was chirp. However, great possibilities were thereby opened up of designing something that would do the job!

The result is the circuit shown. The fourth harmonic is selected in the exciter stage and further selected for amplification by the driver transistor, a 2N2219A. The PA stage then became a BD139 (which I find more stable for general PA use that the higher powered 2SC20078) and I tried again tuning the PA stage to the previously twice selected fourth harmonic of the 7010 crystal. A stable, chirp-free signal resulted – hurrah!. A CQ from IK0YUO was tuned in and a 15 minute QSO resulted with my report RST 559 and the PA transistor not even running warm at an RF output of around 1 watt.

The selection of the fourth harmonic in this circuit is delightfully simple. Eighteen primary turns on a T50-2 toroid core and five or three secondary turns wound over them does the trick in the collector circuits of the exciter and driver transistors (see circuit diagram). Other PA output circuit configurations to mine can be tried but harmonic radiation of higher or lower frequencies than 28MHZ is kept well down in this little rig by tuning to the fourth harmonic in three consecutive stages. Specifically, the XYL reported no TVI – and she has not failed to do so when other homebrew jobs have not come up to spec in this vital area!

I hope that this little rig, built as shown or modified by you gets you on to a band with some of the best QEP DX potential of them all. Good hunting!

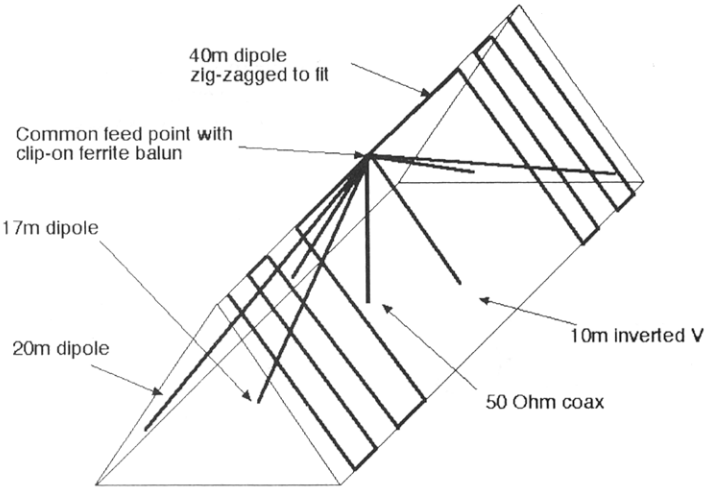


ALL 3 STAGES TUNE TO 28 MHZ. ALL 3 TRANSISTORS HAVE A CUT-OFF OF 250 MHZ OR HIGHER

Multiband Loft Antenna for 40/20/15/17/10m

Steve Nichols G0KYA, 7 Quebec Close, Cringleford, NORWICH NR4 6XU

Multiband loft antenna at G0KYA



There is nothing new about this design, but it does bring together a few useful ideas. What surprises me is it works incredibly well - so well that I have yet to find another antenna that can beat it, including Capco Magnetic loops, end feds and verticals for 10m all mounted outside. It will even load on 6m without an ATU.

It consists of separate half wave dipoles for 40m, 20m 17m and 10m, cut to 468(feet)/frequency x 95 per-cent. These are fed via RG58 50 Ohm coax at a common feedpoint (this was built with a chocolate block connector and a 35mm film canister as it was originally going to be put up outside).

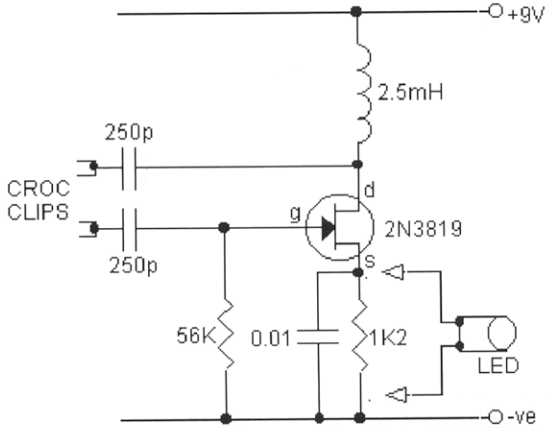
There are two large clip-on choke baluns at the feed point. The first trick is to zig-zag the 40m dipole up and down the loftspace, once the first ten feet or so have been pulled out horizontally - this is where the greatest current is. The second is to make sure that the end of each dipole is kept well away from the others. This helps bring down the SWR and improves the 10m performance dramatically. When it was originally put up they were all bundled together and although the 10m SWR was OK it was decidedly deaf. The third trick is to arrange the 10m dipole as an inverted V - this has always
worked well for me at three different QTHs. I used a staple gun to fasten the PVC coated wire to the rafters leaving the final six inches to dangle freely. SWR is less than 1.5:1 on all bands except 15m where the 40m dipole acts as three half waves and the SWR rises to about 2:1. It isn't a beam, but it doesn't suffer from computer interference either and is a lively antenna, ideal for QRP and M3s. It lives in the main loft and a Capco 1.7m loop for 80m lives in the other garage roof space.

A Versatile Test Oscillator

Ivor Bolton, G3JES, 168 Downs Rd. Canterbury. CT2 7TW

Whilst building several receivers for QRP use, it was found there was a need for a Test Oscillator for alignment and for locating the band easily. There was also a large box of crystals that needed to be tested.

The oscillator was built in a metal conduit switch box. The circuit is a simple basic Pierce [or Rockcrusher] and need no explanation. The RF Choke is an ex-government screened choke. By putting an LED across the source resistor, I found it only lit when the circuit was oscillating,



The input leads are short and fitted with crocodile clips for easy testing. Finding an old wartime 7.010 crystal in the box was ideal for alignment of my receiver circuits on 7MHz. A signal of appropriate strength can be obtained by moving the oscillator further away from the receiver.

Replacing the crystal with a tuned circuit with fixed or variable capacitors and checking on the station receiver or a dip oscillator in the absorption mode, gives a fair estimate of frequency and use useful for check the tuning range of variable capacitors. The brightness of the LED provides some indication of the strength of oscillation. The tuned circuits, tried and checked with these circuit values, ranged from 3 – 70MHz.

No doubt improvements such as pulsing or tone for easy identification of the signal could be added and many more uses could probably be found.

Help Yourself to Hear - by Roy Walker G0TAK

I have a slight hearing problem, (but I would not admit it on any other forum than this), no doubt brought on by a combination of a lifetime of listening to squeaky sounds on the radio, and my other, former, hobby of full-bore shooting.

The problem is made worse by modern radio design, which seems to favour a vertical-firing speaker, and a bail bar, or feet, which lift the front of the radio up at an angle, and point the source away from the listener.

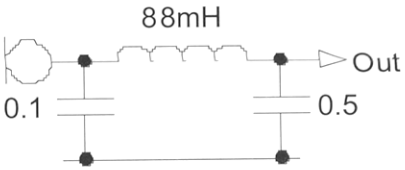
You would be surprised at the improvement made by simply cupping your hand behind the speaker grille and directing the sound forwards.

Go one step further, bend up a piece of "ally", or card, to form a sound deflector, and mount it on the lid of the radio, behind the speaker at an angle of 45 degrees. This can be secured to a convenient mounting point or made free standing, and secured with bluetack or strips of "Velcro". Give it a try, give yourself a chance to hear the weak ones.

Some Top Band Ideas

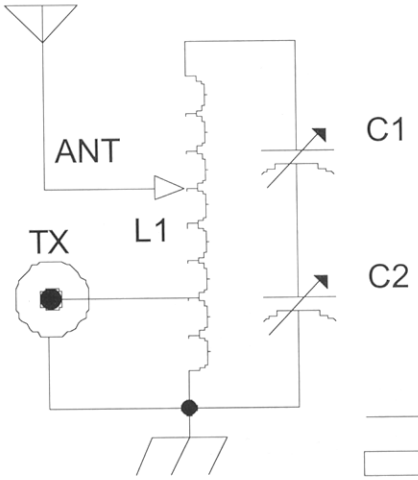
Pat Smith GW0VMR, Bron Awel, Brynissa Road, Brynteg, WREXHAM. Clwyd, LL11 6NS

I have been busy fiddling with a CW/DSB transmitter for Top Band, a band I have neglected for some time. I'm sorry to say the TX is 40 watts out! As when on DSB it was hard for my friends to hear me over our Welsh hills.



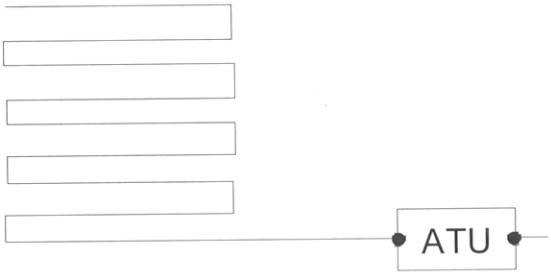
The first problem with the TX was the wide bandwidth and the harmonics of my voice. So I out this simple filter between the microphone and amplifier. It is so simple and works well and I am sure it would help in all sorts of homebrew phone rigs.

The next thing was an ATU for the Top Band end-fed wire.



L1 is 20 turns, 16 swg, 3 inch former "spaced". C1 and C2 are a small dual gang receiver type wired as a differential, to increase the voltage handling. The TX tap is about 4 turns up from ground and the ANT tap is 7 turns up from ground. You may have to change these taps to suit individual antennas.

I made two of these. One was for a friend who lives in a small housing estate and his antenna is 160 ft of wire in the roof space – arranged like this:



CORRECTION – SPRAT 109 "HF Selective Microvoltmeter"

The author, Milan, 9A9RA, and several others have pointed out an error in the input attenuator. The sections have not been joined in the diagram.

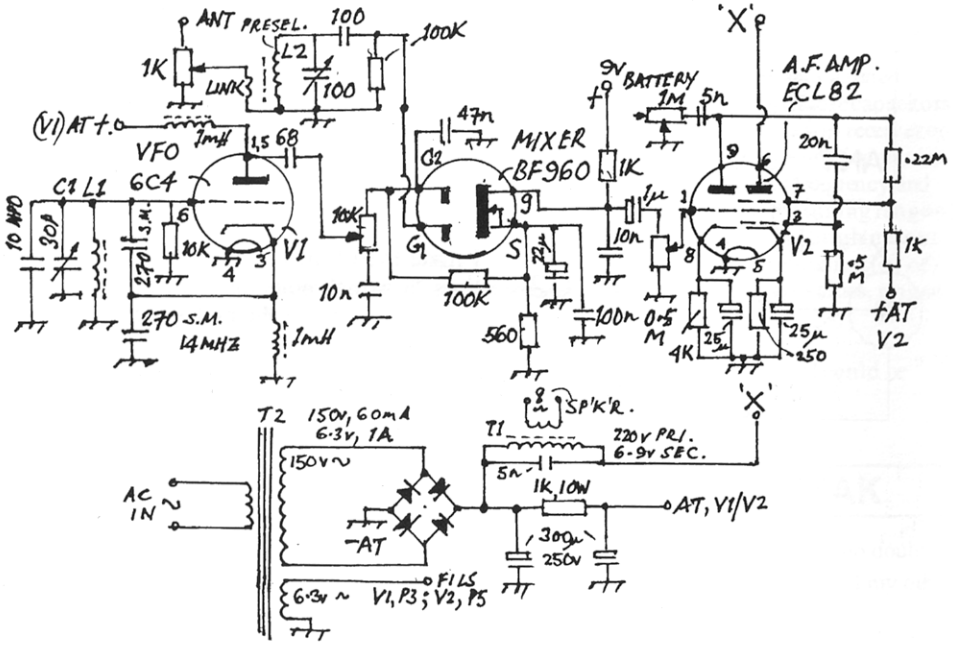
The HIBRYDUS Syncrodyne receiver for 14MHz

Gianpietro Gozzi IK2VTU, Via Flumendosa No 47, 20132 Milano

HIBRYDUS is a syncrodyne receiver, and uses two tubes, respectively 6C4 VFO, and ECL82 AF amplifier. The mixer is a project of Doug DeMaw with a common FET transistor. The reason of using a FET mixer, and not tubes is for the weak signals present in the antenna and for the noise that tubes produce. This receiver has good reception and it's easy to build.

Important notes:

- The 100pF capacitor in the front end must be a variable capacitor and not a trimmer because it is the preselector.
- The H T must be 150v and not more
- The tubes shoould be low noise
- L1 has 9 turns on 5mm variable core
- L2 is 25 turns on T50-6 and the link is 2 turns over L2



WIFB MEMORIAL TROPHY 2001

The Trophy for 2001 has been won by Milan Catari, 9A9RA, for his article "HF Selective Microvoltmeter" in SPRAT 109.

Last call for entries for the 2002 Trophy

Design a Simple Viable HF Band Transmitter to introduce a beginner to QRP operation

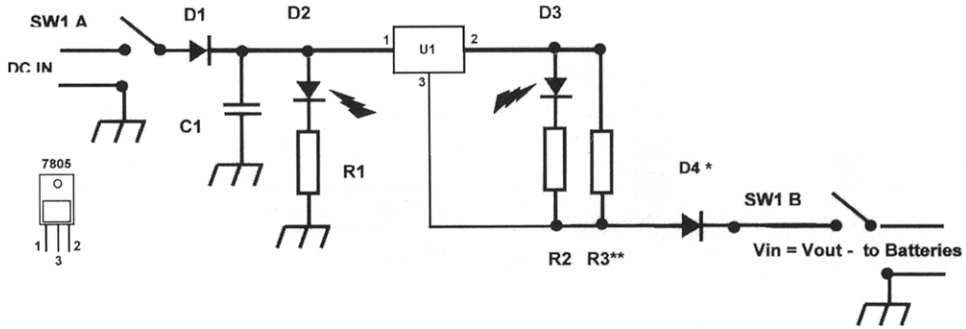
Current Limiting Battery Charger for Digital Camera / Test eqpt. / etc. Battery Packs

Bill Hickox K5BDZ, 15710 Cannion Falls, TOMBALL, TX 77375, USA

- R3 (and R2) is set to limit rate at ≅ 150 mA current to charge NiMH Batteries of 1300mAh to 1500 mAh rating.
- Circuit is current regulating, not voltage regulating.
- 12 VDC input for Battery Packs 6 volts or less (can be used with car 12 VDC systems – use fused lighter plug)
- 16-30 VDC input for Battery Packs of 12 volts (Do not exceed 30 volts as U1 max voltage is usually 35 volts.
- D3 only indicates that charger is on and voltage is connected to batteries.

See formulas for explanations and component values for your needs.
Suggest heat-sink for U1
D4 or SW1B prevents batteries from discharging when charger turned off

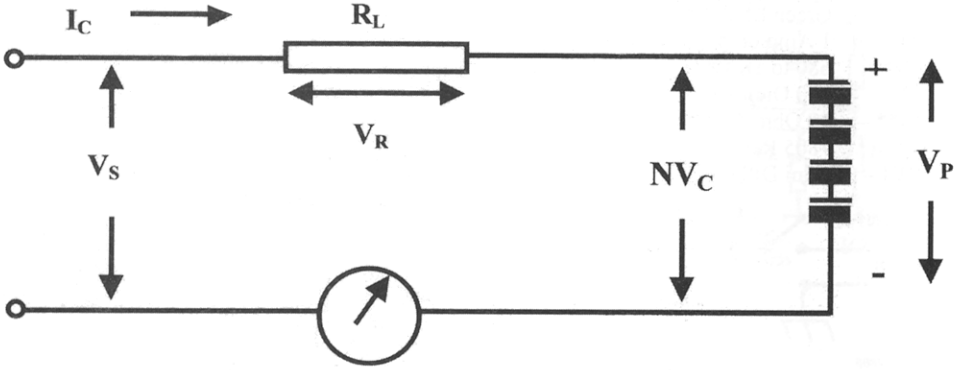
C1 – 100 MFD 35 VDC (or larger)
D1 – 1 Amp or larger Si Diode
D2 – Red LED
D3 – Green LED (Other color OK)
D4 - 1 Amp or larger Si Diode
R1 – 680 to 1K Ohm _ watt
R2 – 330 Ohm 1 watt
R3** – 39 Ohm 5 watt (R3 value for NiMH batteries)
U1 – 7805 Regulator
SW1 – Mini DPDT



* D4 is required only in the event that builder does not choose to use SW1B. If SW1B is used, D4 can be eliminated.
** R3 value determined by formula for 8/C (8 hour charge) or 10/C (10 hour charge). Remove charger from batteries after full charging.

Design Formulae etc:

- Resistor in parallel value calculations **Rt =** $\frac{1}{\frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}}$ (remember R2 & R3 are parallel)
- V_S = source voltage
- V_C = on charge voltage of one NiMH cell (approx 1.45 v @ 20 deg C)
- V_R = voltage across resistor = $V_S - NV_C = R_L \times I_C$
- N = number of cells in battery
- C = capacity of cells in ampere hours (NiCad av. AA cell 500 mAh ea., and NiMH AA cells, from 1300 mAh to 1500 mAh ea.)
- R_L = resistor required to limit current, i.e. **$R_L = 8/C (V_s - N V_c)$ = Ohms = quicker charge than 10/C**
- I_C = charging current required (i.e. C/10 for normal charge or C/8 for a heavier charge)
- W_R = watts dissipated by resistor, i.e. **$W_R = RL \times Ic^2$**
- R_L = for battery pack with unknown number of cells = **$R_L = 8/C (V_s - V_P)$ = Ohms** (remember 8/C is heavier charge than 10/C)
- V_P = Voltage of total battery pack if number of cells unknown ($V_P = NV_C$)
- **ALL BATTERIES IN BATTERY PACK MUST BE SAME TYPE & RATING**

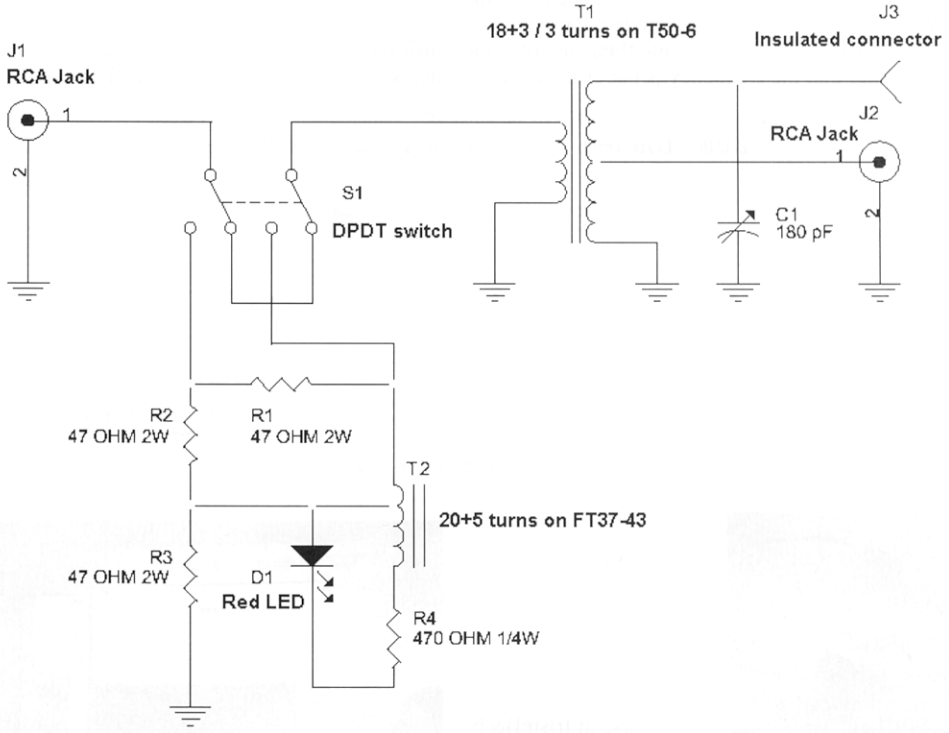


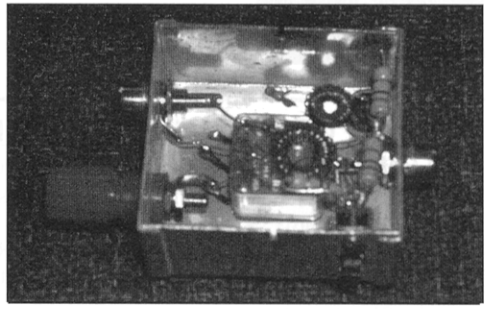
N.B.T.V.A

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"

20m QRP Antenna Tuner Unit & 20m mini-loaded dipole

Guido, IK2BCP/AB9DG ik2bcp@hamlan.org





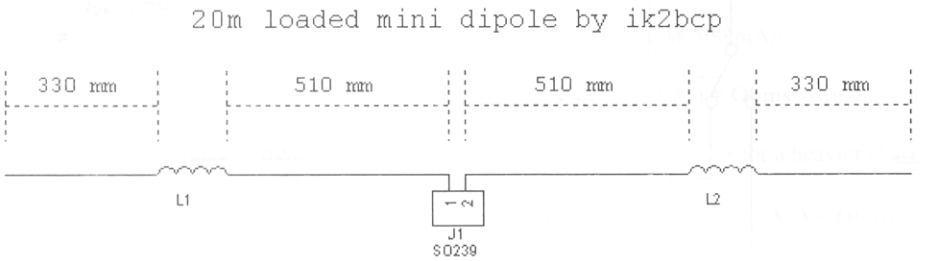
I built this ATU to tune my mini loaded 20m dipole (1.7m long) that I'm using in holiday with my little transceiver CW QRP MFJ CUB (2W on 20m). You must connect a low impedance antenna (near 50 Ohm) to J2 or high impedance antenna (like a half wavelength wire) to J3.
The tuning range of this ATU is not so large like some other types, the resistive part of impedance of an antenna connected to J2 must be not too far from 50 Ohm, but I was able to tune many antennas connected to J2.
The SWR bridge is the classic "SVSI" by N7VE / W6JJZ / W7LS: if the led is on, there are standing waves, if the led is off, we have a low swr. T1 is made of 21 turns of 0.35mm wire on T50-6 toroid with a tap at 3 turns from ground and a link of 3 turns. 2 is made of 25 turns of 0.25mm wire on FT37-43 toroid with a 5 turns tap. he box is 53mm x 50mm x 26mm. With 50 Ohm dummy load, the losses are less than 1dB (about 0.8dB).

I never tried it but I think that this ATU must work also on 30m and 17m.

20m mini loaded dipole

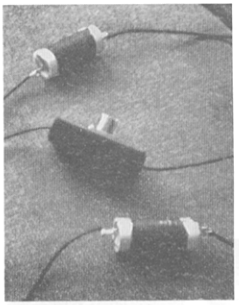
This is my "mini dipole" for 20m that I built to have some fun while in holidays with my QRP setup.

It is very simple to build and you can tune it in your shack room (simulating a holiay installation in a Hotel...) using an antenna analyzer (I used my Autek VA1) but I think that you can do it also with a SWR meter and a general coverage rx/tx using low power. Start with the ends some cm longer (ex. 400 mm instead of 330 mm) and then cut both sides until you have the resonance in 20m band. Remember that the frequency is not critical because then you will "tune" the dipole with the ATU



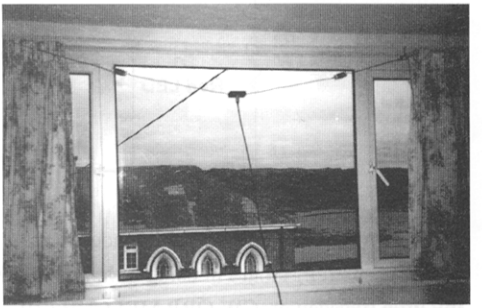
L1 = L2 = 37 turns on 61 (length) x 25 (diameter) mm form
Wire is 0.5 mm enameled and coil is 22 mm long

J1 = SO239 connector in a little plastic box



Left – Mini-dipole centre & coils

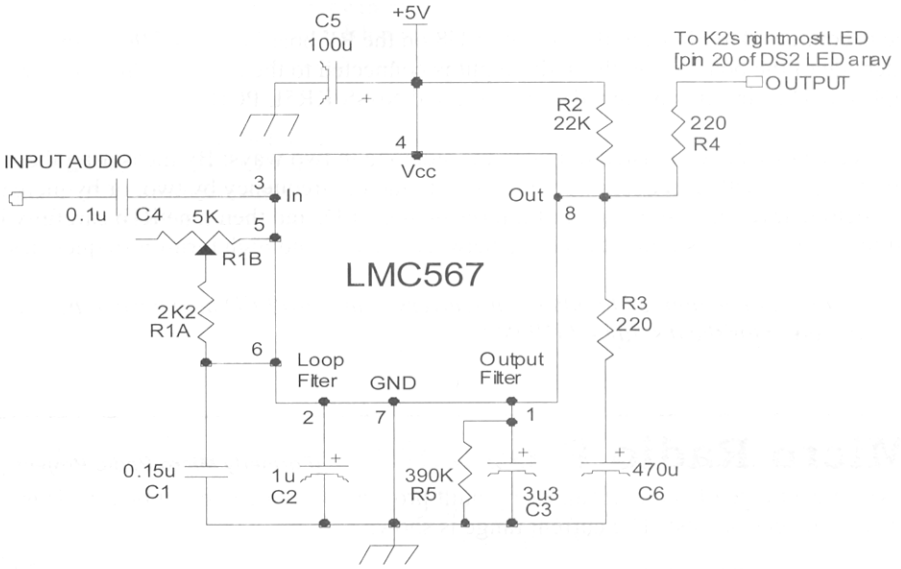
Right – Mini-dipole in use in Irish B&B



QRP Zero-beat Indicator for the Elecraft K2 (and other transceivers)

Sverre Holm LA3ZA, Daliveien 1, N-1383 ASKER. NORWAY

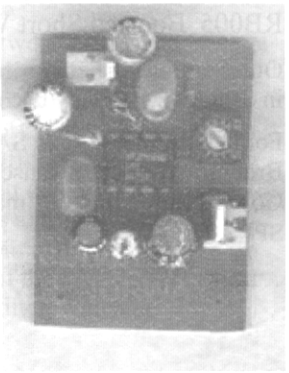
This is a circuit that builds on a zero-beat indicator circuit by KR5L. Reference: KR5L's circuit/PCB: http://home.earthlink.net/~n0ss/kr51_cw_tuning_ind.pdf
He suggested trying a CMOS version of the 567 instead of the standard bipolar version, and here it is: the QRP version of his circuit. It draws only 0.9 mA at 5V compared to about 20 mA/8V for the original circuit.



Compared to the original circuit, C2 and C3 have been divided by about eight, and C1 has been divided by about two.
Component values:

U1 – LMC567 PLL
R1a – 2.2 k
R1b – 5 k pot
R2 – 22 k
R3 – 220 ohm
R4 – 220 ohm
R5 – 390 k

C1 – 15 nF
C2 – 1 µF
C3 – 3.3 µF
C4 – 0.1 µF
C5 – 100 µF
C6 – 470 µF



In addition R3 and C6 have been added. They add a time constant of 0.1 sec or so, but unlike just increasing the output filter capacitor C3, this gives a fade-out when the LED extinguishes, and results in a smoothness to the display much like the indicator on the FT-1000. The value for R3 has been found from the maximum output current of 20 mA of U1, and is obtained if C6

has been charged to 5 V and is then discharged through U1's output.

R5 has also been added for increased sensitivity. I found that my circuit required a little over comfortable speaker level to trigger before R5 was added. Values as low as 270 k can be used and give even higher sensitivity, but also more triggering on noise.

The output is connected to the right-most LED of the K2, an idea that I first heard from W7DZN. The output goes to pin 20 of the DS2 LED array on the Control Board. In the 'Nite' setting, the LED is fed from 2.7 V through a 120 ohm resistor, while in the 'Day' mode it is fed from 4 V. R4 results in less than 50% of the current in the LED than in the usual S-meter, and makes it easier to see that this segment has a different function.

Vcc is connected to 5V from the output of U8 on the RF board (across C90 on the underside of the board), and the audio input is connected to the output of the AF power amplifier. The circuit is mounted on the original N0SS/KR5L PCB.

The frequency can be adjusted to match the sidetone in two ways: By measuring the output of pin 5 with a frequency counter and divide the frequency by two, or by increasing the sidetone level in Test mode until it turns on the LED, and then tune R1b carefully back and forth until one has found the centre between the low and high turn-on frequencies.

The circuit could be applied to other transceivers – an extra LED may have to be added to the transceiver for the display - G3RJV

Hepping up the NE612 and LM386

Bill Currie VK2AWC, PO Box 5197, Mordialloc, Victoria 3195

There are quite a few circuits around for the two chip DC receivers using the NE602 and LM386 ICs. I have made up a few of these sets and find that they generally lack a bit of guts and require a good antenna. Here are a few ideas that will boost the gain of these receivers without having to add RF or AF stages. I modified a two-chip receiver using these ideas. The mods were made switchable so that I could continuously check performance.

The oscillator output of the NE612 can be increased by connecting an emitter resistor from pin 7 to ground. If harmonics of the oscillator are used, it pays to have this resistor switchable to suit different bands, as in figure 1.

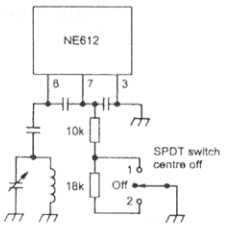


Fig 1: Oscillator switching

The RF gain of the NE612 can be boosted by about two times by increasing the normal bias of 1.4 volts on pins 1 and 2 to about 2.2 volts. I sometimes use a balanced input to the chip and figure 2 shows how this can be done in conjunction with an RF gain control. This control varies the bias from 0.5 volt (cut off) to 2.2 volts (max gain).

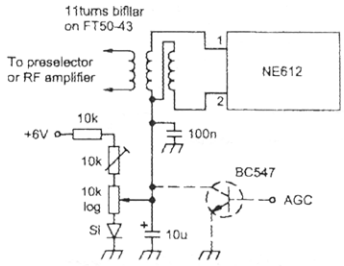


Fig 2: RF gain control

The RF gain control does away with the need for an audio gain control and possibly an RF attenuator. The normal standing current of the NE612 is 2.5mA but when using a gain control it varies from 1.5mA to about 4mA. Surprisingly the oscillator does not seem to be affected by these changes and even a self-excited oscillator does not change frequency. The balanced outputs of the 612 are bypassed for RF right at pins 4 and 5 and can be used to feed the + and – inputs of the LM386.

I installed a 3-position toggle switch to give audio filtering between the 612 and 386. This "selectivity" switch is labelled SSB/Wide/CW, and is shown in figure 3.

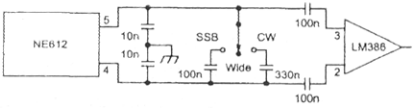


Fig 3: Selectivity switch

The gain of the LM386 is about 200 V/V with a 10uF capacitor between pins 1 and 8. This can be increased 2 or 3 times by feeding some of the audio output back into pin 7. This pin is sometimes bypassed for hum reduction. Figure 4 shows this "audio boost" circuit which uses a 3-position toggle switch labelled Boost/Off/Limit. The limit position of the switch uses a pair of silicon diodes to limit the amount of boost on strong signals. This is a primitive type of AGC and helps to keep strong signals from overloading the LM386 and distorting. As the hiss level of the LM386 seemed to increase with boosting, I installed a hiss filter, which is permanently connected.

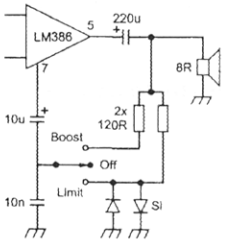
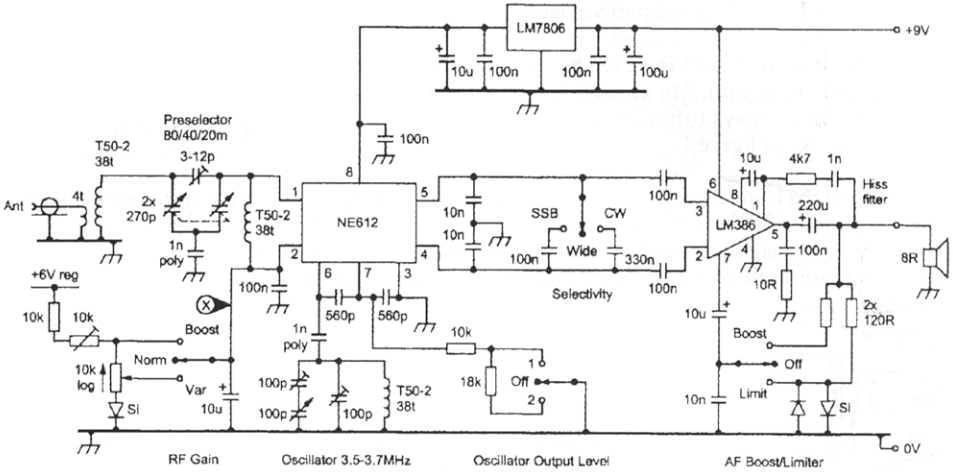


Fig 4: AF boost

The resultant receiver is shown in figure 5 and gives good results on 80 and 40. The VFO tunes 3.5 to 3.7MHz and the second harmonic is used to tune 40 metres. 20 metres is tuneable but conditions need to be good for speaker reception.
If you want 10MHz and 10.1 to 10.15MHz (30 metres), you can shunt the VFO with capacitors to tune, say 3.33 to 3.39MHz and use the third harmonic (9.99 – 10.17MHz). I have tried this and it works fine. The front end tunes 3.5 to 14.5MHz so there is no need for band switching there.



Voltage at X

Boost	2.2V
Normal	1.4V
Variable	0.5-2.2V

Two IC 80 to 20m DC Receiver

by Bill Currie VK2AWC

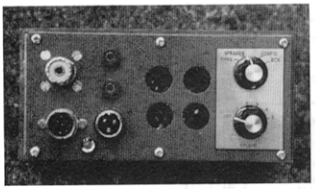
The set runs off 9 volts and uses 6 C cells, or a 9 volt "wall wart". An LM7806 regulator provides 6 volts for the NE612. You could of course add an RF stage, full AGC and an "S" meter, but then we are getting away from the KISS (Keep It Simple Stupid!) principle aren't we? You may be able to use some of these ideas in your receivers. You do not need to "switch" all functions like I did, but it is great fun for demonstrating "boost" circuits. These modifications described for the NE612 will also apply to the NE602 and the SA6xx versions. The modifications for the LM386 could also be applied to the LM380 with the appropriate circuit changes.

Reprinted from the March 2002 issue of Lo-Key, the magazine of the Australian CW Operators' QRP Club by kind permission of the Editor.

The Heyphone

John R Hey G3TDZ - 8 Armley Grange Crescent, Leeds LS12 3QL.

April 2001 saw the launch of a replacement radio for the cave rescue services; the first few delivered to British Cave Rescue Council (BCRC). Sixty-six radios have now been built with on-site testing slowed due to foot and mouth disease. In honour of the designer, or perhaps they couldn't think of another name, the radio was named the Heyphone by BCRC. There has been some coverage in the amateur press in recent times of the experimentation and construction which has been done by members of the Cave Radio and Electronics Group (CREG), a special interest group of the British Cave Research Association.



We have been asked at club lectures, "What has this got to do with amateur radio?" All the members turning up for experimental field meetings are radio amateurs, and while the caving frequency is not an amateur band, the circuitry below can easily be converted to 73kHz or 136kHz operation. Those wishing to read the full story should seek out the references given. The other radio magazines chose not to print the circuit details, but as Sprat readers are known to like circuit diagrams, here we go.

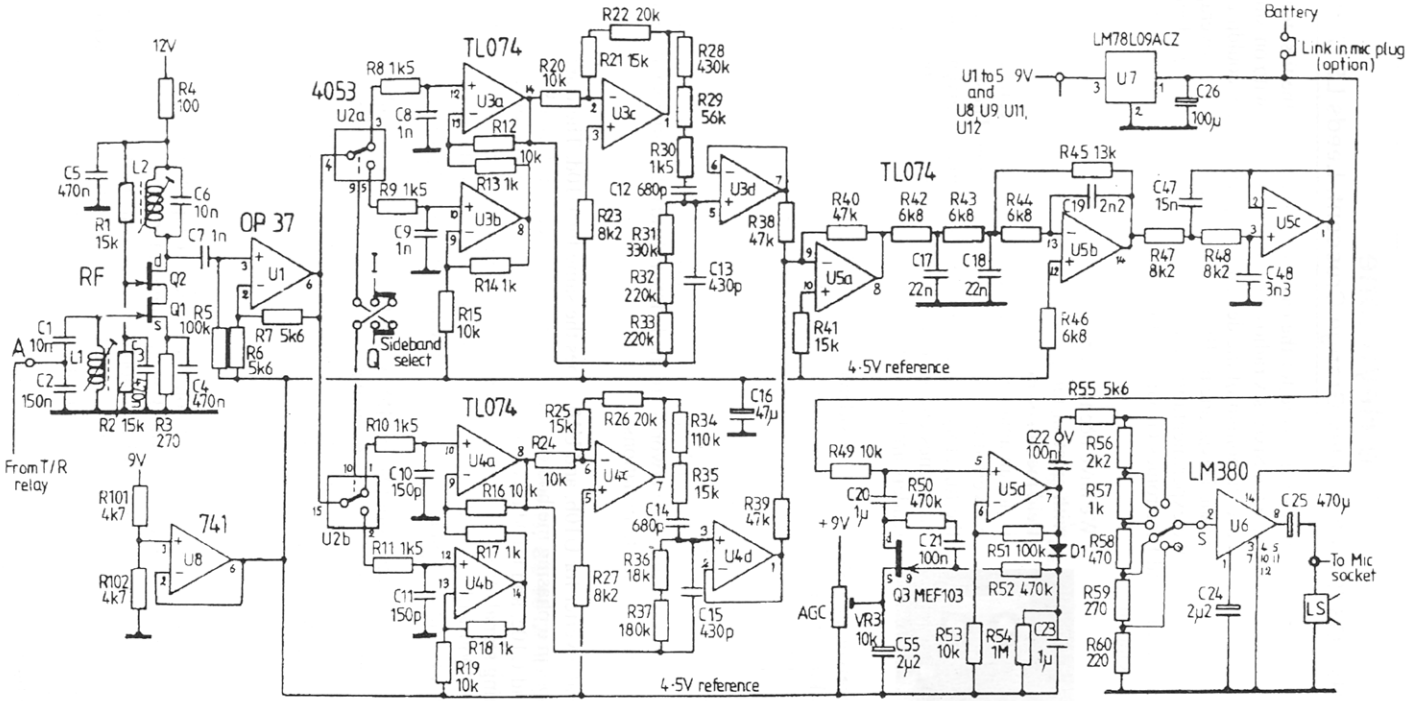
The transmitter/receiver uses SSB, the upper sideband being selected for compatibility with earlier cave radios.[4] Looking at the transmitter, most amateurs remark on the apparent simplicity – only one tuned circuit and a few op-amps. In band direct conversion is easy at 87kHz. A single op-amp U9a forms a mic amp. This is followed by a third order Butterworth low-pass filter U9b at about 2.6kHz to define the bandwidth. A 90deg audio phase shifter requires a low resistance drive in the ratio 3.5:1 and a very high resistance termination. The output of U9b drives the lower end of the network and U9c has the required gain of 3.5 to drive the upper part of the network. The strange values usually found in audio phasing networks are made from standard off-the-shelf values. U10b & U10d form the high resistance terminations.

U10a forms a signal inverter for U10b, and U10c does the same for U10d. There are two mixers or balanced modulators in a phasing method circuit U11a & U11b; sections U10a & U10b provide a p-p feed for U11a and U10c, and U10d drives U11b likewise. These electronic switches are fed with two digital switching signals from a crystal divider chain at 87kHz but with a phase difference of 90deg from U12, a 4060 with 5.568MHz crystal, and a 4013 which provides the 90deg bit. Carrier balance is done by varying the voltage on U10a & U10c non-inverting inputs.

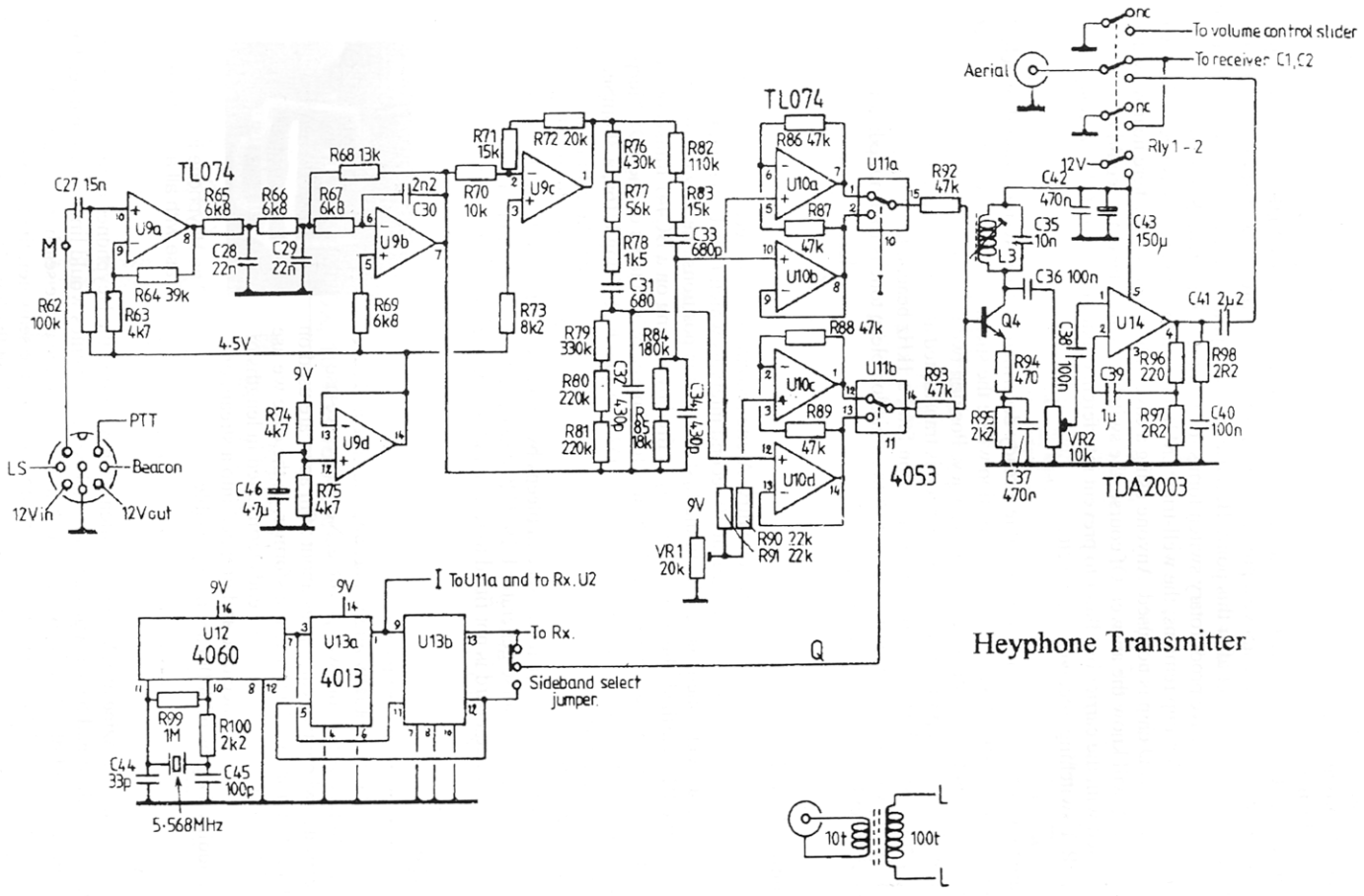
Signal combining is a single transistor Q4, BC458 with a tuned circuit in its collector. A degree of series feedback is applied, as there is lots of signal available, this improving the waveform. With a two-tone generator into the mic socket and a 'scope at Q4 collector, a text book waveform is seen. The PA is a car radio audio power amp TDA2003. VR2 adjusts the drive to just flat-topping at strong voice level.

The Receiver

The aerial couples into the first tuned circuit through a capacitive tap. A well-known cascode circuit forms the RF stage with a gain of just over 40dB, with a second tuned circuit in the drain. There are two mixers, U2a and U2b, whose injection I & Q come from the transmitter crystal chain. The balanced amplifiers U3a and U3b are fed from U2a & U4a, and U4b driven from mixer U2b. Because the switches spend half their time off in each leg, sample and hold components R8 to 11, and C8 to 11, hold the voltage till refreshed again on the next half cycle. As any two switch elements are on at a time, a buffer with a modest 6dB gain is interspersed between RF stage and the mixers to provide low resistance feed and good isolation from L2.



Heyphone Receiver



Heyphone Transmitter

The low resistance outputs of the mixer amps feed the lower end of the phase shift networks with U3c and U4c providing the x3.5 gain to feed the upper terminations. Signals are combined in the adder U5a which is followed by a third order Butterworth filter U5b and the second order Chebychev filter U5c. Audio AGC is generated where an amplifier with a 20dB gain has a rectifier D1 which switches on an FET above a pre-set level, this forming a divider with R49, the output remaining substantially level after this point. Because switched potentiometers readily available are rather fragile, a more cave proof rotary switch forms the volume control with R56 to 60.
Only the audio power amp remains; the well-tried LM380 is employed here. It has been asked why a more modern class D chip is not used. Anyone using a cave radio when somewhere nearby switches on a photoflash will know the answer. Of course, the switcher in the Class D IC could in theory be synchronised with the carrier oscillator to prevent interference, but this is a bit OTT. A relay provides R/T switching, receiver muting etc.

There are two user controls: the on/off volume already described, and the system control switch. A four position rotary switch selects firstly a position where the speaker is switched out, the receiver listened to through the microphone to allow privacy. Position two is normal operation with the speaker on. In the third position a confidence beep is transmitted at half-minute intervals to let the remote operator know he is not forgotten. In position four, a 1kHz beacon tome is transmitted continually. As well as these facilities, a start of transmission bleep tone is transmitted; at the end of transmission, an EOT bleep is transmitted.

The Control Board

A third printed board houses the control circuitry. A one second oscillator feeds both the beacon oscillator and a 4024 counter set to output at 30 second intervals which fires U16a and the transmitter with a bleep tone from U17c. In the first two switch positions, the 1Hz oscillator is killed. With the PTT earthed, the transmitter relay is fired by turning on a BC441 transistor. As D1 and D2 line is pulled low, a monostable U16b fires for 22mSec, which turns on the SOT bleep oscillator U17d As the PTT is released and the D1, D2 line goes high firing U16a, a 300mSec monostable which in turn causes U17 to generate a tone. At the same time, the gating circuit U15c ensures the transmitter is held on during the 300mSec tone burst. With the supply switched to U21, the tone oscillator is turned on at one-second bleeps by a connection from U17 to D8. An alternative to the beacon bleep is a Morse generator U19, U20 described long ago in Sprat. This circuit provided on the printed board is not fitted to rescue radios, these components omitted.

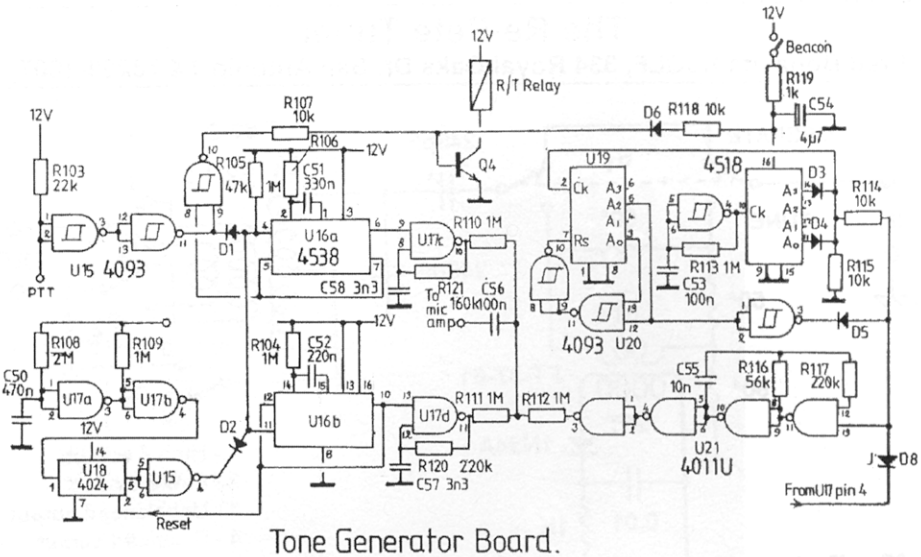
The Aerial

Traditionally a 1m diameter tuned loop was used as an aerial. These had to be fairly mutually aligned between surface and cave and a depth to just over 120m was possible. Nowadays we use earth electrodes where two earth pegs about 50m apart are used on the surface, fed from a 1:10 ferrite transformer. In the cave we use two similar electrodes but with their ends terminated in lengths of copper braid or electric fence tape and dropped into a stream or muddy puddles. Depths of 800m are now possible.

The Heyphone in PEL1 Case with all accessories

Late News

Since the various magazine articles were written we have tested the Heyphones in tin and copper mines in Cornwall. It had been suggested the metal bearing granites would limit performance. The radios worked splendidly. As a bit of fun after leaving a tin mine at the seashore, we threw the short electrodes into the sea. Due to the much lower impedance of the seawater, the transmitter complained, so we switched to the PL259 socket, that is without the transformer; a 5 and 9 contact!



Tone Generator Board.

Technical Figures:

Receiver – Bandwidth 2.6kHz, shape factor 2.42, consumption 60mA (idling, noise floor 0.07uV = 127dBm, useful sensitivity 1uV, minimum voltage 9V.

Transmitter – Power out 3.8 to 5W, consumption 150mA Idling) 250mA (average speech), SOR bleep 1946Hz 330mS, EOT & conf bleep 1620Hz 220mS, beacon 808Hz 1Hz rep, output resistance 0.5ohms.

References:

(1) Hey JR, RadCom July 2000, "Cave radio, the story so far"

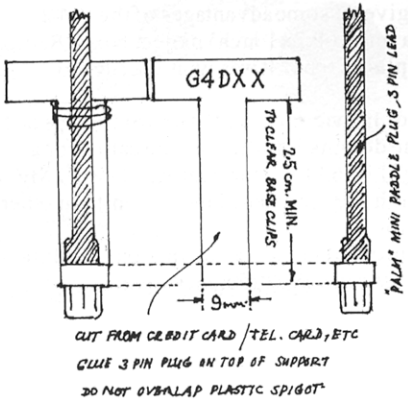
(2) Hey JR, CQ January 2001, "Cave radio in Britain"

(3) Bedford MD (Scheduled for January 2002), "The Heyphone to the rescue"

(4) The Molephone, a design by Bob Mackin of Lancaster University

Palm Mini-Paddle Plug Support

Ron Pratt G4DDX, 16 Thurlow Close, Stevenage. SG1 4SD



The Palm mini-paddle is a popular choice of key with the FT817.

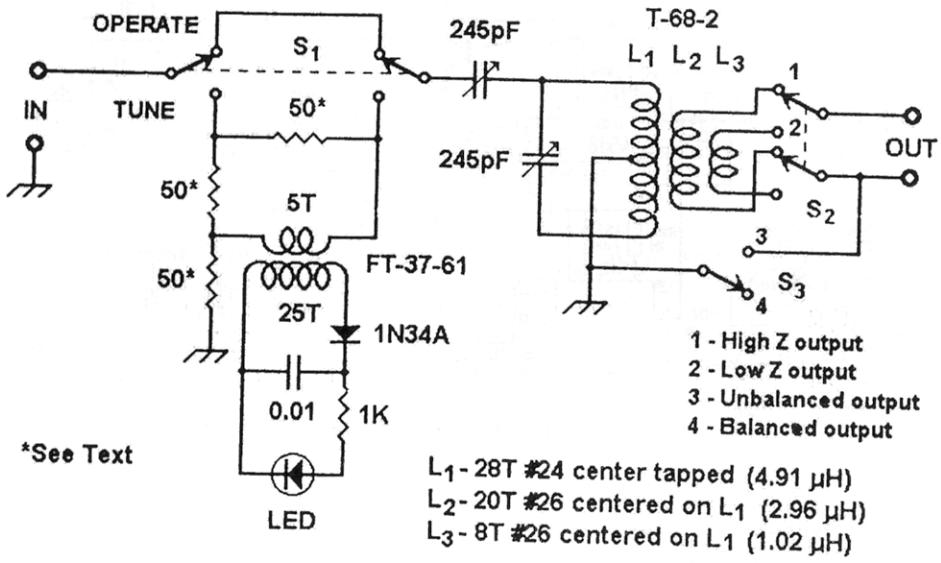
The plug to the FT817 can be difficult to insert and remove and wire can be detached by pulling the lead.

This little attachment is made from an old telephone, or credit, card. The paddle lead is attached using waxed whipping cord [I have this in my sailing gear] but other cord or PVC tape could be use.

The attachment makes the insertion and removal of the lead much easier with less danger of pulling out leads.

The Re-Pete Tuner

Fred Bonavita K5QLF, 334 Royal Oaks Dr. San Antonio,TX 78209-1607



When I found myself needing a small, Z-match tuner for portable work recently, I went digging in my collection of articles and came up with several possibilities. In no particular order, they are:

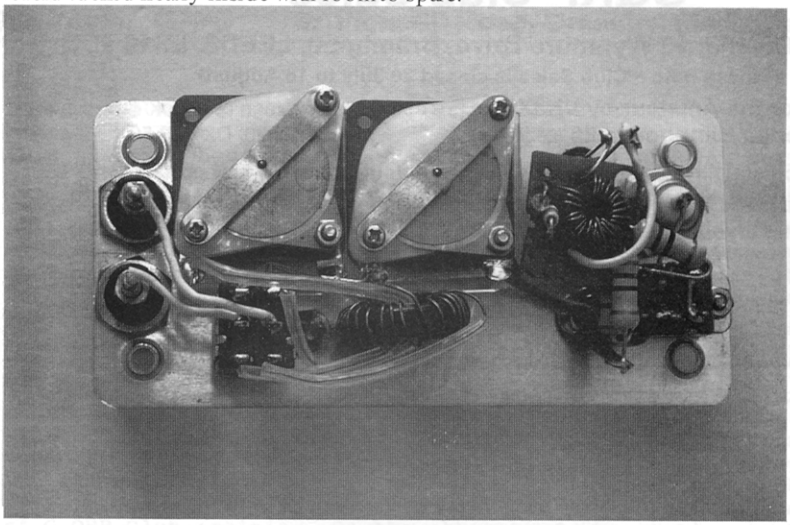
- "Charlie's Balanced Line QRP Tuner for 30/40 Meters," by Cam Hartford, N6GA, from QRPp, September 1994
- The W5JH Z-match tuner from www.swlink.nmet/~w5jh/zmatchsc.jpg
- The NorCal BLT tuner as adapted by Monty Northrop, N5FC, and found at www.io.com/com/~m5fc/blt_sch.jpg (There's an underline between blt and sch)
- "The ZM-40 – A Tiny QRP Antenna Tuner for 40Meters," by Pete Hoover, W6ZH. The QRP Quarterly, July 1998.

I have an EMTECH ZM-2 tuner, and while it is one of the best QRP Z-matches available, I wanted something even more compact. To get it, I was willing to give up some advantages of the ZM-2 (i.e., all-band capabilities). About the same time, I found a small (4x2x1 inch) project box at Radio Shack (270-1802, $2.29) that comes with aluminium and plastic tops. It was what I needed to house the tuner.

But those dimensions proved to be a two-edged sword, too. Its one-inch depth limited the size and number of components I could fit inside. While each of the designs I studied design called for a toroid core for the inductance, their sizes ranged from an FT114-63 to a more realistic T-68-2. My junk box yielded a pair of 250pF variable caps, and although they consumed more room than other components, they fit nicely. And I had a T-68-2 in house, too.

The design I wound up using was Pete Hoover's ZM-40, which led to my calling this the "Re-Pete Tuner." I claim no originality. All I have done is package his work in a different case and

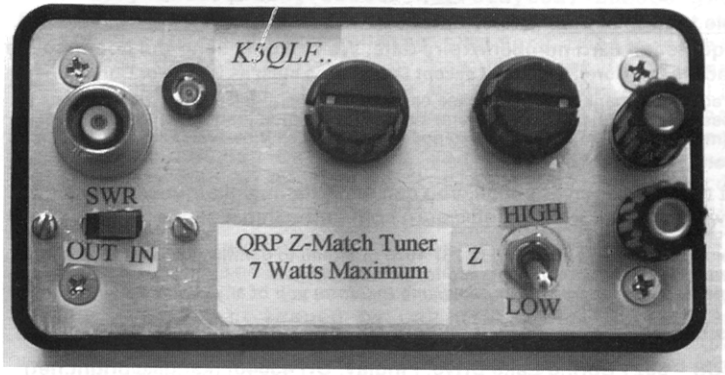
squeezed more bands out of it. The fact the ZM-40 used the T-68-2 was the winning element. That toroid tucked neatly inside with room to spare.



The components were mounted on the aluminium cover, which screws onto the plastic case. Despite every effort to get things to fit, even with the smaller toroid, the cover would not drop in place. I had to cut off two plastic ribs inside the case that support p-c boards. Using a chisel-pointed knife, I carefully shaved off the ribs flush with the wall of the case. The caps cleared the sides, and the cover fit perfectly. The SWR circuit was mounted on a scrap of RS p-c board (276-159).

While Pete designed the original to tune a 40-meter portable antenna, I got the Re-Pete to tune my portable KISS doublet on 40,30,20 and 17 meters. I thought it would work on 15m too, but that proved to be a little unstable. I also wired my version with a BNC connector on the input and only binding posts for balanced feeders on the output. There wasn't room on mine for a BNC connector for coax output, although Pete's version had that option.

Builders should read about the designs cited here, but the best article on this type of tuner is by Charlie Lofgren, W6JJZ, who is acknowledged as the guru of Z-matches. His piece on the Z-match in Volume 3 of the ARRL Antenna Compendium (1992) is a must. Charlie's influence can be found in all the designs considered for this tuner.



Photographs by Dave Gauding, NF0R

GQRP Club Sales

(For all items listed formerly from G3YCC)

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

(Please note – Club Sales is closed 20 July to 16 August)

Radio Projects for the Amateur by VK3XU. £6 (£7.50) } plus postage per book: UK - £1.25;
GQRP Club Antenna Handbook. £5 (£6.25) } EEC - £2.90; DX - £3.50

6 pole 9MHz SSB crystal filter 2.2kHz @ 6 dB, 500ohm in/out £12 (£14) } plus postage: UK - 50p;
6 pole 9MHz CW crystal filter 500Hz @ 6dB, 50ohm in/out £12 (£14) } EEC - 80p; DX - £1

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] £6 (£7) **pair** } plus postage
MC1350 at £2.25 (£3) **each; SA602AN at £1.75** (£2); } (any quantity)
IRF510 FETs £1.25 (£1.50) **each;** } UK - 30p; EEC -
3.579545MHz fund crystal 25p (30P) **each** } 40P; DX - 60p

[Special offer UK members only – the above crystals - 1 first class stamp each – no extra for postage!!!]

NJ-QRP Club pad cutters (Sprat 109) - £4.50 each inc post UK, £5.00 EEC & DX

SORRY – All 88mH toroids, LT700 transformers and the Mini Circuits TAK-893 mixers are now sold out I'm afraid, also, all kits previously advertised have now all gone.

NEW ITEMS:

Toroid cores – Available in packs of 5 – max of 2 packs of each per member
T37-2 – 65p; T37-6 – 75p; T50-2 – 75p; T50-6 – 90p; T37-43 – 65p
Plus postage – up to 5 packs = 30p (UK), 50p (EEC), 75p (DX) for up top 5 packs.
up to 10 packs = 60p (UK), £1 (EEC), £1.50 (DX) for 56 to 10 packs (max)

MK484 radio on a chip - £1.00 inc postage & circuit diagram.

Sprat on CD (1 to 109) - See separate advert in the magazine

G-QRP Club mouse mats

£3.50 each inc post UK
£4.00 each inc post EEC & DX

Back issues of SPRAT – 50p each. *At the time of printing, I have most issues from 78 (except 84)*
Plus postage (sorry about the large postage charges – posting magazines is not cheap nowadays!):
UK : 1st magazine 33p + 17p each extra magazine
EEC : 1st magazine 75p + 26p each extra magazine
DX : 1st magazine 115p + 50p each extra magazine

To keep within second class postage limits, all orders may be sent in more than one package!

Cheques (UK) and payable to G-QRP Club (cheques payable to me will be returned!)
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.

UK members only – to help reduce our bank charges, please can you use cheques/credit cards only for orders over £5. For orders less than £5 – please use postage stamps (any denomination 50p or less please), or uncrossed postal orders (more expensive for you due to poundage charges, however, £3.49 (for example) costs half as much as £3.50 and I won't complain!)

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 or e-mail to g3mfj@gqrp.com. Fax to the same number (by arrangement only). Prices in brackets are for non-members
If, with your order you give me an e-mail address, this allows me to inform you of any problems with supply.

North American members can order from me, but pay our US rep –

Bill Kelsey N8ET (Kanga US – 3521 Spring Lake Drive, Findlay, OH 45840) (kanga@bright.net)

ANTENNAS - ANECDOTES - AWARDS

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

DO WE NEED A QRP EXTRA MASTER AWARD ?

This question has been raised by Alan, MoAVN, who was admiited as QRP Master in March 2002, almost 23 years to the day after George,GM3OXX was admitted as QRP Master number 1. In considering this question let us go back and consider the original ideas behind the Award. In doing so we must remember that nowadays the number of active QRP stations has increased vastly over the 1979 figure, and the number of countries active on QRP has also increased. In considering the original requirements it was felt that 50 countries was not too difficult to achieve, but that the next 25 would be more difficult, so 75 would be a reasonable figure. Similar thinking applied to the requirement for contacts with 20 countries on two-way QRP. The number of members to be contacted presented greater difficulty. Contacts with 60 different members would not be too difficult for a station in Birmingham,England, but it would be a much more difficult achievement for a station in Birmingham, Alabana, a place much further away from the centre of G QRP Club activity. On the other hand the station in Alabama should not find it too difficult to meet the countries worked target. A further point in the thinking was that the operator with limited space and simple antennas must be able to meet the requirements. (indeed his achievement would be even greater than that of the man with a large antenna farm).So two points need to be resolved. They are (a) Is there a real demand for an Extra Master Award ? and (b) What should the requirements for qualifying for such an Award entail ? Please send your vote for or against suggestion (a) to G8PG at the address above. If yours is a "for" vote , any ideas you may have on the qualifying requirements for the Award should also be included. If the (a) vote is "yes" then we can put the matter to the other appropriate Committee members for discussion. As a footnote, only approximately six people per year reach the existing Master qualification standard.

BEATING THE BIG DRUM FOR QRP

In a very interesting letter Roy Clayton, 2Eo000 gives us further news about the exploits of 2Eo000 as a QRP demonstation station in the Scarborough area. Using the very sensible philosophy that practical demonstration is by far the best way to make people realise just what can be done using QRP, he has collected an array of awards which would impress even the most hardened "QRP is for the birds" critic of our approach to amateur radio. Apart from our own QRP Master and the Awards necessary to qualify for it, Ray can also display the ARRL QRP DXCC Award, and QRP WAC and 1000-miles-per-watt Awards from QRP ARCI. Ray points out that obtaining these Awards has not been without its problems, especially where the rare DX QRP station uses a QSL Manager, who often does not indicate on the card he sends what power was used by the station he is acting for. This invalidates the card for many if not all Awards issued by QRP Clubs and the ARRL.So once again we would plead for every QRP operator who sends a QSL to make sure that the power used is prominently displayed IN WATTS, and for QSL Managers to do the same.

AN 80 AND 40 METER END-FED ANTENNA

E.Voeller, DL2QA, Kielsbergstr 8, D-36251 Bad-Hersfeld, Germany

My 21 metre end-wire had given me good service on 40m for a long time, and it was almost invisible. My problem now was to modify it to also work well on 80 metres. Multi-band antennas like the W3DZZ or G5RV were not suitable, because the feeder would have caused an obstruction in my back yard. After a lot of trial and error the problem was solved in the following way. Adding an additional inductor to the existing matching system made it possible to resonate the existing antenna on 80m with an swr of 1.3-1 at 3550 kHz and 1.8-1 at 3500 and 3600 kHz. This was just what I wanted. Fig 1 shows the circuit details. It is mounted in a box made from copperclad material and measuring 7x6x3 inches which is mounted in the roof space adjacent to the point where the antenna wire enters the house. The antenna itself is taken up to the top of a TV mast about 27 feet above ground level, then slopes to the bottom of my back yard. Alignment of the system is simple. Connect a jumper wire between the points XX in Fig 1, then tune the capacitor at the antenna end of L1 for lowest swr on 40m. Then remove the jumper wire and tune the capacitor at the antenna end of L2 for lowest swr on 80m. Repeat the whole process several times to get the best low swr on both bands . Tuning should be carried out at low power, but once tuned 100 watts can be handled. L1 is 25 turns of 1mm diameter enamelled coper wire on a 40mm diameter former and L2 is is 18 turns of 1.5mm diameter diameter enamelled copper wire on a 30mm diameter former. For best results,especially on 80m, a good earth and/or counterpoise system should be used.

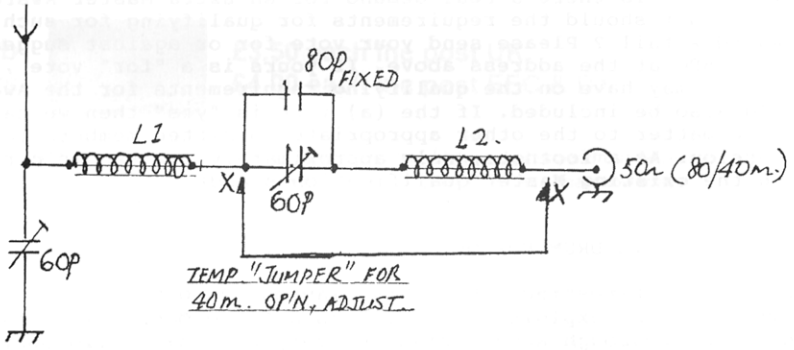


Fig. 1

ANNUAL AWARD OF OUR MAJOR TROPHIES

Our three major trophies have been awarded as follows.

THE G2NJ TROPHY. This has been awarded to Graham Firth, G3MFJ, our Club Records and Sales Manager. Even though our membership runs into thousands Graham does a great job keeping tabs on everyone, and we all benefit from his efforts. Congratulations !

THE SUFFOLK TROPHY goes to Richard Constantine, G3UGF, for his article "PSK-The new cw.....or maybe not ?" published in SPRAT No.106. A considerable number of QRP operators are experimenting with PSK, and Richard's article provides a useful and concise introduction to the mode. Congratulations !

THE PARTRIDGE TROPHY goes to Gerry Smith, ZB2GS, for his "Gibraltar Special" antenna design published in Sprat No.107. Capable of single or multi band vhf operation and adaptable also for hf , Gerry has used QRPpp to show just how this one can hit the DX on 144 MHz. Congratulations !

OPERATING AWARD NEWS.

QRP MASTER. Congratulatons to a record admission to the Worshipful Company in the shape of 2EoOOO, GMoBCA, MoAVN, DHoJAE, WE7G (ex-WJ7H), S53MA and RN3BC. Well done all !

QRP COUNTRIES. 100. PAoRZ, 2Eo000, DHoJAE, 75. RN3BC, GMoBCA, MoAVN. 50. GM4OSS . Late entry. 100. YO2VA.

WORKED G QRP CLUB. 580 G4NBI. 300 GM4OSS. 220 GW4MYY, DL1HTX. 140 GMoBCA. 80 GoKJK, MoAVN. 60 RN3BC, DHoJAE, S53MA.

TWO-WAY QRP. 100 GM3OXX (It's that man yet again !). 50. G4NBI, MoAVM. 30 GMoBCA. 20 WJ7H (now WE7G), DJoJAE, S53MA. 10 GW4SD), GoKJK.

Hearty congratulations to all the above.

NO-COST INSULATORS FOR LIGHT WEIGHT ANTENNAS.

It is very easy to make insulators for light weight portable antennas or "invisible" antennas used at difficult locations. All that is required are one or two of the transparent tops from tubs of margarine or butter, a strong pair of scissors and a bradawl. Use the scissors to cut an insulator of the shape and size you want from the tub top, then punch the required holes in it with the bradawl. The result is a no-cost insulator that can be made in about a minute. We have not tried it, but it ought to be possible to make much more heavy duty insulators by making several identical light weight insulators, then glueing them together using weatherproof adhesive just as several laminations of wood are glued together to make sheets of plywood . Such insulators should be much lighter than conventional pot or plastic insulators. If you try these ideas do please let AAA know how they worked for you. Also if you have any other antenna ideas that conserve materials which might otherwise be thrown away, please let us know about them as well

COMMUNICATIONS AND CONTESTS

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

CHELMSLEY TROPHY

My thanks to those who submitted an entry, detailing their year of QRP activity on the bands in 2001. John, **G0BXO**, had 1031 qso's (35 DXCC) and 113 QRP/QRP contacts with 26 different countries. Highlight of the year for him was the 3 qso's he had with D68C (on 12m, 15m and 17m). **AB8FJ**, Ted, had a whale of a time with a variety of rigs (including 300mW from a Norcal 38 Special, and 1.5 W from a Small Wonder Labs SW20+) working 31 DXCC countries, and notching up 17 QRP/QRP qso's. Ted's best Dx was also D68C, and best QRP/QRP Dx was a contact with LZ2RS (1W) on 20m.

Peter, **DJ0GD**, had 1771 qso's (165 DXCC) and 375 QRP/QRP contacts with 43 different countries. Peter stressed, however, that "QRP is for FUN, not just to get awards", but nevertheless his entry does earn him the Chelmsley Trophy. Many congratulations Peter.

CZEBRIS 2002

Disappointingly, only 5 entries this year, but it seems there was quite a lot of activity, and plenty of DX was worked. Thank you to **M0ANQ** (Ron), **GM4XQJ** (Brian), **G4MRH** (Ron), **G4MQC** (Stan) and **RW3AI** (Valery) for sending their logs. I should mention Stan's super QRP/QRP Dx contacts on 10m (with 4W from an Argosy into a W3EDP) which include 4X, JA, LU, PZ and VE. His overall score of 182 was excellent, but not quite enough to top Valery's score of 230. Valery used his IC706 at 5W with a delta loop, and ground plane, and (once again) and has submitted a huge log which makes him the Contest winner. Well done Valery.

YEOVIL QRP CONVENTION

Around 250 people attended the 2002 Convention, enjoying its friendly atmosphere and typically fine weather. The Somerset Morse Test Team tested 6 candidates at 5wpm (5 passes), and carried out 10 Foundation Morse Assessments for existing Class B licence holders. However, one of those was 'destroyed' because the candidate was persuaded to take the 5wpm test, and passed!

Construction Challenge: This interesting challenge (to build a VXO with a maximum of 15 components, to operate from 9 volts, with the maximum possible frequency range) had been suggested by **G3OFX**, and so when he arrived at the hall was immediately told that he was to be the adjudicator! There were 5 entries, and the results were as follows:

1st	G0UKB	Max freq. Swing	167.9	KHz.	(Wow!)
2nd	G3ESP	"	8.1	KHz	
3rd	G0OFX	"	4.3	KHz	
4th	G3PCJ	"	3.4	KHz	
5th	G3HDJ	"	3.0	KHz	

YEOVIL FUN RUN

31 QRP stations from 7 countries took part in the 2002 Fun Run, and there were 16 entries and one check log received by the Yeovil Club. The 80m winner was **GW4ALG** (600 points), the 40m winner was **G3BPM** (588 points), with the Both Bands winner being **G3BPM** with his combined total of 1058 points. A late entry was received from **PA3ADJ**, who would have won the 40m section (608), and the Both Bands section (1088), had his entry been received in time!

The certificate for the station consistently using the lowest power went to **G3NKS**, who used 1 watt throughout the Contest.

The committee of the Yeovil Amateur Radio Club would like to thank all those who helped to make the Fun Run a success again this year. They would also like to apologise that stations in the Yeovil area (including GB2LOW) had to close down early at about 2020z on 2nd April owing to the arrival of a rather fierce thunderstorm!

CROATIAN TELEGRAPHY CLUB

On the 12th December 2001. several active radio amateur old timers, lovers of telegraphy, founded the Croatian Telegraphy Club - CTC.

The new Club welcomes membership applications from telegraphy lovers from all parts of the world. The only requirement for prospective members of CTC is that CW should be their main (or only) mode of operation on the amateur bands. The only cost is 1 US dollar cash, or 1 IRC, as a contribution towards postage charges. However, if membership application is submitted by E-mail, then no fee is required. It is the Club's principle of supporting CW which is far more important than any financial consideration. In order to become a member of CTC, send your application, quoting call sign, date of birth and (where possible) E-mail address to :

Croatian Telegraphy Club
Franjevacka 5
42220 Novi Marof
Croatia (E-mail : 9a3fo@hi.hinet.hr)

If the application is by post please include 1 USD or 1 IRC to cover postage.

Rules of CTC are as follows :

1) CTC is an association with free membership for telegraphy lovers across the world.
2) The only requirement is that members be active radio amateur CW operators.
3) The aims of CTC are to support and promote CW as an active mode, to teach new telegraphy operators and to increase the numbers of CW operators on the amateur bands.
4) CTC will, from time to time, organise activity periods and contests.
5) CTC will have only a chairman and one secretary.
6) A membership number will be issued to every member, which they will be able to quote on QSL cards, letters etc.
7) The Club logo is an image of a hand key with the text "Croatian Telegraphy Club".
8) The CTC can have a stamp like an amblem. A rubber "CTC logo" stamp will be available to members.

9) Although there is no membership fee, voluntary contributions (towards the cost of organising activity periods, contests etc) can be made.
10) The 12th December 2001 is the inauguration date of CTC and on this date each year members can celebrate its "Birthday" by their activity on the CW section of the radio amateur bands.

QRSS QRPp(pp)
Here is a note from **ON5EX** about very low power activity, which might appeal to you if you are a regular Internet user. The interchange of ideas and skeds is carried out via (daily) emails:

Some amazing QRPp(pp) experiments are being run on 10MHz (and others) using microwatt power and QRSS (slow CW in the order of 10s per dot) between the USA and Europe, as well as interstate. We would very much welcome G QRP stations participating. There is a mailing list, just send an email to "qrss@cnts.be" for further information. This is a not a formal list, just a group of friendly hams fascinated to push the frontiers and wanting to discover new horizons. Any questions will be answered, even if it is "off-topic". 72/73, Johan **ON5EX**

QRP Dx NET
As I write this, **RV3GM** is trying to organise a QRP Dx net on 14060kHz, and is suggesting Saturdays 1000z and 2200z. It's very early days yet, and so I don't know how successful this will be.

I am deferring news of the recent Somerset Contest until the next issue of SPRAT, for which please send any contributions by the end of July. Summer is coming, so let's hear plenty of QRP /P activity from around the UK, and the globe. Have FUN!

72 de QRPeter

VHF MANAGER'S REPORT

John Beech G8SEQ, 124 Belgrave Road Wyken Coventry CV2 5BH
024 76 273190 & Fax: 024 76 272709
E-mail: john8seq@discover.co.uk; Packet: G8SEQ@GB7COV

A few editions ago I published some designs for turnstile antennas, which give omnidirectional horizontally polarized radiation patterns. One of them I called a quad turnstile because it used four crossed dipoles. However, L.B.Cebik W4RNL has published in May 2002 edition of QST a design for a quad turnstile. This uses two quad elements in an octahedral arrangement, but because of the way it is fed (at the corner of the loop), it is equivalent to a single pair of crossed dipoles and as such has inferior gain to the designs I offered. The only advantage it offers is a slightly simpler mechanical construction and can be made from wire. It also uses a length of RG63 125 ohm co-ax, which is not generally available in this country. Bob G4GEE has built & tested one, but had to resort to making his own twin feeder for the phasing section.

The original reason for making these omnis was to have an antenna, which would be useful in contests and avoided the complication of a rotator. It also stooped operators from twiddling the rotator when it wasn't necessary. They have also proved their worth at home on bands with low occupancy as the number of QSO's resulting from random CQ calls has improved.

People living on the edges of Britain may prefer a figure of eight pattern. This could be achieved by using two Yagis, pointing in opposite directions. But this may contravene the regulations in some restricted sections, which only allow one antenna. The solution to this is to use a bi-directional Yagi antenna. Instead of a reflector(s) behind the driven element, a set of directors is used. This could be the same number as at the front, making the radiation pattern symmetrical, or you could put less to give lower gain in the reverse direction and a wider beam width. Such an antenna would be particularly useful for a station on the East Coast who wants to beam at the continent and cover the UK as well.

As a starting point, you could take the hacksaw to your existing reflector and make it a director. This would reduce the forward gain slightly, but give you a sizeable lobe off the back of the beam. If you are one of these people who never beams north, you might just increase your chances of making more QSO's. Better still, if you are not restricted for antennas, build yourself an omni for your favourite band and keep the beam to wheedle out the really weak DX.

I have just scrapped my 6m beam and re-used the boom to re-build my 6m turnstile which was damaged in a storm, because the omni has more gain than the beam! Due to turning circle restrictions at the home QTH, the biggest beam I could put up was a 3 element Yagi (about 6dB). The omni has about 4 dB more gain than this.

Good DX & 73 de John G8SEQ/M3AGM

SSB & Data Report

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

Some nice reports this time, keep it up guys and gals

Carl Mason GW0VSW, managed to operate for a short time in the CQ WPX SSB Contest. Conditions on 40m were not good and only a few European stations were worked. Best DX included 20m - 9K9K, FM5GU, P40V and WP2Z. 15m - CN2R and D44TD. 10m - LU7FCV and ZV2V. Power output was 4-5 watts from my Ten Tec Argonaut 2 and the a.t.u. used was the MFJ-971. I have been using a new FT-817 for the past week and must say I am very impressed so far. Conditions on 20m this morning were very good and I managed to work VK4CEJ (Laidley, Queensland) using 5 watts into my Carolina Windom after one hour. He was working quite a pile-up. John was 59+ here and my report 43. I just need the QSL card to confirm another s.s.b. country!

Rado OM2ZZ wrote: I like CW a lot and there was WPX contest during the weekend the CW part of band was empty, so I tried SSB. first contact was with EA, than W, 5B4, VE, FM5... I really enjoyed this contest, and have worked over 150 QSOs with 5W with my Ten-Tec Corsair II. The highlights were: LR0N, D44TD, FM5GU, J6DX, YW4M, T93M/HI9, VE7AV.... man, it was really interesting for me, what can be done with indoor dipole

Alan G4KRN has been on 20m for the past couple of years with an MFJ9420 and had fun in the recent ARRL contest where non-US stations had to give their power out. His 5 watts confused many who expected nothing less than 100 watts. Alan is also looking forward to upgrading the computer for PSK soon.

Vic GW4JUN has been very active, a few more countries in the bag, 3V8BB, 0D5/OK1MU, 4X1VF, JI1KXL,, DU1IVT T77M, TA1D, and ZB2FX. During the Marconi 100 anniversary Vic fired up his K2 and worked 23 DXCC countries (12 new), 5 IOTA islands (4 new). After just 3 sessions with his new K2 he has bagged 44 DX countries and 15 IOTA islands. Well done Vic.

Ian G3ROO popped in to see me recently to show off his new kit to convert a Power meter to 'read' CW and PEP. Another great idea from Ian printed in Sprat 110. He is providing kits for this unit with a nice PCB and all 'on board' parts. Easy to build and works with the Stockton Power Meter from Kanga Products a treat.

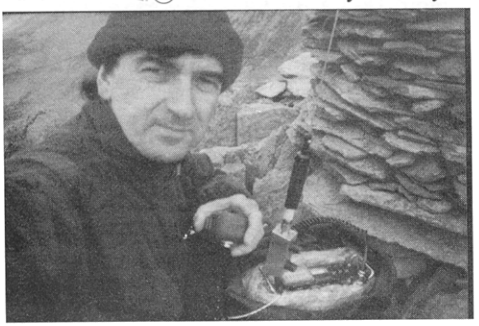
That's it for this time, news and views to me at home or via g0bps@gqrp.com.

MEMBERS' NEWS

by Chris Page G4BUE

Highcroft Farmhouse, Gay Street,
Pulborough, West Sussex RH20 2HJ.
Tel: 01798 815711 Fax: 01798 813054
E-mail: g4bue@adur-press.co.uk

FISTS CW Club have extended their annual Straight Key Week (SKW) to non-members. This is a leisurely relaxed event where QSOs need not be of the 'rubber stamp' variety if participants wish to chat and exchange more than the basic information. It runs from 0001z Sunday 16 June to 2359z Saturday 22 June 2002, exchange is RST / name / QTH / FISTS number (non-members, send NM) / day number (Sunday is day 1, Monday day 2, and so on up to Saturday day 7 (this allows working the same station on different days). Scoring is one point per station worked per day. Logs, to include date, call worked; RST; name; QTH; FISTS number (if not a member = NM); day number, and one vote for *Best Fist*, to Keith Farthing, **MØCLO**, 86, Coldnailhurst Avenue, Braintree, Essex, CM7 5PY, or by e-mail <Keith m0clo@hotmail.com> by 31 July.



G4FBC went backpacking in the Lake District on Good Friday and the picture below was taken at the summit of 'Skiddaw', 3000ft ASL. Ron used a FT-817 and ATX15 to work I, S, UR, SP and ES on SSB with 2.5W QRP before the freezing winds forced him to duck behind the summit cairn, his hands being too frozen to fiddle with the small control panel! He also used a ICZ-1E to work **GØMRL** and **EI2DJ**. Ron mentions the new Summits on the Air (SOTA), <www.sota.org.uk>, an award scheme along the lines of IOTA to promote backpacker radio operations. He would like to hear from members participating in the scheme (finebiz@kineone.net).

2E1LOK is now **M3LOK** and is QRV on 20m with a "badly cut dipole at 10ft in a shed (it's a big shed) and have been having nice QSOs to middle England and Europe". Nicholas hopes to have QSOs with club members soon. **CU2JL** was QRV with his homebrew QRP DSB rig on 17m from HI for 10 days in February. Bill used a dipole "that was strung a bit too close to the ground" and found that 1W was "a bit too QRPish for phone" and plans to increase it to 5W. Despite this, he worked LA, J3, PA, I and C6. New member **G4DMP** (previously **G3KEP**) went more or less QRT 26 years ago, disillusioned by the influx of black boxes. After building a K2, and more recently a K1, David has been inspired to be QRV again and most days is on 40 or 30m.

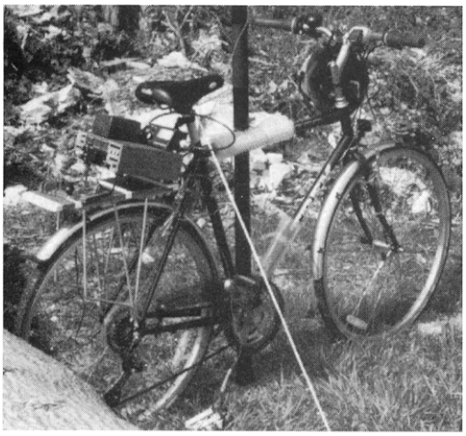
GØUKB "snagged 38 US States including two new ones (SD and MS)" in the ARRL Phone Contest. Brian now needs just seven States to complete his SSB WAS. He later worked H7DX for SSB DXCC 150 with his K2 and says his next target is 168 DXCC, "then I can say my K2 has worked half the world - I think the current DXCC count is 335". He is using a 102ft doublet at 32ft which recently replaced a 132ft Windom at 25 feet which broke in the winds. **G4PEO** worked 36 States (including CA, WA, OR and CO) in the contest on 10m with 5W and Jaybeam Minimax beam at 20ft. John found propagation to be excellent for the weekend.

MØCDP was QRV in the SSB WPX Contest with his FT-817 and worked VO1 and A61AJ (on the first call). Paul says "The

bands didn't seem great, certainly not when I had a sniff on the CW ends for a bit of sanity! I found SSB so noisy compared with the usual CW". **PE1MHO** says the latest version of his FT-817 Commander CAT software is available at <http://www.halpin.tomaatnet.nl>. At the beginning of April Peter said, "PSK31 Deluxe is coming along nicely, and Simon is planning to add the log option as soon as possible. PSK31 Deluxe will shortly be available as a stand-alone version for those who are FT-817 challenged".

G4EDG reports **ZK3HC** working into Europe in March around 14025kHz with 5W to a dipole. Steve worked him at 0835z. **G3XBM** says "I had my first 80m QSO last weekend with my *Poxie* - well it would be unkind to call it a real *Pixie* as it looks at total mess! Amazing that so few bits in such an untidy heap can communicate. The circuit was the *Pixie* TX and a discrete two transistor RX. Nothing new but certainly fun for me". Roger asks if anyone has got a "new, ultra-simple, one transistor transceiver circuit yet? Has anyone built the one in SPRAT a few issues back?".

GW4ALG says the arrival of the first 136kHz RSGB repeater in October 2001 "brought with it the expected bunch of pirates and 'lid' operators. So, after three years of LF experimentation, I decided that it was time to quit LF and spend more time on MF/HF QRP". Steve's first *bicycle portable* operation took place from on 4 April from Shirenewton, Cheshire, an uphill six mile ride from his QTH. "I set up my bicycle near a few logs that had been conveniently left on the ground as 'adventure radio operating chairs' and, from the seat post of the bicycle, I guyed the bike in an upright position. I assembled my **DK9SQ** 10 metre fibreglass pole and taped a length of wire to it. The pole was then erected, and the base section tied to the crossbar of the bike. The remainder of the station was quickly assembled on my mini operating desk, previously made to fit on the rear cycle rack and a couple of radials were added to reduce the earth losses. I was delighted to make my first *bicycle portable* QSO with new member **G3YMC** on 40m and then worked another ten stations on 40, 30 and 20m including members **G4IYC**, **G4JZO** and **F6CZC**".



If anyone attended the second EA-QRP Club meeting in Valencia, Spain on 11 May or the DL-QRP-AG meeting in Oer-Erkenschwick, Germany 31 May/2 June, I would appreciate any reports and photographs for the next SPRAT. "How about planning a trip to Pottenstein next year?" says **DL2BQD**. Dieter says, "I have just arrived home from our annual DL G-QRP meeting in Pottenstein. There were some interesting lessons as well as a bring-and-show afternoon full of practical ideas on rigs, ants, ATUs, PIC programming etc. We welcomed an HB friend and others from OE. The landscape is marvellous for a longer holiday, there are lots of B&Bs and Franken wine is without an earnest competitor!".

If you worked **II7GM** on 25 April, then you may have worked **I7CCF** who was at Felix's club on the QRP QRGs to mark Marconi's birthday anniversary. Congratulations to **GM6JAG** on his retirement on 28 June and also becoming **MM3AIM**. Mel will spend the winter in Spain to see if he will like living there permanently. **TK/F5MOG** was QRV 4/11 May with his K2 from EU-014, 104 and 164 and **FY/DJØPJ** was QRV again in May.

RV3GM built the NorCal-20 TCVR presented to him by **G3RJV** and says it works very good with 2W output. Despite his "piece of wire about five to six metres long out of a window to a nearby tree", one of Oleg's first two-way QRP QSOs was on

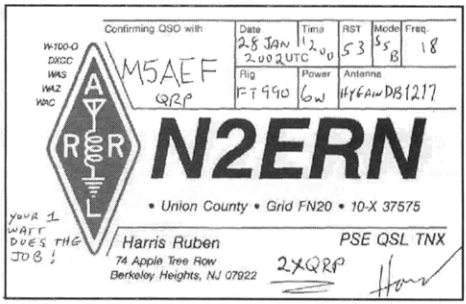
14060kHz with **JA1PA**. He is now regularly QRV on 14060kHz between 1800 and 1900z looking for members. New member **G3YMC** has used a K2 since Easter and says, "Not only has it completely cured my TVI problems, but I can work all the exotic DX just as easily with the K2 as I could with the FT-101ZD, and that's with only *a bit of string* 60ft long-wire, 76 countries so far, and rising". Dave will enter NFD with the K2 battery powered and says, "To me, the K2 and G-QRP is an eye opener. What a great bunch of amateurs are out there".

GØDZB has "just started playing with some homebrew kit again after a few years" and has built the AD9851 DDS with a pair of IRF510s driven hard in the PA followed by a bridge Tee diplexer and LPF and PIC 16F877 controlling the DDS, relay switching, side tone and reading frequency from the FRG-100 via a CAT interface. Peter says results are good on 80m but he was having problems driving the gates of the IRF510s on 40m. Changing them for VN88AFDs gave better results but the lower maximum drain voltage resulted in a few load *bangs* and dead devices, so he is keeping the supply to 25 volts which gives about 10W (at more than 75% efficiency).

G3XBM has been using his all discrete version of the Pixie on 80m and has now converted it for 15m. Roger hopes to work Europeans with it in the Sporadic-E season. He says, "I am still intrigued by the one transistor transceiver concept". **DL2BQD** has finished his SW40+ to use in Wales and North Yorkshire. Dieter wants "to climb Snowdon top and hope to be QRV from the summit between 7 and 18 July". **GM4XQJ** was QRV from EA8 with his FT-817 and dipoles for 10, 17, 15 and 20m Brian had the loan of a 'Miracle Whip' antenna "but found it to be next to useless!". He worked mostly around 28060kHz using the dipoles at a maximum height of 15ft AGL but only 60 feet from the sea. He was pleased to QSO members **EA8YU/P**, **G4MRH**, **GM4OSS**, **GWØVSW** and DX included 9L, 9M2, V5 and VK4. He will return in October.

G4PRL was QRV with 1W on 20m from CT in January/February with a MFJ Cub and a W9SCH loop antenna (SPRAT 60) with sides only 33 inches. Roy fixed the antenna "outside the shack window about 10ft AGL and bingo, first QSO with a QRP station in OZ". He then built the 4W JBS (SPRAT 97) and using the Cub as a receiver, worked **GM3OXX**, who designed the JBS, on 2 February. Roy's best two-way QRP QSO with 4W was with KØZK and with 1W was **VE3OXQ**. **G4GDR** would like to see some QRP activity on 160m and despite regularly calling CQ on 1843kHz, has only had one QSO, with **GW4ALG**. Adrian also calls CQ QRP on 144050kHz with little success from his Wiltshire QTH.

M5AEF has been concentrating virtually all his efforts on 17m with 1W from a FT-757 modified for QRP use to a "full wavelength dipole fed a quarter wavelength from one end with an extensive ground radial system" 5m high. Robin has worked 71 DXCC this year (including JA, ZL), 61 on SSB and 50 on CW.



G4EHT moved QTH in December to a bungalow with a small garden and has been using an indoor (in the loft) Z shape 48 feet doublet antenna with 300ohm feeder for his QRPing. Bill says, "I have been amazed and surprised at the performance of my indoor antenna and found my days of working DX are *not* over! I have even cracked the odd pile-up, including **KG4ZK** and **JT1BH**". Finally a plea from 82 year old **G3SOX** who says, "I thought before I get too old, I would try for a QRP award". So far Harry has been very disappointed with the return of QSL cards from members for QRP QSOs with his 5W to an inverted vee in Ramsgate, Kent. That clears the files once again. Please let me know how your summer goes, by 20 August please.

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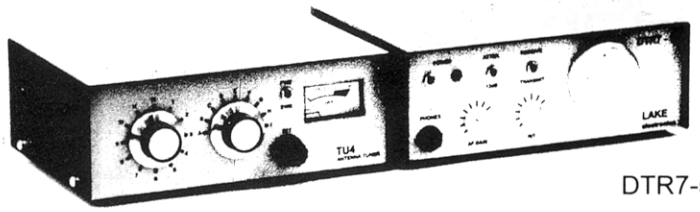

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