SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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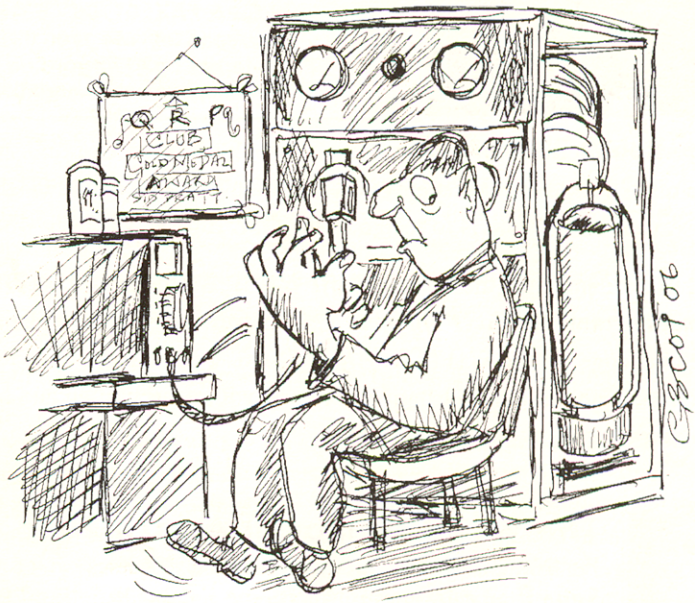

Two Tone Oscillator ~ Mods to the Cub ~ Russian Keyer
More 78 Regs ~ Balun Switcher ~ Ferrite Antenna
Photonic Orientation ~ 1 Chip 200mW TX ~ VFO Chirp
Lets Play Toroids ~ Slow Rotator ~ Pandora's Boxes
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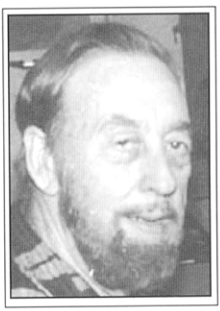
JOURNAL OF THE G QRP CLUB

St. Aidan's Vicarage,
498 Manchester Road
Rochdale, Lancs.
OL11 3HE. England
TEL & FAX: 01706 - 631812
(overseas tel: +44 1706 631812)
Internet : g3rjv@gqrp.co.uk
Homepage : www.gqrp.com

Rev. George Dobbs G3RJV

We have had quite a few officer changes in recent months. Sadly Bob, G4JFN, a long and faithful servant of the club, is to resign of the QSL Bureau Manager – See page 32.

I am pleased to announce that the winner of the W1FB Award for 2005 is **DF6MS** for his **"Universal Portable Receiver"** in issue 124. Oliver will receive a plaque shortly. Below is the challenge for the W1FB Trophy for 2006. I can handle most PC file formats for electronic submissions but I am also happy with hand written and hand drawn material for your SPRAT articles.



The W1FB Memorial Award 2006

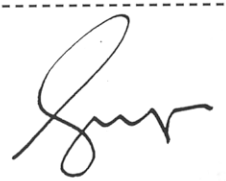
For 2006, the theme is **Shack Accessories**

Submit any design on this theme – those little [and large] useful extras that help to run your QRP station.

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

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

72/3



G3RJV

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A Two-Tone Oscillator for PA Testing

Dr Andrew Smith, G4OEP, 15 Dyrham Cl. Henleaze, Bristol, BS9 4TF
(aj-smith@uk2.net)

If you intend to make a SSB transmitter and put it on the air it is essential to ensure that it is set up correctly and is behaving linearly. If you neglect this you will almost certainly put out a very rough audio signal and attract comments that you are 'wide' or 'spattering'. A two-tone oscillator, used with an oscilloscope, can give a good visual indication of non-linear behaviour, and is a good signal source for routine testing and adjustment.

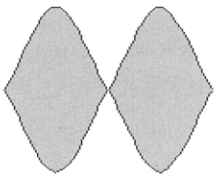


Fig 1a

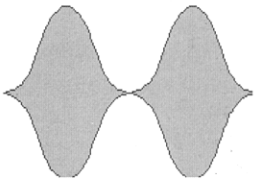


Fig 1b

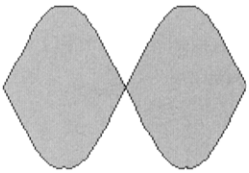
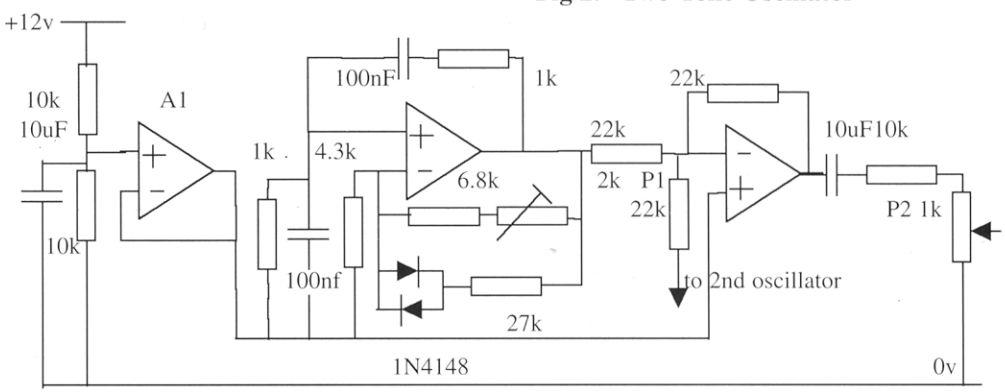


Fig 1c

Fig 1a shows a normal envelope waveform of a well-adjusted system. Note the sharp zero-crossing points of the envelope, and the rounded tops. Fig 1b shows crossover distortion caused by insufficient static anode current in a class AB amplifier. Fig 1c shows slight flat-topping caused by overdriving one or more stage. Carrier imbalance will also show up as a non-zero envelope at the crossing point (not illustrated). The PEP output power of these waveforms can be calculated in the usual way ($V_{pk}^2/2R_{load}$), but the average power in Fig 1 is only half that delivered by a CW tone of the same amplitude, so a 2-tone signal used for tuning or PEP testing causes less PA heating.

To produce these waveforms it is necessary to feed two equal-amplitude audio tones at different frequencies into the microphone input, and observe the rf output from the PA. Fig 2 shows a suitable circuit using a TL084 quad op-amp in a Wien-bridge oscillator. P1 is adjusted to equalise the amplitudes of the two tones, while P2 reduces the output to suit a mic input. Only one oscillator is shown; the other is identical except that the capacitors are 150nF and P1 is replaced by a fixed 1.5k resistor. A1 provides a bias common to both.

Fig 2. Two-Tone Oscillator



Modification of the MFJ CUB - 40m

Daniel Savel, F5ITU, 20 Rue du Prof. Patel, 69009 LYON. France

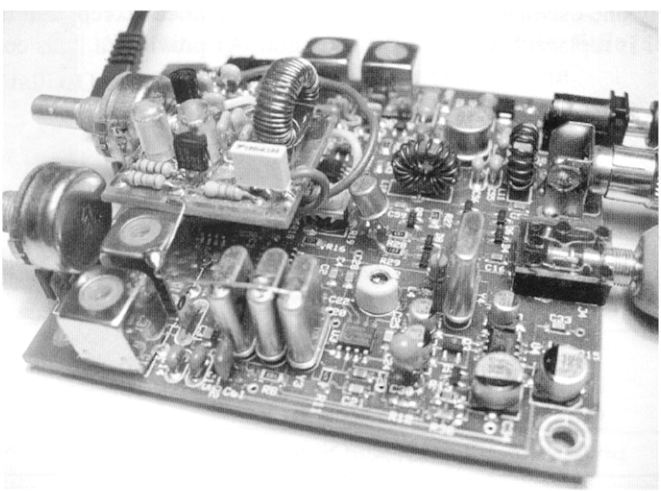
Several years ago, I bought a MFJ-CUB 40m. Quickly, I noticed that it had a serious drift problem.

I tried several ideas given on the Internet but I didn't succeed to correct the problem despite much time spent ... The CUB remained several years on the shelf until I decided to try something else...before throwing it in the dustbin !

The frequency of the VFO seemed to me too high. I thought also that it was daring to use the NE602 as VFO. I decided to build a separate VFO, running at a lower frequency (near 2 MHz).

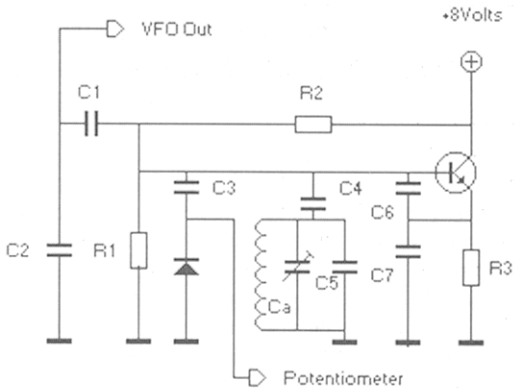
Obviously, I had to change the frequency of the I.F filter. I choose 4.9152 MHz because I had a lot of crystals in my shack. As I went on, I decided to solve some problems such a very low sidetone, some clicks and a bad sound, terrible for my poor ears...
Here is what I have done :

1 - Remove
L3-C9-C10-D2-C7-C6-C18-C19-C20-C21-Y1-Y2-Y3-Y4-Y5-L4-R3-R5-R30-C30
2 - Solder C18=C19=C20=C21 = 220pF
3 - Solder Y1=Y2=Y3=Y4=Y5= 4.9152 mHz
4 - Solder a wire as R5 and a wire as R3
5 - Solder a 47K as R30
6 - Solder 2.5 microH as L4
7 - Solder 4.7 MF tant. as C30
The separate VFO is on a piece of engraved copper clad board. The components are Soldered either as dead bug style, or as Manhattan wiring.
I was inspired by the VFO of the SW40 which has a very good stability.



C1=C5=10pF
C2=300Pf
C3=100Pf
C4=3300Pf

C6=C7=2700Pf
Ca=40Pf
R1=22K
R2=47K
R3=2.2K
Diode BB112
Tr=2N4401
L=6.4µH = T50-2 36 turns

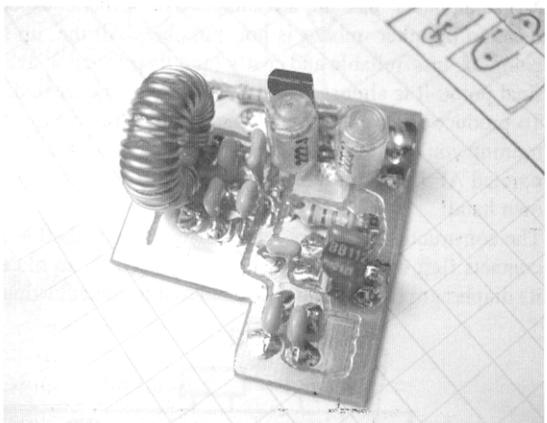


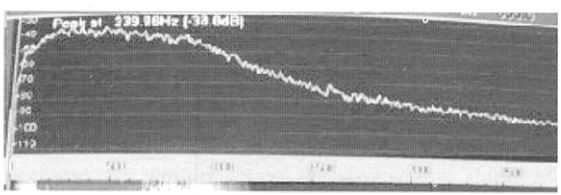
I think that if you dare to do that fix you don't need any help to adjust the rig.

The result is very good. The stability is excellent since, starting at the power on, the VFO decreases by 153 Hz the first ten minutes, by 58Hz the ten minutes following…and so on…

The volume of the sidetone is rather good and its sound pleasant.

I noticed that the higher level of the VFO had increased the power OUT. I'm able now to get a bit more than 2W.

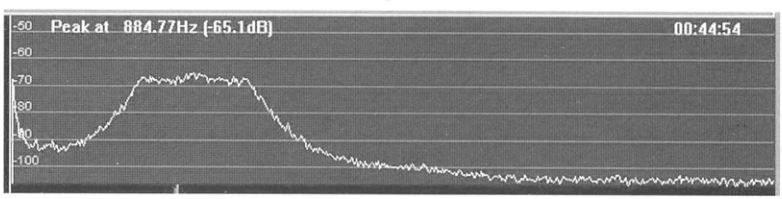




FI before and after the modification.

Before

After



Morse-keyer with AC-generator

Victor Besedin (UA9LAQ) 625015 P.O. Box 1310 Tyumen.
Russia ua9laq@mail.ru

In spite of the development of digital modes of amateur communication, still the old CW mode is great fun and there is a professional pride for those taking part. Knowing the Morse code alphabet means that you can work CW mode by hand and ear. You can receive and manipulate it according to the rules of the mode. With the help of CW you can make the longest range "man-made" QSOs. This most beloved "manual" mode of the great majority of hams is CW, my personal preference is for this ancient, simple and reliable mode - CW. So many unforgettable hours have been spent receiving the heart-touching signals on HF and VHF! If this mode is not to die it is up to us enthusiasts to encourage and prepare the new generation, and at the same time we can keep and improve our own traditional skills.

This simple project is devoted to all that are concerned with the great opportunity to be able to communicate by means of this universal language/mode, I refer to Morse/CW.
The reliability of Morse telegraphy is based upon simplicity: imagine you have a transmitter and you can send information simply by switching it on and off, the man who knows the Morse alphabet has an advantage over others, especially on various occasions, when communication by other modes is not possible. All the up-to-date modes make the equipment more complex, less reliable and costly (and therefore not available to many who would like to use it). One final point: it is almost as if the CW mode was created specially for QRP, do not forget it!
To produce all the equipment needed for a radio/Morse class there is a lot to do. But for individual training you can produce a keyer (Figure 1) that needs no external power supply or battery. The incorporated AF oscillator is all that is needed for training. All the energy needed you produce by your own hand!
The construction of the keyer consists of a standard Morse-key having a box as a base. The pair of contacts (left ones in Figure 1) are replaced by an old ear-phone insert (telephone magnetic insert): its diaphragm (at the centre) is soldered to the adjusting screw.

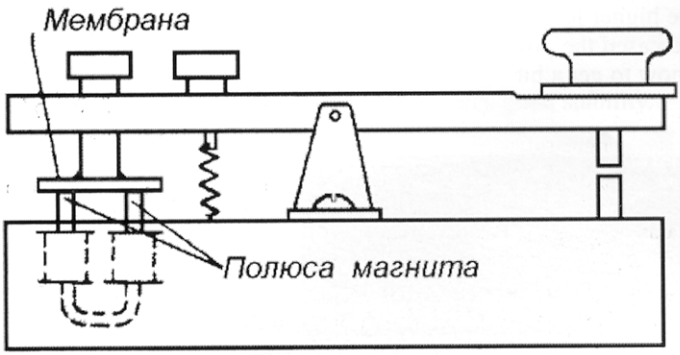


Figure 1. The CW-keyer – AC-generator.

Whilst operating the key the diaphragm is raised and lowered. The electro-magnetic system of the ear-phone produces AC electricity with a frequency of the manipulation of the key. The electrical current is taken from the coil terminations of the ear-phone to a diode rectifier and DC is created across the capacitor of the filter which is used here as an electric power accumulator. The power is fed then to the AF-oscillator as a supply voltage via the right

hand pair of the keyer contacts (Figure 1). The impedance of the coil of the electro-magnetic generator is low, around 65 to 130 Ohms.

The ear-phone (telephone) insert was removed from its housing with the diaphragm and installed into keyer's base through a suitable hole where it was fastened, with clamps and epoxy adhesive, axial to the adjusting screw. The diaphragm material is hard to solder, so cut a new diaphragm out of white iron (steel plated with solder – tinplate should do nicely - Ed) not less than 0.4 mm thick. The minimum diameter of the diaphragm must cover the magnetic poles plus a bit. The diaphragm must be strictly even and lie flat across the poles slightly spaced from touching them. To minimize the sticking effect put a thin piece of paper or scotch-brand film under the lower side of the diaphragm. Note: the thinner the layer the more power will be obtained from the AC generator.
If you push the keyer's knob you'll raise the diaphragm from the poles generating a pulse of electricity in one direction, lowering the diaphragm gives a pulse of electricity in the opposite direction – so, as you see, it is an AC generator. The frequency of the AC voltage depends on manipulation speed of the key.

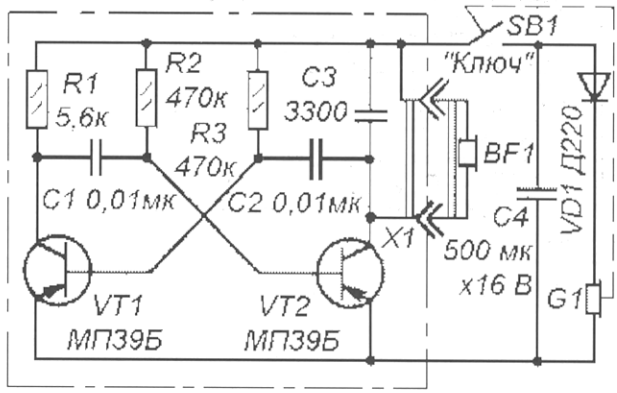


Figure 2. AC generator supplied AF-oscillator for Morse training purposes.

The AF oscillator (Figure 2) incorporates two germanium transistors VT1 and VT2, it represents by itself a symmetric multivibrator, its frequency depends on the values of R2, R3, C1, C2. The load of the AF oscillator is the high impedance ear-phones BF1 plugged into socket X1. Parallel to BF1 is soldered ?3 to make the sound softer. If you want to connect the AF oscillator output to an AF-amp put a 4.7 to 5.6 kOhm resistor across the pins of X1 instead of the ear-phones (a series DC blocking capacitor may also be required – Ed). Low impedance ear-phones can be connected to port X1 with a series connected resistor of 1 kOhm or more, but it will decrease the volume. Note: be aware some high impedance phones are produced from low impedance ones with serial connected resistors, such ear-phones will work but too quietly.
The supply voltage is fed to the AF oscillator via the pair of contacts SB1 on the key, the ear-phones will then produce sound at the set frequency.
The component values of the AF-oscillator have been selected for minimum current consumption. It can work at minimum supply voltages of 0.1 to 0.5V the consumption will then be 25 to 75 μA. The oscillator power is supplied from the AC-generator G1 which produces an AC voltage, this is fed to rectifying diode VD1, the resulting DC voltage is fed to the filter and accumulator capacitor C4. At the first touch C4 is empty and there will be no sound heard. Before

starting operation you have to manipulate the key quickly for some seconds to charge C4 then you'll operate as if your AF oscillator is supplied by a battery. Intensive operation gives supply voltages of 0.8 to 1.5V.

The AF oscillator uses old-fashioned Germanium transistors of p-n-p structure with the highest possible ?, if there is a possibility, choose transistors with minimum leakage from collector to base. VD1 must be as near to ideal as possible having the minimum forward and the maximum reverse resistance. It can be a low power RF or impulse type. The oxide capacitor C4 must be a low leakage one, use for instance a higher voltage or low leakage type. Other capacitors are ceramic or similar types. Resistors are ? or $^1/_8$ watt. Ear-phones are high impedance types 1600 to 2200Ohms with serial connection of the two halves. The supply power can be taken from other sources if needed (battery (it can be an old one), solar cell [ref.3], home-brew galvanic cell, mains regulated and so on).

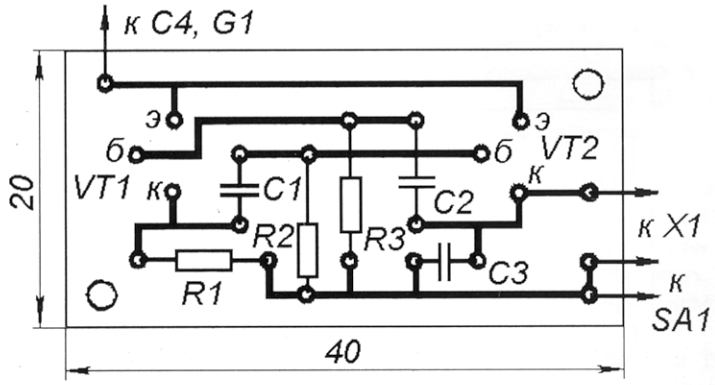


Figure 3. The board of AF-oscillator with parts' placement.

The parts of the AF-oscillator are mounted on the single sided PC-board (Figure 3). The board and other parts are mounted inside the base box of the keyer (Figure 4).

Start testing the keyer by charging the capacitor C4. Manipulate the keyer fast and measure the voltage on C4. Its value must be not less than 0.1V. If C4 takes too long to charge, change the polarity of the insert of AC generator, use C4 with smaller leakage, use better diode VD1 and adjust better the mechanical system of the AC generator.

The AF oscillator can be adjusted first separately supplied from a battery. If You want to change the tone-pitch change the values of C1 and C2 simultaneously. The values of R2 and R3 also change the tone-pitch but they also influence the consumption of the AF oscillator.

All the alternative supplying voltages are connected parallel to C4.

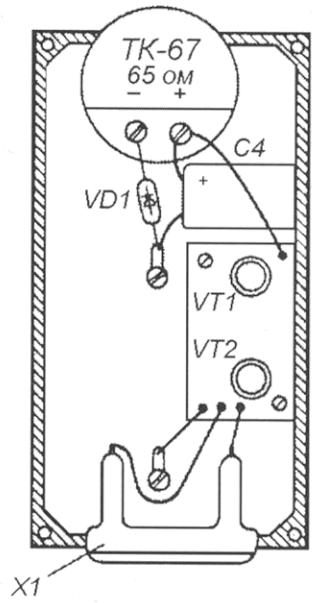


Figure 4. The lay-out inside the keyer base

The above mentioned keyer is useful for personal training. To maximize your results and for a team to receive training you can connect the AF oscillator's output to the input of an AF amplifier or use the alternative set mentioned below.
The set is based on the broadcast loudspeaker common to all who lived in USSR. Here is its schematic:

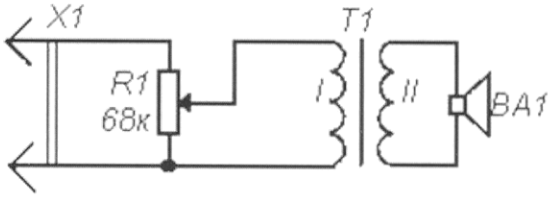


Figure 5. The loudspeaker for the wired broadcast line.

T1 is a step-down line transformer from 30V AF line to 12V loud speaker. (One powerful AF-amp was used to broadcast to all the population of the city via a wire net which took the signal to every loud speaker, as shown above schematically, situated in every house, kitchen or room, at working places – this is the Russian invention that is why such loud speakers are in common use here).

Of course, you could play recordings using a tape recorder or a PC program to give lessons in Morse. But there are cases where such equipment is not available. If there is a group of people who have a lot of time free and want to know Morse code, if one of them already knows it and can be the teacher the only equipment required is the small AF-oscillator as shown in Figure 6 and the keyer.

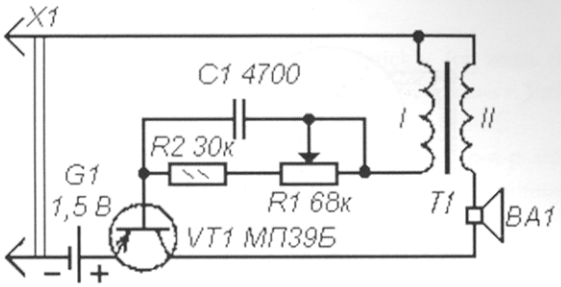


Figure 6. AF-oscillator for team training use, based on broadcast loud speaker

Add to the broadcast loud speaker one Germanium transistor (VT1), one resistor (R2), one capacitor (C1) and one battery and you'll get a loud-speaking AF oscillator sufficient for training a small audience (the team) (Figure 6). If you want to retain the function of the broadcast loud speaker, add a 3-way 2-position switch to the loud-speaking AF oscillator and you'll get something that is shown in schematic of Figure 7.

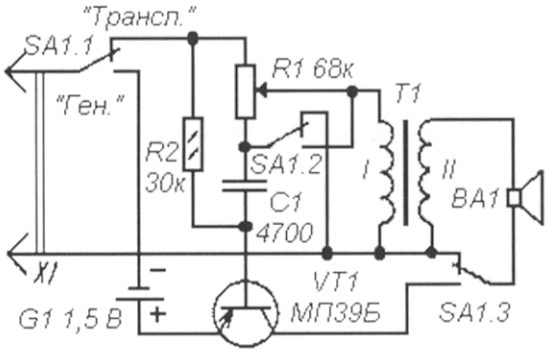


Figure 7. Universal combined AF oscillator – loud speaker for team training use.

As it can be seen from the schematic (Figure 5), the broadcast loud speaker consists of the loud speaker itself (BA1), step-down transformer (T1) and a pot (R1). The loud speaker is mounted in a box which has a connecting cable with plug to join the broadcast line. When used as AF-oscillator, the loud speaker standard cable is connected to the key and the pot (volume control) is used to control the tone-pitch. SA1 is shown in Figure 7 as switched to loud speaker. Oscillation occurs due to the positive feed-back from collector to base circuit of VT1 according to the polarity of T1 windings.

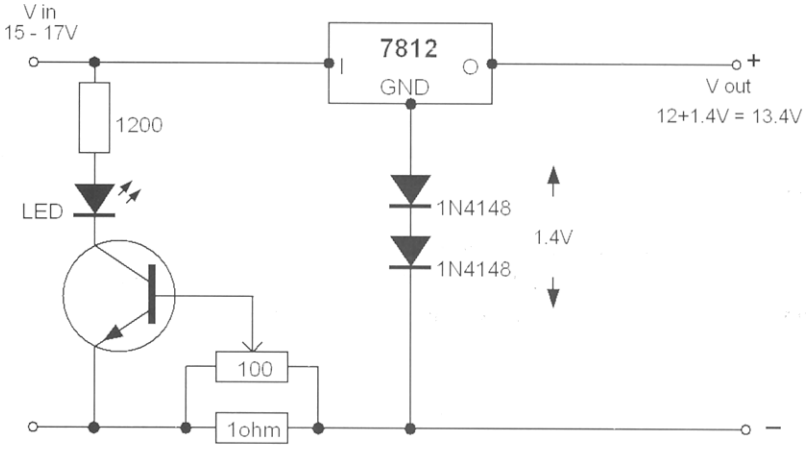
The system needs few adjustments. If you do not hear any tone from the loud speaker when all is OK and supply voltage is connected in the right polarity, change the polarity of one (either) of T1 windings. Various transformer types will function.

References:

1. В. Беседин. Путь в эфир. Радио № 12, 1995 г, стр. 36, 37.
2. В. Беседин. Телеграфный ключ с генератором переменного тока. Радиолюбитель № 12, 1992 г, стр. стр. 35.
3. В. Самелюк. Солнечная батарея. Радио № 12, 1982 г, стр. 49.

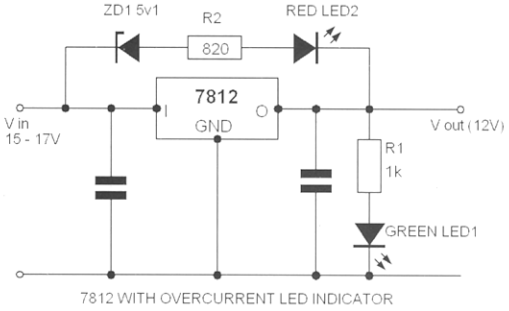
More on 78xx Regulator Circuits

Stef Niewiadomski & Frank Dinger GMØCSZ



Frank, GMØCSZ, contacted me to comment on the article by Stef in the last issue of SPRAT [pages 16 and 17].

He suggested the 13.4 volt circuit shown above. The over current level can be set by the 100 Ohms (or similar) trimpot at a current level slightly lower than the one whereby the 7812 Volt reg shuts down. For higher currents when employing a wrap-around power transistor the 1 Ohm resistor should be reduced such that the voltage across the resistor does not exceed 1 – 1.5 V at the set over-current level. With the 100 Ohms or about trimpot the over current can then still be set properly at the desired level. To make your own low value resistor for this purpose you can use a short (coiled) piece of (galvanized) steel wire and determine its resistance by allowing a fixed current (say 1 Ampere) through the wire and measure the voltage drop with a DVM. Galvanised wire can be readily tinned.



7812 WITH OVERCURRENT LED INDICATOR

Stef points out that Fig.2. in the last issue of SPRAT was incorrect. The diodes in the ground of the 7812 should be omitted [my fault – G3RJV]. The correct circuit is shown on the right.

Balun Switcher & Feeder Strapper

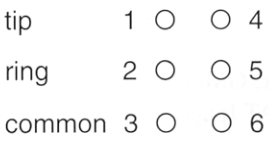
Ian Brown, G3TLH, 15 Juniper Close, Exeter, EX4 9JT

Most of my antennas have used balanced feeders of open wire or 300 ohm line. I have built and experimented with several types of ATU to feed these antennas. ATUs often incorporate a balun at the output to feed into the line.

This arrangement usually works well but sometimes the best way to match the antenna on a particular band is to switch out the balun and strap the feeders together. In most of my ATUs I incorporate the following circuit to make it easier to do.

Each ATU has an insulated ? inch stereo jack socket wired as shown.
An insulated jack plus with tip and ring shorted together is plugged in to disconnect the balun and strap the feeders. When the plug is out the balun is in circuit and connected in the usual way.

The jack socket has
6 connections on each side
looking at the underside from the front



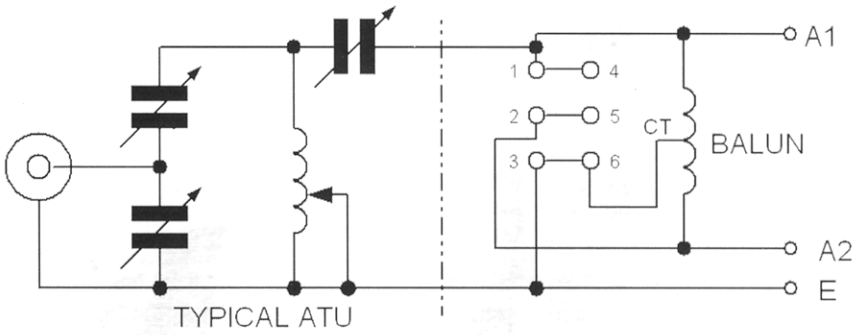
With the plug out 1 – 4, 2 – 5 and 3 – 6 are connected together. With the plug in the plug tip, ring and common connect to 1, 2 and 3 respectively and 1 – 4, 2 – 5 and 3 – 6 get disconnected.

Also the plug is wired to short tip and ring terminals 1 and 2 together.
This provides a convenient method of balun switching and feeder strapping simply by inserting the plug. Removing the plug reverts to normal operation with the balun in circuit.

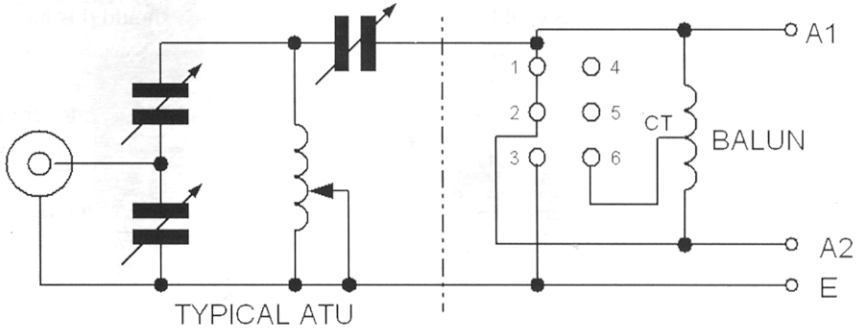
The circuits below show the wiring of the socket and connections to the ATU and balun with the plug out and with the plug inserted.

- With the plug out terminals A1 and A2 connect to the balanced line.
- With the plug in terminals A1 and A2w are shorted and the balanced feeders are strapped.

In this configuration the ATU may also be used with a single antenna connected to either A1 or A2.



Plug Out - Operation with Balun & Balanced Feeders



Plug In - Operation with Strapped Feeders - Balun out of circuit

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PCB Layout for GM0LLJ's Iambic Keyer

Derek Alexander G4GVM. 52, Brockington Road,
Bodenham. Hereford. HR1 3LP.

I was impressed by Bruce Burrows, GM0LLJ's, modifications in SPRAT 97 to DF1KY's circuit, which transformed it into an iambic keyer.

It worked so well when I made it up 'ugly' style that I was encouraged to produce a 'tidy' layout. As this was quite a struggle I thought the result might be useful to others – so here goes.

I usually design my layouts on _" squared paper (representing a .1" matrix) and use double sided board. This allows one side as an earth plane under the components and makes designing the layout easier, there being no difficulty with ground connections. Holes are spaced by multiples of .1". By using IC holders with unused pins removed, tracks can be routed under these blanks as well as enabling easy replacement of an IC, should this be necessary.

When designing a layout one tries very hard to avoid the need to use link wires, but here I had to enlist the use of twelve of them !

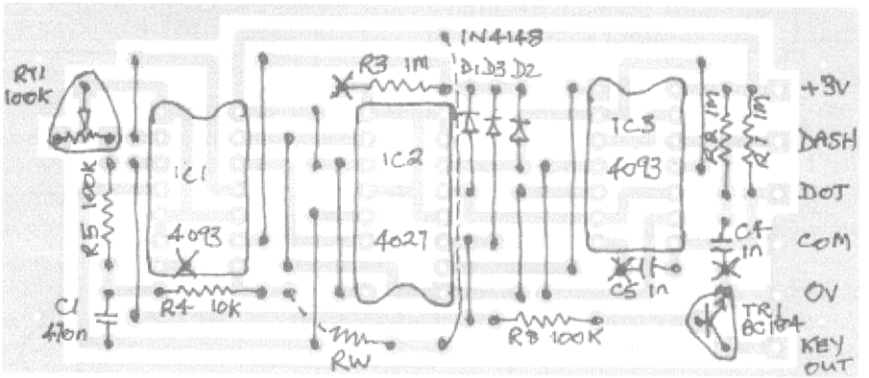
The trick when drilling is to mark all earthy holes on the track side first, drill all the others, countersink them on the ground plane side to avoid shorts and then drill the earthy holes. This means that all earthy holes are easily recognised on the ground plane – some of which will be soldered to a component lead in order to connect with the earth track under it - there are four of these on this layout (marked 'X'), one with just a short connecting wire under IC1.

The on-board speed trimmer may be replaced by a potentiometer, fitted elsewhere.
Speed can be set about 3-40 wpm.
The 3v supply can be from 2x AAA batteries or a zener if intended to be installed inside a rig, from the rig supply.

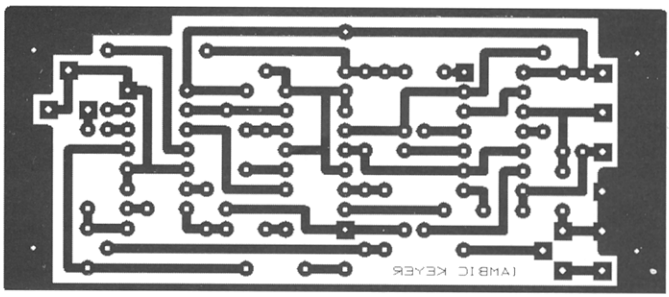
Current consumption is a mere 50 micro Amps. In use the external unit uses the same socket on the rig as the 'straight' key it replaces.

I have not included R9 and R10 and have omitted, but allowed for, RW. For these and more, I strongly recommend you read the SPRAT 97 article

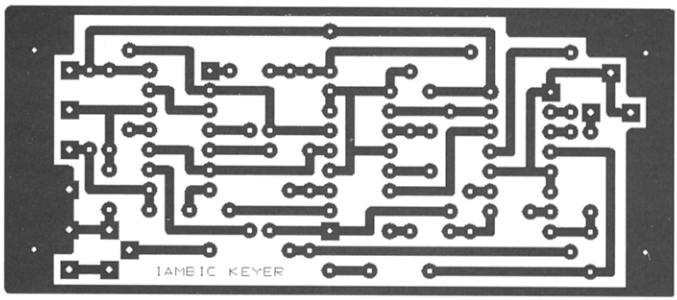
Iambic keyer Board Layout



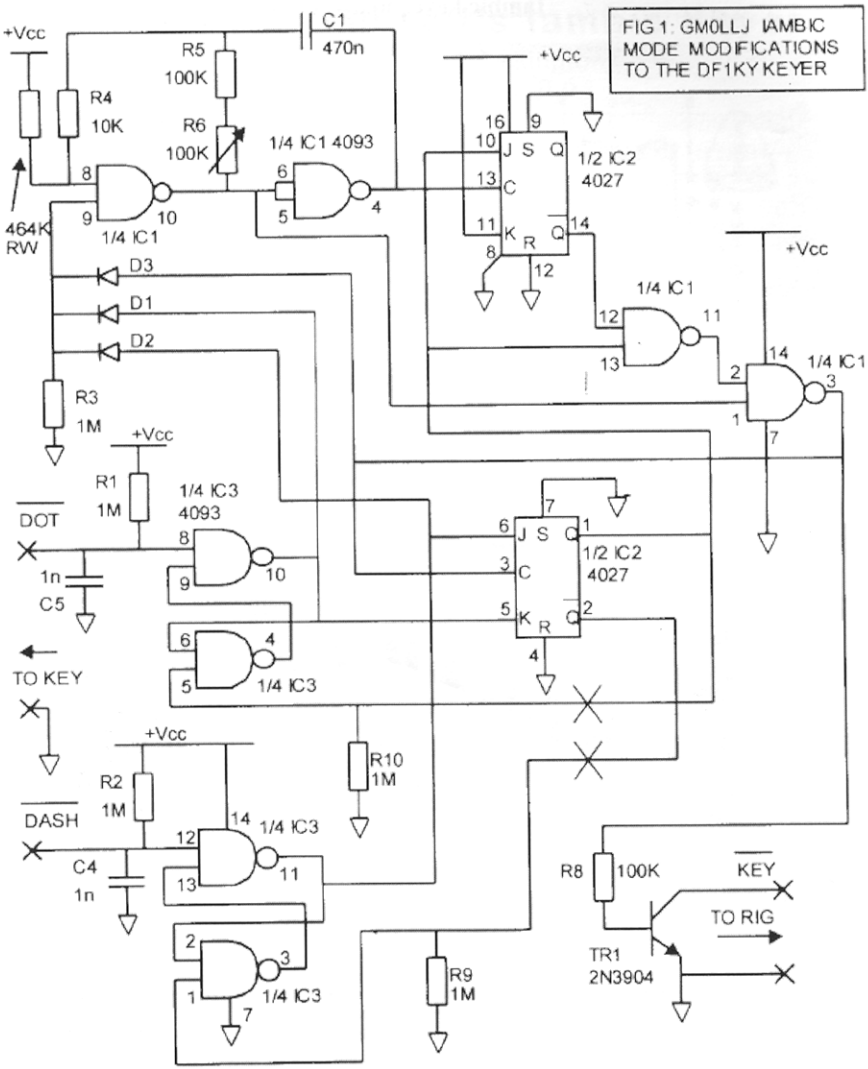
Component side – tracks seen through board



Component side - Actual size



Track side – Actual size



Component List

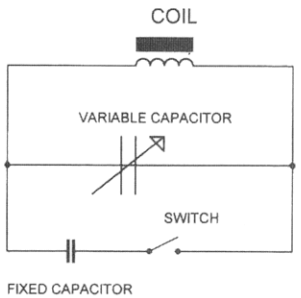
Resistors	Capacitors	Semi-conductors	Misc
10k - R4	C1 - 470n	BC184 - TR1	Double sided
100k – R5,8	C4 - 1n	1N4148 - D1,2,3	PCB 3.4" x 1.4"
1m - R1,2,3	C5 - 1n	4093 - IC1,3	IC Holders -
100k – RT1 (cermet)		4027 - IC2	2x14, 1x16

Ferrite Antenna for Medium Wave Broadcast Listening

Gianni Lorenzi IT9TZZ, Via Catania 16, I-98124 Messina,

I had the idea to make this antenna to use it with medium wave broadcast receiver with an internal ferrite antenna. It improves the receiver performance and allows reception of very low signals. For example, I've listened County Sound Radio (QTH London) transmitting with 750 W: good MW DX from Sicily!

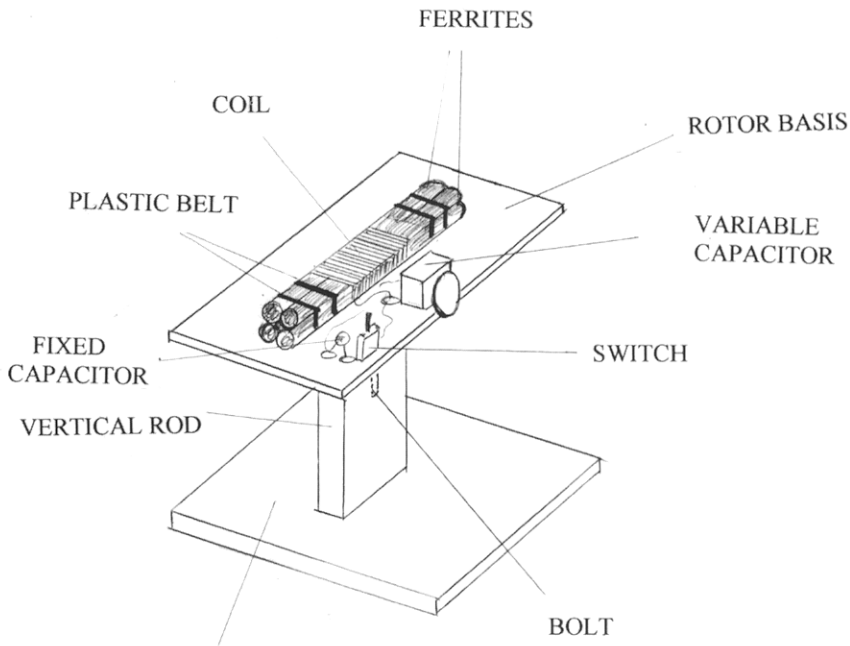
The construction is very easy and low cost. You need four ferrites taken from other medium wave receivers. Belt the ferrites and to fix them on the rotatable base of ply-wood. The base is able to rotate around a bolt over a vertical rod of wood (see drawing).



The inductor L is wrapped with 35 turns and soldered to a variable capacitor (also taken from a medium wave receiver). Capacitor value is 40-250 pF. With a miniature switch you can insert a fixed ceramic capacitor (330 pF) to cover the lower medium wave band portion < 900 kHz .

To cable the components on the ply-wood I used some drawing-pins. The antenna is made in 3 sections and very portable for vacation listening.

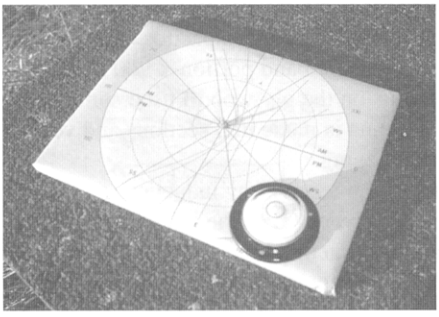
The signal is transfer to the receiver by induction: so please care to put the receiver near to the base rotor. Tune a weak signal with the receiver and tune the variable capacitor to observe an increase in receiving performance. Rotate the base for the best performance of the antenna.



Photonic Antenna Orientation Device

Tony Lymer GM0DHD, 16 Gerson Park, Greendykes Road, Broxburn, West Lothian, EH52 6PL. (tony@lymera.freeserve.co.uk .)

We all know how unreliable magnetic compasses are. The earth's magnetic poles are always moving around, and the magnetic polarity of the earth's magnet flips every now and again. They are also affected by nearby magnetic objects and electric currents. This compass allows a true N-S line to be found on any sunny day, in spite of magnetic variation or deviation, it is as accurate as you make it, and won't drain your batteries. Compasses similar to this were originally used by the Vikings more than a thousand years ago. British and American forces used sun compasses in the desert during WWII.



Instructions:

1. Photocopy the graph and glue or pin the copy onto a flat piece of wood about 6mm thick. (You can reduce or enlarge it.)
2. Knock a nail through the wood in the centre of the graph so that it is more-or-less perpendicular to the wood.
3. Cut off the nail so that the portion sticking out of the wood is the same length as one division on the radial scale, and sharpen the tip to a point with a file.
4. Bend the nail, if necessary, so that the tip is vertically above the centre of the graph, when looking down on the graph. (The tip is the only significant point on the gnomon.)

Of course, aluminium sheet can be used instead of wood for the base, and a screw instead of a nail allows the gnomon to be easily adjusted in length.

Using the orientation device:

On a sunny day....

1. Hold the base so that it is level. Several methods can be used to make it level: a bubble level, rolling ball bearing or gymbal arrangement or float the device in still water or you can try guessing! My bubble level was obtained from Maplin for less than £1.

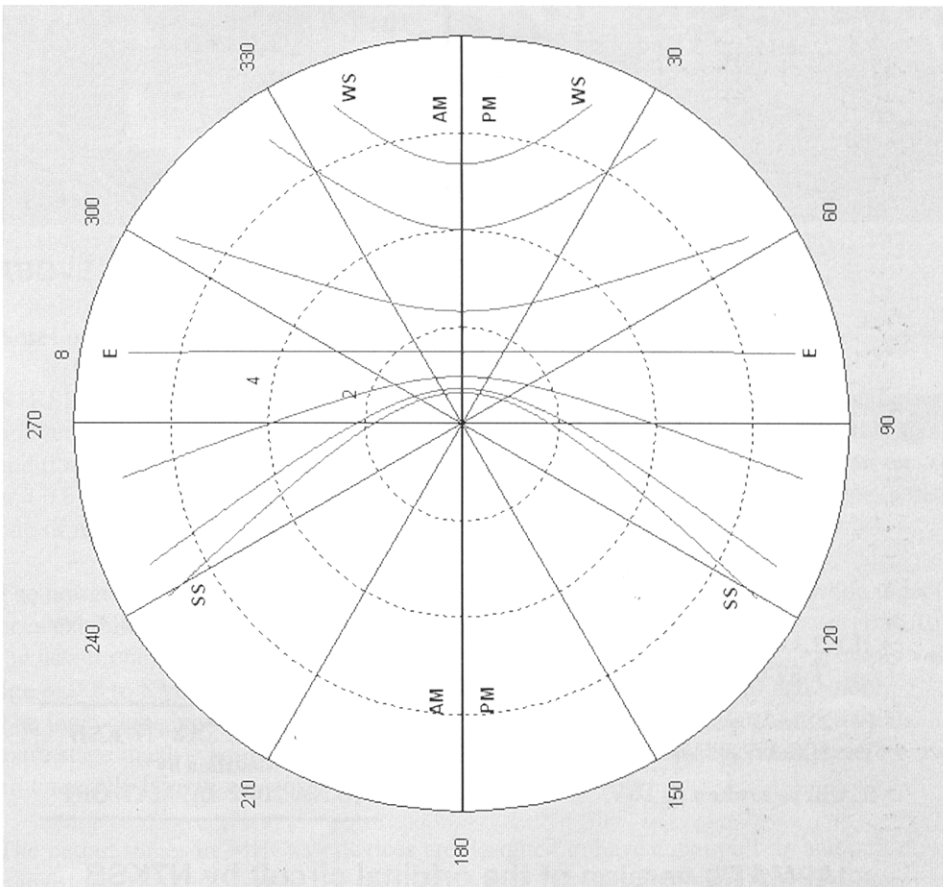
2. Determine if it is AM or PM.

3. Select the appropriate curve for the date nearest to the current date – the inner curve is for the Summer solstice and is marked SS. (21st June in northern hemisphere). The next curve is 21st July. The third is for 21st August and the straight line is for the equinox (21st September) and marked E. The next one is for 21st October then 21st November and finally 21st of December marked WS (winter solstice). The November line is used again in January, the October line in February and so on.

4. Rotate the device until the tip of the sun's shadow cast by the nail touches the appropriate curve, on the correct side of the curve, for morning or afternoon.
The 0 degree axis is now pointing to north. (Note that it is important to use the correct side of the curve for AM and PM.) .

For those not in the U.K.
The graph has been drawn for latitude 54 degrees N, but is satisfactory between about 49 and 59 degrees N, or S.

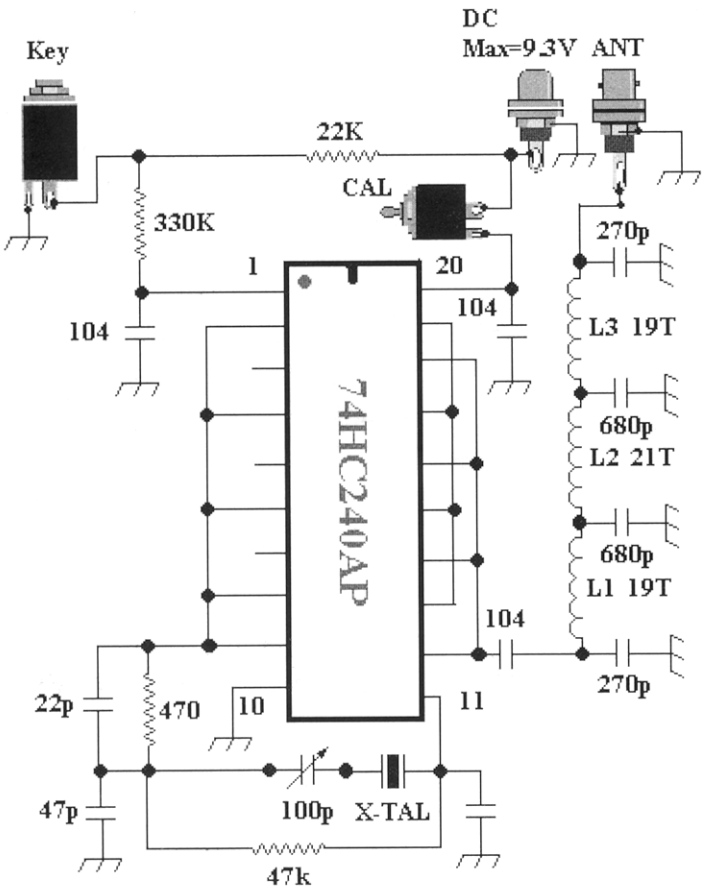
For those not in this latitude band, you can try making your own graph for the current month by using a blank piece of wood, and levelling it with, say, a bubble level, then marking the location tip of the sun's shadow over the day. The curve is a symmetrical. one, and the N-S line is found by bisecting the curve using a pair of compasses. This can also be calibrated in time.



74HC240 40m 1-Chip 200mW Transmitter

Hidehiko Komachi JA9MAT, 44-10 Ishize-Honmachi,
Takaoka City, TOYAMA. 933-0011. Japan. (ja9mat@jarl.com)

74HC240 40m 1-Chip 200mW Transmitter



* L1,2,3 = AMIDON
T-37-6 (YELLOW)

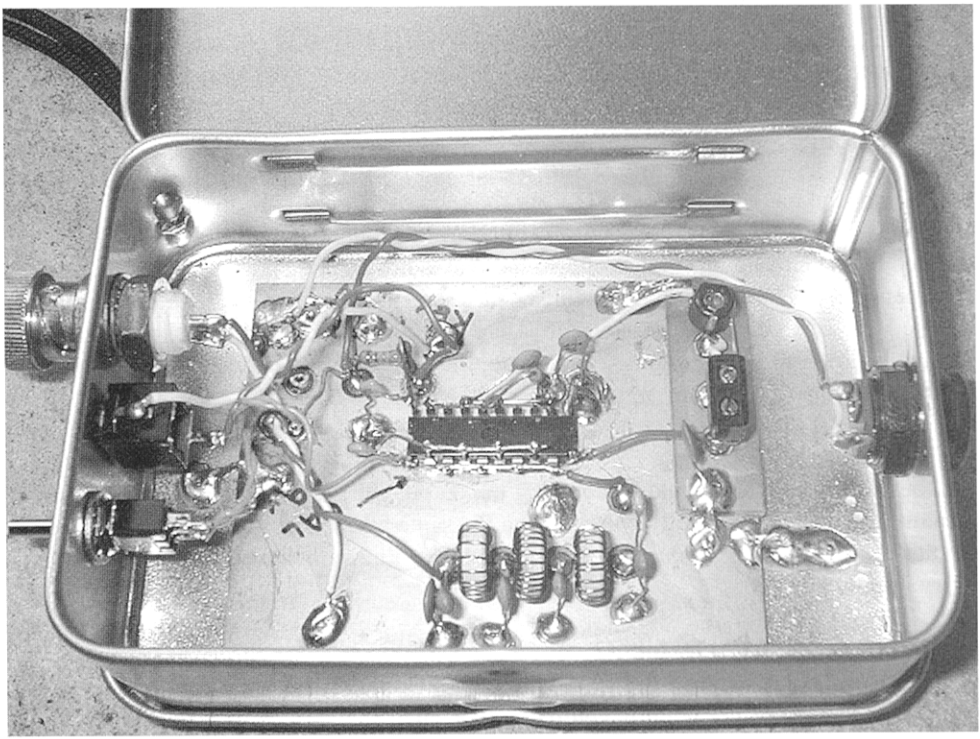
* Po=200mW@9Vdc,60mA (Pin=540mW)
Po=100mW@6Vdc,40mA(Pin=240mW)

* IC will be broken @ 10V

Original Circuit by N7KSB
Modified by
10,Nov.2002 JA9MAT/QRP

JA9MAT's version of the original circuit by N7KSB

(Note - the capacitor at pin 11 is 47pF)



ABOVE – THE JA9MAT TRANSMITTER

Notes on N7KSB original transmitter:

N7KSB's experimental CW transmitter uses a 74HC240 high-speed CMOS octal buffer, one section which serves as a crystal oscillator, four sections of which amplify this signal, and three sections of which are unused. Because the 74HC240 dissipates 1/2 watt on 20M and 0.9 watts on 10M, it must be heat-sunk. Epoxying the IC to the ground plane in dead-bug of ugly construction provides adequate cooling.

The newer 74HC240's available today show little power drop-off on 10M, while older ones exhibited a 20% power drop-off. The older 74HC240's can handle power up to 10V, the newer ones latch up at 9V. It is therefore important to operate the rig at a supply voltage of 7.8 to 8 volts, which is a compromise between maximum power and safety.
The logic chips have built-in input and output buffers. The extra gain provided by the extra stage make it harder to get rid of key clicks. The rig's key-click filter therefore uses an unusually large time constant (33 ms.)

The output stages in 74HCxxx devices are designed to have equal pull-up and pull-down transistors. This minimizes even-order harmonics, simplifying the rig's output filtering. The 74HC240 can directly drive a power MOSFET amplifier.

VFO Chirp Experiment

Gert de Gooijer PA3CRC, St. Adrianusstraat 81, 5614EN Eindhoven, pa3crc@PeopleSkills.nl

Chirp

Everyone who has ever built a VFO-CW-TX knows what chirp means. Many home-brew CW-rigs got this problem of frequnecy shift during keying the dots and dashes. It can be caused by the change in supply voltage, but that is not an issue anymore with all the inexpensive, easy to use voltage stabiliser IC´s around. Changing the load on the output of the VFO also gives a frequency shift. Here a good buffer should help. I preffer the grounded grid buffer (= grounded base, gate, ..). It gives very good isolation between in- and output. That´s why they´re so stable at vhf.

Shielding the VFO

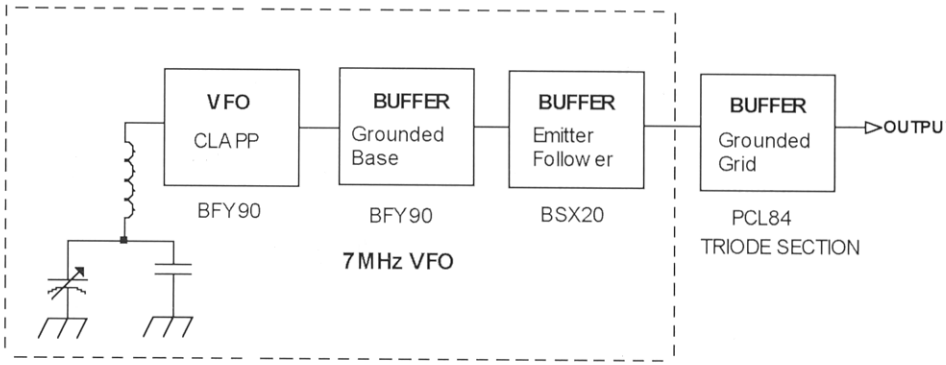
An other cause, I read, would be coupling the output RF-energy back into the resonant circuit of the VFO, especially when it is on the same frequency. Solutions are: frequency multiplication, mixing or extreemly good shielding. I never believed this shielding being very important....

Stubborn people learn by falling

I´m currently constructing a 7MHz tx with the VFO directly on the output frequency. The VFO was built, together with two buffers into a small shielding PCB enclosure. Main purpose of the box was ruggedness and keeping temperature changes outside. One side (below) was kept open since I wanted to build it on the chassis and shielding wasn´t that important, right? The VFO itself was a Clapp circuit, with output taken from the base of a BFY90. This is a low impedant point caused by the large shunt capaciters in the base/emittor divider. The VFO with two buffers was very stable (50Hz/hr) but when I touched the output it shifted some 150Hz. So I added a grounded grid triode, which gives very good isolation from load changes and some amplification too which I needed for driving the next valve anyway. But now on touching the output of this valve, the frequency moved even more! Amazement! Would it be true after all, shielding being that important? I was beginning to believe this, because now I had -1- higher power at the output, -2- more buffering and -3- still more shift. Connecting a small antenna, lead 5 cm long, at the variable capacitor of the VFO and putting this through a small hole out of the box even made the shift worse. This was enough proof for me. I was dealing with coupling output energy back into the VFO LC-circuit. Thus I mounted a bottom plate on the VFO compartment and connected the copper foils all arount to earth. Tried to "glue" every hole in the shield wit solder. This together with using feed-through capacitors and decoupling resistors on all DC-leads solved the problem.
Note that this chirp problem occured at very low output levels (some 30 mW) I hope the shielding will still be adequate when the signal is further amplified in the driver and the final. Note: The VFO itself is very stable, even hard-keying the VFO supply on/off will not give much chirp. It really looks like the electro-magnetic feedback that has the ill effect.

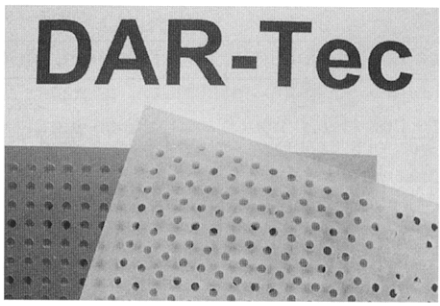
Conclusion

Well, I learned something... Extreemly good, air-tight shielding of the VFO compartiment really is important when the VFO is at the TX output frequency. All conductors entering the shield (including the shaft of the variable C!) should be at RF-gnd potential. So use a plastic/ceramic shaft and use feed-through capacitors and decoupling resistors on all DC leads. Use at least one well insulating buffer amplifier inside the box.



Shield - Box 70x55x95 mm double-sided PCB

All DC bypassed with feed-through C's



A company local to the G3RJV has begun to manufacture a range of Matrix Boards. DAR-Tec produce a plain 0.1" spaced matrix board (Perfboard) in two sizes and in translucent FR4 material. The also produce an interesting matrix board which is completely copper clad on one side. This is ideal for forming a ground-plane – remove the copper around the hole with a countersink drill for insulated entry or leave the copper in place for a ground connection.

DAR-Tec, 109 Mercer Crescent, Haslingden, Rossendale. BB4 4RL.
Tel/Fax 01706 215450. email sales@dar-tec.co.uk.

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

Or order via Ebay: search for "Matrix Boards". Ebay user name JAMSANDTHINGS.

FOR SALE: ATU (QRP up to 10w) £15, Morse Keyer £15, 2 Way Antenna Switch £10, prices include postage. Max, G3BSK, 0121 744 4671 (Birmingham)

FOR SALE: Copies of SPRAT, 67, 71, 74-90, 94-110, 113-125. £10 the lot. Collect or plus postage at cost. Max, G3BSK, 0121 744 4671 (Birmingham)

Lets Play Toroids

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

Lets play Toroids .

So you want a coil for the 80 Meter band, how many turns, what inductance are the first questions that come to mind and need not be a bugbear, we'll stick with the more common types used for rf work that's used in filters, tuned circuits and oscillators.

We need our coil to tune to 3.8MHz with a 100pf capacitor, we will avoid resonant and reactance formulas here we are only interested in toroids.

An 100pF capacitor at 3.5MHz would have a reactance of very nearly 420 ohms, since XC=XL at resonance our coil would also require an identical reactance,

since $L = \frac{XL \text{ (in ohms)}}{2\lambda f}$ we can solve for L the inductance required to give us our 420 ohm reactance, which works out as 17.6µH. Before we can start winding we need to know the AL (permeability) value of the core we wish to use, we will only consider the more common cores here but first we need to have some tables.

Core size (inches)	Green 41 – mix µ = 75	Red 2 – mix µ = 10 1 – 30 MHz	Yellow 6 – mix µ = 8 10 – 90 MHz
T-68	420	57	47
T-50	320	49	40
T-37	308	40	30

These are the most widely used in these pages. For our example we will use a Red T50 size core with a 2-mix, alias T50-2 the AL value is 49 taken from above.

No calculators – use too much power, slide rules only! The formula is-:

$$\text{Turns required} = 100 \sqrt{L\mu H \div AL} \quad \text{therefore}$$

$$17.6 \div 49 = 0.36 \qquad \sqrt{0.36} = 0.6 \times 100 = 60 \text{ turns}$$

So 60 turns on a T50-2 evenly wound would give us a 17.6uH inductor which would resonate on 3.5MHz with a 100pF capacitor by adding a 18/22pF variable the frequency could be varied down to 3.5MHz. The wire used is 36 SWG would just about fit on a T50 with 60 turns any thicker and you would have problems, better using a T68-6 and recalculating gives us 61 turns and 30SWG should be ideal.

Don't forget to wind the coils evenly no kinks or crossovers, a pass through the core counts as one turn.

For a VFO, say the electron-coupled oscillator we could tap the inductor a quarter way up (15 turns in our case) from the earthy end, or indeed use a 15 turn link, for the oscillator feedback tap, as well as adding or removing turns you can also adjust spacing of the windings to trim for exact coverage. The yellow 6-mix cores offer's better stability as oscillator coils over the Red 2-mix types, the 7- mix are even better if you can get them, these cores with polystyrene capacitors seem to aid stability.

For antenna coupling you could either tap about 4 turns from the earthy end or use a 4 turns of thin insulated wire over the earthy instead. Two of these coils 'top coupled' with a very low capacitor about 5pF would make a band-pass filter,

For cores above 63 mix, that is cores with mH per 1000 turns (we used cores with uH per 100 turns), simply use 1000 instead of the 100 in the equation, these have high permeability and are normally used in power applications, such as broadband amplifiers, LF chokes and LF filters etc.

Other inductances could be calculated using the example given, a full range of cores is available in various publications along with their AL value, these can be used in place of the usual Toko coils in many a circuit.

Knitting needles, wooden dowels and Toroids?
A range of inductances could be wound, the completed unit could be slid over a plastic knitting needle or wooden dowel and cemented, with a little ingenuity this could then be cemented inside or outside the cover on a 5 pin DIN plug or other means of mounting the plug onto the former, such as mounting the toroid over the cover a nick in the cover would allow connections to be made prior to fixing, even better is to mount them on a valve base plug such as a B9A, no doubt there are many other way's.

For reaction winding's one tenth of the total number of turns seems about right and being about 36 SWG on all ranges should suffice, this can be placed near the start of the earthy end, it may help if this is wound first and the main winding over the top and remember this winding has to be phased for it to work, simply keep all windings in the same direction.

And to wind up
With a 22pf fixed capacitor and a 100pf variable placed across the following coils you can expect the approximate coverage. The 22pf capacitor can be omitted (it will alter the coverage a little HF) or you can make it variable and used as band spread tuning.

Range	Coverage	L	Turns	Core	SWG
1	1.7 - 4.0 Mhz	70uH	111	T68-2	36
2	4.0 - 9.4 Mhz	13uH	48	T68-2	28 - 32
3	8.3- 19.0 Mhz	3 uH	25	T50-2	30 - 26
4	13.0 - 31 Mhz	1.2uH	15	T50-2	30 - 26

Suggested wire gauges, thicker wire can be used if a T68 is used
Ensure the windings are evenly spaced around the entire core.

TORIDAL TURN CHART

	GREEN			RED			YELLOW		
LuH	T37	T50	T68	T37	T50	T68	T37	T50	T68
1	6	6	5	16	14	13	18	16	15
5	13	13	11	35	32	30	41	35	33
10	18	18	15	50	45	42	58	50	46
15	22	22	19	62	55	51	71	62	56
20	25	25	22	70	64	59	82	70	65
25	28	28	24	79	74	66	91	71	73
30	31	31	27	87	78	72	100	87	80
35	34	33	29	93	84	78	108	93	86
40	36	35	31	100	90	84	115	100	92
45	38	38	33	106	96	90	122	106	96
50	40	40	35	112	101	94	129	112	103

Note. You can't have half turns on a core, therefore the numbers have been rounded off.

Tip for Slow CDE Autorotor

Bill Hickox, K5BDZ, 15710 Cannion Falls, Tomball, TX 77375. U S A

I find the most often claimed problem with any of the CDE rotors is the gradual S-L-O-W rotation, and finally NO rotation of the rotor, with no apparent visual problems etc. 99% of the time, the solution to the above problem is the AC electrolytic capacitor across the motor. Since AC electrolytic capacitors are often hard to find, I usually make my own by taking two DC electrolytic capacitors of 35 working volts or more, hopefully 100 MFD or more, and tie the negative leads together and use the positive leads as my capacitor leads for connecting to the rotor.

This not only solves the above problem, the higher capacitance "encourages" the rotor to turn a little more quickly.

This is a simple cure to a common problem with CDE rotors (and maybe others too).

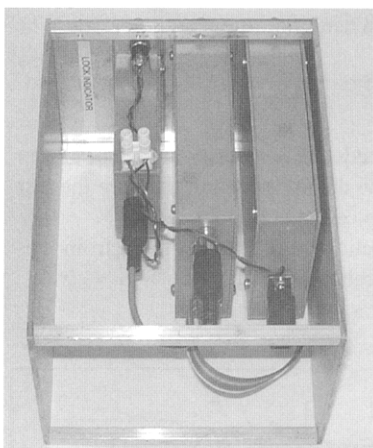
PANDORA'S BOXES

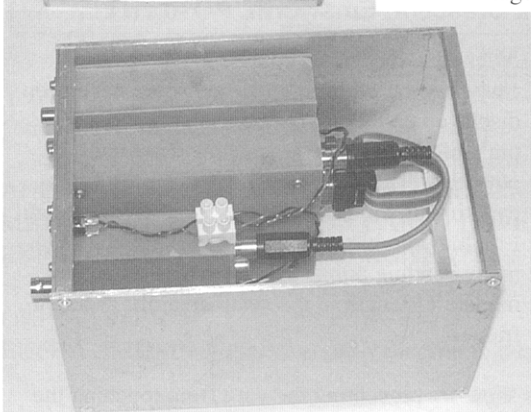
Anthony Langton, GM4HTU, 71 Gray Street, Aberdeen, AB10 6JD

I have always been an enthusiastic builder. Over the years I have found that the best chance of success comes with building projects in modular form. Each one can be designed, tested, documented and put away safely before the next one is started. However, this sometimes meant that there were many boxes of various types spread across the bench, coupled together with a maze of leads.

In an effort to keep things tidy, I tried building a project into a frame to keep everything together. This worked so well I have now started to develop it as my main method of construction.

The method I used was inspired by some of George Burt's, GM3OXX, designs; frames based on ? inch square aluminium rod and 1/8 inch aluminium plate. I just turned it through 90 degrees, so George's front and back became my left and right sides. When I told George I had pinched his idea he told me that he saw it in a 1936 magazine!





The photos show the general idea. If drilling the ends of the rods is a problem it would no doubt be possible to make something similar out of aluminium angle.

The boxes only have to be the same height: the width and depth can be adjusted as required, although for my latest project I have standardized on the width as well as it makes marking out repetitive and therefore easier.

The boxes are held into the frame with M2.5 screws and the lids are attached similarly. I have used various ways to secure the lids, the current favourite is ? inch brass bushes soldered into each corner of the box.

The photos show a 200kHz off-air frequency standard which uses long wave Radio 4.

Disadvantages are more construction and connectors are required. I use SRBP printed circuit board, and phono connectors work fairly well at low RF. Also, It is not the smallest way of building something.

Advantages are: good screening, manageable size, neat appearance, easy to make and inexpensive compared to boxes you buy. During development, the device can be built open-ended, leaving room for modules containing bits you have forgotten or suddenly thought of....

Internal construction can be done any way you choose: I have used ugly, Manhattan, New Jersey, stripboard, everything except beautifully crafted printed circuits. Once the lids are on, nobody knows what's inside. Except Pandora.

Membership Secretary News

Tony Fishpool – G4WIF

Please look carefully at your Sprat label. Does it at least say "2006"?
If it does not then this is your last Sprat unless you renew your subscription. As I process the standing orders I am seeing references that do not contain a membership number. In some cases I have been unable to identify who is sending us money. So if you pay this way or any other way and your Sprat Label hasn't been updated please contact me.

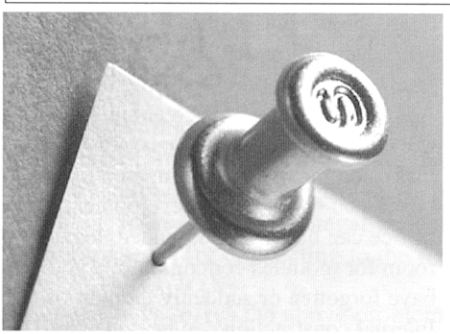
Many members have commented that their Sprat Label contained "Isle of Man" in the address and my thanks to those that took the trouble to write and tell me. The membership database has not been corrupted but it does appear to be something the distributors are doing with the file that I send them to make their labels. They have promised to correct the problem and I would appreciate you letting me know if they don't manage it. The other issue is one where two labels are being inserted into one envelope. Once again they have undertaken to fix this, but if it happens to you then do please let me know by email or post so I can send the Sprat to the person who does not get one as a consequence of their error.

Credit Cards and Club Transactions

In line with all other on-line ordering, the club bank now needs the 3 security digits for all credit card transactions. We are sure that everyone will know this by now, but they are the last three digits of a longer number printed on the signature strip of the credit card. The omission of these numbers will mean a delay to your transaction whilst we get them from you. Sorry - not our rules! [See note on Club Sales page] Graham, G3MFJ

The Map Pin

Laurie Booth G4XEC, 12 Park Crescent. Emsworth. PO10 7NT



After announcements concerning Feng Shui classes or car parking misdemeanours have been displayed on the office notice board, the map pin's life has usually reached its maximum potential. The usefulness of its features for experiment was not immediately recognised until I built a portable meander antenna which has many bending points along the wire to accommodate its length in the small area of a wooden frame.

The pin can be seen as a plastic insulator; its shoulder preventing the wire from touching the antenna framework, its top preventing it from slipping off.
The sharp hard steel shaft enters the wood easily, leaving only a small mark when removed as easily as it is pushed it.

ANTENNAS – ANECDOTES - AWARDS

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

A USEFUL SHORT SLOPER FOR 7 MHZ

A. Upton, G3UZU, 16 Robin Way, Woodchurch, Wirral, CH49 7NA

With a length of only 4.87 m and a counterpoise of the same length this antenna is ideal for restricted space and it has worked well, particularly as a sloper. It is shown in Fig. 1. The radiator is made from a length of slotted 300 ohm ribbon feeder, with the two conductors soldered together at the end. This joint should be weatherproofed. The tuner consists of coil L1 and capacitor C1. L1 is 20 turns of 16 swg wire spaced to occupy 80mm on a 2.5 cm diameter former.. The inner of the co-ax feeder from the rig is is soldered to the tenth turn .. Capacitor C1 is of 250 pf.. The components are mounted on a piece of printed circuit board of suitable size, and this in turn is mounted in a plastic food container with all the holes for input and exit wires sealed with glue. With the component values shown the antenna will also resonate on 3.5 MHz, but on air tests have not been made on this band.
(This one would also seem to have possibilities for /P work. G8PG)

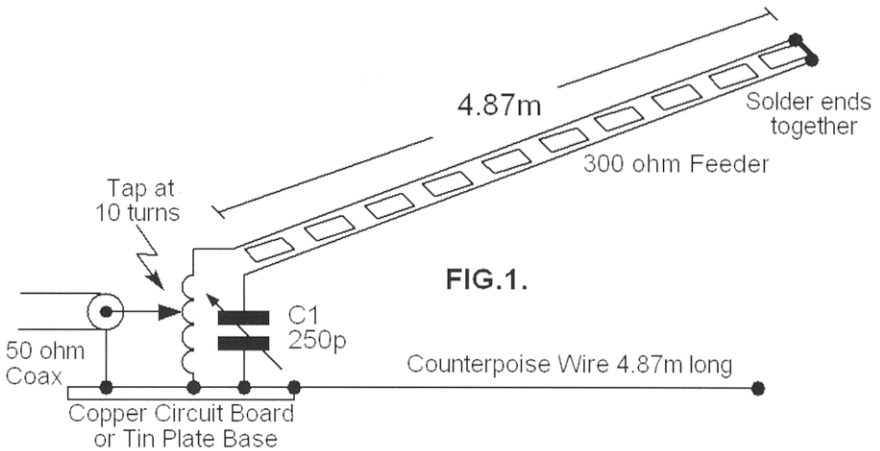


FIG.1.

AND THAT, GENTLEMEN, IS THE ONLY ANTENNA ARTICLE RECEIVED IN MANY MONTHS. WHERE ON EARTH HAVE ALL OUR ANTENNA EXPERIMENTING MEMBERS GONE ???

QRP MASTER
EU6DA ,.12DMN.Well done and welcome to the Master Roll Gentlemen.

AWARD NEWS
Worked G QRP C - 340 DL9CE; 260 GI4SRQ, 100 12DMN, 20 MØCUT .. Two-way QRP:- 30 12DMN; 10 MØDBO

QRP Countries. 75 12DMN.
Congratulations to the above on great work.

QUICK THOUGHTS ON LOADING L.F. BAND ANTENNAS FROM G8PG

Base loading with a coil adjusted to give quarter wave resonance. Not very efficient. It is antenna current that does the work and most of it appears across the coil, not in the radiator. Loading with a coil near the far end of the antenna. Much better, but do make sure that the coil and its associated joints are really well weatherproofed. End loading with a series of vertical wires spread out in a fan shape and soldered to the far end of the horizontal antenna wire. If outdoors quite effective but far from XYL complaint proof. Possible compromise erect in winter DX season only. Better solution feed the antenna via a remote tuner at the far end and bring the loading wires horizontally into your roof space. End loading by making the wire length a quarter or a half wave long and forming the excess wire into a series of narrow U shapes. These can often be hidden on a wooden fence, or the remote atu method can be used with the U sections in the roof space. Years ago G8PG worked 3 continents on 1.8 MHz using the latter arrangement. Those are just a few workable ideas. No doubt Members can come up with a few others, so if you know one or more of these drop me a line with a simple diagram and I will print it in a future issue of SPRAT.

WAITING FOR THE LAKE TO FREEZE

Not often we mention QRO in SPRAT, but this antenna story is so unusual it is worth telling. Back in December last year I had a OSO with fellow FOC Member SM6CNN and he told me that he was waiting for the lake outside his house to freeze so that he could experiment with Beverage receiving antennas for 80 and 160 metres, erected over the ice. These antennas are some 350 metres long , so he would have to use a number of bamboo poles, mounted in holes drilled in the ice. The antennas would actually reach to the far side of the lake, and as the far end of the antenna has to be earthed via a terminating resistor it was hoped that a holed drilled in the frozen ground with an earth spike driven into it would work. Other possible hazards were skaters colliding with the bamboo poles and, if there was too much sag in the antenna wire, passing moose getting their horns entangled in it.

TROPHY TIME AGAIN
The Awards are as follows.

THE G2NJ TROPHY
This goes to Bob Hudson,G4JFN, our retiring OSL Manager. Over the years Bob has handled thousands of QSLs for members, and we all owe him a big debt of gratitude for his great work. I am sure everyone would like to wish him a long and happy retirement.

THE SUFFOLK TROPHY
This goes to Dick Pattison, VE7GC, for the "Wee Willie" dsb transceiver. A very clever design both electrically and mechanically which really encapsulates the fun and skill of ORP home brew. What QRO man would use cardboard in his construction!

THE PARTRIDGE TROPHY

This goes to Stuart Martin, GMØHMR for his loaded W3EDP antenna. This is a shortened, loaded version which covers all bands from 1.8 MHz upwards, and should be of great interest to those coping with restricted antenna space.

THERE ARE STILL SUNSPOTS AROUND

We are well into the sunspot decline years, but conditions in February 2006 were surprisingly good. During the FOC Marathon G8PG worked five continents when using 3W of cw. During the A.R.R.L. CW Contest the same power again produced excellent results, even though on that occasion operating time was limited to about two and a half hours on the Sunday. Forty meters was really good, with Ws workable well into the daylight hours. A K1 station in New Hampshire was actually audible after 12 noon. The latest time a North American station has ever been heard in daylight on 40m at G8PG. It is interesting that in both events U.S. west coast stations were exhibiting pronounced echoes on 14 MHZ., all of which shows the iono-sphere can be a source of endless interest.

10th RED ROSE QRP FESTIVAL.

Sunday 4th June, 2006, 11am to 4pm.

Formby Hall, Alder Street (off High Street), Atherton, Manchester.

Easy access from all directions - Trade and individual stalls. - Sales of new and surplus equipment and components. - Club stands, including RSGB, GQRP - Low cost "Bring & Buy. (No sell, no pay!!) - Sales of new and surplus equipment and components.-
Hassle free. Large spacious halls at ground level.- Huge, free car park, disabled facilities. - Delicious refreshments at QRP prices! - Comfortable, well stocked lounge bar. –
C.W. "Sign in". - Talk in on S22 - SPECIAL GQRP CLUB DISPLAY.**
Admission still only £1.50p - Some tables available at £7 but please book early.
Les Jackson, G4HZJ g4hzj@ntlworld.com 01942 870634

G QRP Club QSL Bureau – Bob Retires

Sadly we have had to accept the resignation of Bob Hudson, G4JFN, as the manager of the club QSL Bureau for family health reasons. Bob was instrumental in turning the bureau into an efficient and very worthwhile club service.
We thank him (and Ann) for all their hard work over many years.
Bob is to be awarded the G2NJ Trophy in recognition of his excellent work.

Can You Help?
We are looking for someone to take over the bureau from Bob.
Bob has submitted a useful paper on how it could be made into a simpler job.
If you are interested please contact G3RJV as soon as possible.

Earth Quake Research and Amateur Radio

Marco Eleuteri , IK0VSV [marco.eleuteri1958@libero.it] has sent me an article about his studies on earthquake research, he would like to involve some other amateurs interested in VLF ULF tests, in particular in the New Zealand area. G3RJV is happy to mail [or email] copies of the article to those interested.

Corrections – Useful Leads for the FT817 by G3YUQ [issue 125]

- For use with the linear amplifier the FT817 needs to be set at 0.5w. output

- The attenuator values should be as shown.

Mod 1 refers to 1 & 2 in the photograph, Mod 2 refers to 4 and Mod 3 refers to 3.

Club Stands at Rallies

Paul, M0BMN, is kindly running club information stands at some radio rallies this year. Paul is booked in at the Red Rose QRP Festival, Formby Hall, Alder Street Atherton, Manchester (4th June) and the Donnington Rally on the 8th and 9th Sept..

G3CQR

We regret to announce the death of Peter Burridge, G3CQR, in the December of last year.
For many years Peter was the driving force behind the Yeovil QRP Convention.
He will be a sad loss to the hobby and to QRP.

COMMUNICATIONS AND CONTESTS

Peter Barville G3XJS, 26 Hever Gardens, Bickley,
Bromley, Kent. BR1 2HU. E-mail g3xjs@gqrp.co.uk

WINTER SPORTS

The worst HF conditions ever – in the opinion of Derrick, G3LHJ. Judging by the comments I saw in most of the logs, I doubt many would disagree. However, everybody also agreed that they'd had plenty of fun and enjoyment, whatever the conditions. I didn't expect to make many contacts myself, because of the limited antenna in use here at the moment, and (like many others) limited opportunity. Time was when I'd make dozens of QSO's during WS, but this year I had to make do with a total of 5!

My thanks to all of you who supported the event, no matter how few contacts you may have made, and to the following for sending their logs to me: G0BPS, G0KRT, G0OTE, G3ICO, G3JFS, G3LHJ, G3MCK, G3NUA, G3VTT, G3YPZ, G3ZHE, G4VPF, G4XRV, G8PG, M0BLT, GI4CBG, MI5MTC, GM0NTR, GM3OXX, GM4XQJ, AB8FJ, DL2BQD, DL4NSE, EA5/G3PTO, EI8FH, OK2BMA, ON4ADF, PA0RBO, PA9RZ, W2JEK, W3TS and W7CNL. It is good to see so many familiar call signs amongst the list, but even better to see those who are included in the list for the first time.

As always, there are just too many highlights and comments from logs to extract and include here, but let's see how many I have space for ... **W7CNL** says that the best 20m 'window' from Idaho to Europe was again 1530-1700z; **ON4ADF** remarked on the courteous behaviour on 3560 during the busy evening periods; for **AB8FJ** "the most bare bones operating in 34 years of activity" was while he was using his OXO to make 40m QSO's as he had to use manual change-over (including applying/removing power to the Tx); **G0BPS** sent an all PSK31 log which included 9J2, HS0, NP2 and PZ5 (juicy Dx!); the highlight for **MI5MTC** was a two-way HW8 QSO with GI3PDN who had helped him prepare for the CW test and progress to his MI5 ticket; **GI4CBG** was not alone in commenting how pleased he was to work "the Patron Saint of QRP" George, GM3OXX; **W2JEK** worked R1ANN in Antarctica, as did G3JFS who worked 5 continents (but no VK/ZL) with contacts on all HF bands including 5MHz; **G3YPZ** was delighted to catch a 12m opening to the USA; two stations who managed to put just about all of their collection of homebrew rigs on the air were **G3LHJ** and **AB8FJ**; **G3MCK** has noticed a decline in the number of our OK and OM colleagues on the bands; "Man of the Match for me" says **GM3OXX** "was G4XRV"; **G3JFS** made his QSO's using CW/SSB/AM/FM/RTTY/PSK31/Hellschreiber/MFSK/Olivia/Contesia and RTTYM and says "there are far too many new digital modes for most people to cope with!"

The log from Peter, G3JFS, was extensive and contained an impressive amount of Dx spread across 5 continents. George, GM3OXX, was the outstanding QRP CW signal on the bands, as is he always with his homebrew 1 watt and wire antenna. I have lost count of the number of members who remark how pleased they are when they work him – often on more than one band. George's signal is like a beacon, particularly during every Winter Sports, and he is a true asset and ambassador to our hobby.

In the normal course of events, either of those two logs would be a deserving winner of the G4DQP Trophy, but I always suggest trying 'something different' during Winter Sports, and

G3VTT, Colin, did just that. Not only did he operate from his home location, and from the QTH of George, G3RJV, but he braved a cold and windy beach on the foreshore of the River Thames in Kent on 31st December to operate /P with his K2, as he describes: "The WX was sunny but with a biting cold wind. I camped there along with G3YVF for a day using a small tent, the K2 with a dryfit battery and kite antenna. We kept warm with soup, brandy and Geoff YVF constructed the biggest fire seen on that beach using drift wood ignited by a strictly QRO taper constructed from a myriad of flammable materials! Cold weather forced us back to our rendezvous point and collection by my XYL at 1500z. The name of the location is St Mary's Bay and we have operated from here before, as has Mike W3TS when he stayed with me last year. We intend to activate the Marshes again regularly in 2006. The K2 worked flawlessly on the beach although I forgot the paddle adaptor and had to remove the side of the case to clip the paddle directly to the socket. Thankfully I had packed three crocodile leads! The antenna was around 40 feet of wire suspended from a kite which stayed up such was the strength of the wind, and we used a large counterpoise draping into the river."

At home, Colin used his homebrew single 807 crystal oscillator transmitter with 4w out on 3560Khz together with a 1V3 receiver. The receiver uses all octal valves, 6SJ7 RF, 6SJ7 detector, 6SN7 audio and 6V6 output stages and certainly "gives the flavour of 1930/40 and 50's operating". He had to find the crystal frequency on a Class 'D' wavemeter and then transfer that frequency to the receiver due to overload using the transmitter alone in order to net! "One certainly appreciates the skills of the operators of yore with that simple equipment" he says.

Congratulations Colin, your considerable efforts and fascinating log have earned you the 2005 Winter Sports G4DQP Trophy.

GM3OXX ACHIEVEMENTS RECOGNISED BY RSGB

The RSGB Board has just announced that George has been awarded the Don Cameron G4STT Memorial Trophy. It is awarded each year "for significant achievement in the field of low power Amateur Radio communication", and I know you will join me in offering him heartfelt congratulations. It's long over-due George!

12m PROPAGATION STUDY

John, EA5/G3PTO, would like to study 12m propagation during the course of 2006. He is likely to enjoy more openings on the band than those of us in Northern Europe, but John will appreciate any input members may care to offer. He will call CQ on 24990kHz almost every day between 1100 and 1300z, but reports of other activity can be emailed to him via his email address: jreynoldsg3pto@yahoo.co.uk

LOW POWER SPRING CONTEST 2005

Alex, G4FDC, has kindly sent me the results of the above event. Please contact me if you'd like me to forward the information to you. He also points out that the 2006 QRP Calendar shows an incorrect date for this year's event, which should have been quoted as 17th April. My apologies for the error.

7th QRP – MINIMAL ART - SESSION

My thanks to Hal, DJ7ST, for the following details:

Challenge: Contacts to be made with homebrew rigs as simple as possible and constructed with as few components as possible.

Date: May 25th, 2005 (Ascension Day); 1900-2300 UTC.

Mode: Single Op CW, Output < 5W or Input < 10W.

Band: 80m CW-Band CALL: (cq) mas de...

Class A: TX+RX resp. TRX consisting of not more than 100 components.

Class B: TX consisting of not more than 50 components, RX as you like.

Exchange: RST/Class and number of components, e.g.: 559/B25 (feel free to exchange name and small talk).

QSO Points: Any QSO will be counted 1 point. 4 points will be counted for a QSO with another MAS-stn whose log has been received.

Bonus: You will get bonus-points in percentages if you stay below the limit of components permitted for your class, e.g. a 50% bonus will be added to your final score if you only use 25 components (instead of max. 50) for your TX in class B or only 50 parts for your TRX in class A (instead of max. 100). Correspondingly 90 parts in class A or 45 parts in class B would mean a 10% bonus.

Remarks: Components will be the following: Resistors, capacitors, coils, diodes, transistors, tubes, crystals, ceramic resonators etc. Any selective network in the TX output stage will be counted as if consisting of 3 components. For a better suppression of harmonics you are free to use more components - they will not be counted. IC's are permitted as long as YOU(!) can give a specification of HOW MANY single components are integrated. Plugs, connectors, knobs, fastening material etc. will NOT be counted. This also applies to power supply, headphones, speaker, key, antenna etc.

Logs: Must contain UTC, call of stn wkd, RST sent & rcvd (see EXCHANGE). Please give your callsign, full address and possibly PR-mailbox.

Urgent: A circuit diagram of rig used with NUMBERED (=counted from left to right) components has to be enclosed (and an IC specification if used)! There is no absolute need to indicate kOhm, pF etc. or type. (It is not necessary to send a circuit diagram for a second time, if the same equipment has been used in an earlier QRP-MAS).

Deadline: Within 2 weeks after qrp-mas to:
DJ7ST, Dr. Hartmut Weber, Schlesierweg 13, D-38228 SALZGITTER,
Germany. E-mail: dj7st@darc.de Packet-Radio: DJ7ST@DB0ABZ

The deadline for the next SPRAT is the end of April – in the meantime have QRP FUN.
72 de QRPeter

VHF Manager's Report

John Beech G8SEQ 124 Belgrave Road Coventry, CV2 5BH
Tel. 024 76 273190 or johng8seq@ntlworld.com

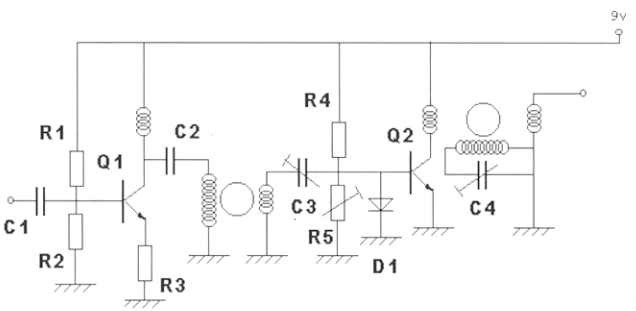
Last quarter saw the details of the "Fredbox" published in SPRAT (only 30 years late!) Although some impressive results have been obtained with the flea power that the "Fredbox" puts out, many people would like a bit more umph to increase their chances of contacts. So this little circuit was devised (actually a re-hash of a circuit I used as a beacon transmitter). It is linear and therefore will cope with SSB and FM as well as AM without modification. The driver stage works in Class A and the PA in class AB.

I used a fluted heatsink for the PA device and slotted the diode, D1, inside one of the flutes with some silicone heastsink compound for good measure. I built my circuit Manhattan Style on a piece of single sided PCB as the ground plane, but I have also built similar circuits just using a chequer board pattern on PCB material. The layout more or less follows the schematic.

Powdered iron cores are from Amidon, colour coded green. Available from JAB and the like.
73 de John G8SEQ

Linear PA for Fredbox etc.
Output up to 2 W

R1 = 5K6
R2 = 2K7
R3 = 47R
R4 = 3K3
R5 = 2K2
D1 = 1N4003
Q1 = BSX19
Q2 = 2N3553
C1 = 100pF
C2 = 100pF
C3 = 30pF Murata
C4 = 30pF Murata
T1 = 5t + 3t
T-25-12
T2 = 2t + 7 t + 3t
T-37-12



Notes: P=out depends on supply voltage - up to 15 V (A PP3 will only last seconds!)
D1 must be in thermal contact with case of Q2 NBQ2 can is connected to collector
Q2 must have a heatsink fitted if dissipating more than 200mW
Adjust R5 to give about 50 - 100mA standing current on Q2, no drive, depending on supply voltage. Q2 must not go into thermal runaway.
R3 can be by-passed with capacitor to increase gain.

MEMBERS' NEWS

by Chris Page, G4BUE

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

G4NSG writes, "I was intrigued to read in both the Autumn and Winter editions of *Members News* about the guy who got his wife to carry his stuff at the Drayton Rally. As a Midland ARS member for over 30 years, I also witnessed that event as I manned the club's table, and we all commented on it, but our ladies comments are unprintable!". Stuart says the 2005 Drayton Rally was the last and will be replaced with a new rally at Alderbrook School, Blossom-field Rd, Solihull on 7 May, where he will be on duty in the kitchen, see the photograph below of him at the 2005 rally. Details of the rally are on the Internet at <www.midamradio.co.uk>, then 'Winter 2005 Rally' section.

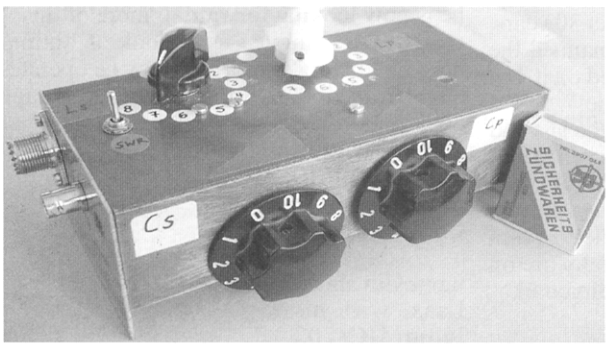
G3YMC offers some words of advice on working weak DX stations with QRP. Dave writes, "I heard **7Q7VB** this morning (19 February) at 0806 on 17m CW and he was so weak I could barely get his callsign. I called him and he came back first time for a solid exchange. But there was of course no pile-up. The other night I worked **PY1OTO/PYØT** on 30m for QRP country 206 in similar circumstances". Do you remember your first CW QSO? **M3KXZ**'s first was on 20 February on 80m with **DL2BQD**, 5W both ways. Pete writes, "I can't put into words how good it felt. It was great, but also nerve-wracking, which resulted in me having that feeling that I get when I do a presentation in front of a group of people with no prior preparation! I sort of get in a panicky rush and fall over my words. And I got that funny watery taste in my mouth - like the adrenaline effect you get when you realise that you've just driven too fast past a traffic cop, and the happy feeling when you realise he's not coming after you!". This was only Pete's second day at trying CW, he thanks Dieter and says he is now looking forward to more of this.

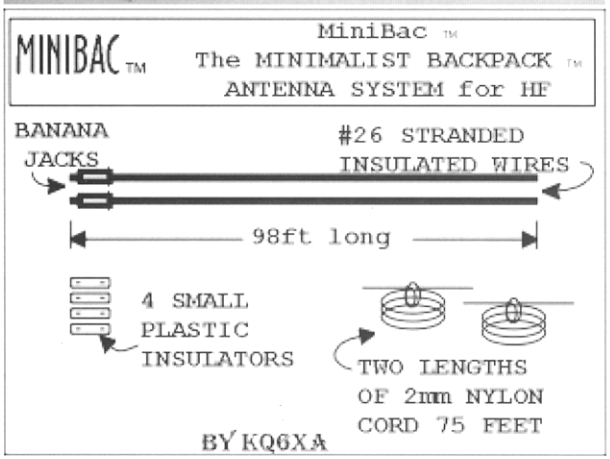
HB9DRV invites us to look at <http://blog.hb9drv.ch/?p=15> to show he operates QRP from time to time! The photograph alongside shows Simon operating on 10 December from Crap Sogn Gion, a 7464 feet mountain above Laax, with his Icom IC-703 and Buddipole antenna. Simon made SSB QSOs on 14285kHz with 2EØNHM, EI7CC, GW4BVE, GWØVMZ and HB9AZT. He says the only downside was, "The rescue helicopter carting skiers off to hospital all the time; it made a racket and chucked out some electrical QRM, but the IC-703's NB took care of this". He learnt several things on this first trip, including to wear warm clothing, take bin liners to lay things on and use a voice recorder for logging (trying to write in a log book with gloves on is not easy!).

EA5/G3PTO found 10m open on 26 November and worked TZ, ZS and 6W with his 5W and sloping 17m double and on 6 February found 12m open when he worked **7Q7BP**

(**G3MRC**). **M3KXZ** was pleased to 'bust' the **D44TD** 20m pile-up at the end of November with his 5W SSB. **K5NT** spent some of December at the family house in Virginia Beach, VA and one night at 3am local time when he couldn't sleep, Dave took a listen down the low (DX) end of 40m and heard your scribe calling CQ. He called me several times and I finally heard him well enough to exchange reports. Dave said in a later e-mail, "It's flattering when one of the Big Guns takes the time to talk to my peanut whistle". I, in turn, am flattered to be called a Big Gun, Dave!

DL2BQD built the ATU pictured below following the experience of **DJ1ZB** arranging 2x8 single coils/cores to get the best SWR in contradiction to tapped coils. Here you see Dieter's gadget on an experimental board housing, together with a balun for 'non-defined impedance' which can also be used with feeder lines. Pictured below the ATU is Ha-Jo's original version of the ATU from previous SPRAT issues.





EA3/G3PTO reports a new QRP beacon on 10133.9kHz, **OKØEF** running 200mW. John also reports **F/G3MNS** QRV in the middle of February with 5W and a mobile whip from near Montpelier.

G3LHJ made 388 QSOs (78 DXCC/22 zones) for 80k points on 20m in the CQWW CW Contest. Derrick had less QSOs than 2004 but levelled his score thanks to more USA (three point) QSOs. **GØBON** worked 7X and 3V on 80m in the CQWW CW Contest. Ivan says, "A lot of patience and listening skills were required and it was gratifying that one can get through the pile-up whilst running QRP. **GM4XQJ** has worked 63 DXCC with PSK-31 at 5W or less output but says "I have now given it up as I got bored pushing buttons". **G3VTT** was QRV from three locations in the Winter Sports, (home, **G3RJV**'s QTH in Rochdale and on 31 December with **G3YVF** on the beach at St Mary's beach on the banks of the River Thames). Colin says, "For the last location we kept ourselves and the K2 warm with a monster fire, burning all the driftwood we could find, hot soup and brandy. We worked 30 and 20m from the beach with a kite antenna and used alarm dryfit batteries for power until the cold forced us to return to the rendezvous and pick up point at 1500z". They will be QRV again from there in March.

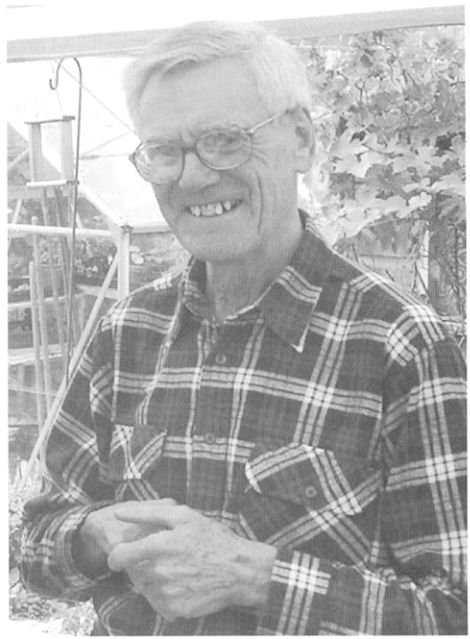
GØUPL was QRV in January from Greenwich, CT as **W1/GØUPL** rockbound on 3558kHz with a Unichip TCVR at 2W to a 40m longwire and ATU, see <http://www.hanssummers.com/radio/unichip/index.htm>. **G3ROO** e-mailed Hans and suggested a sked starting at 2300z. Ian started with 200 watts and although he thought Hans was there, he was not workable, but the following day he copied Hans' call and 559 report. **CO2KK** is having a lot of success on 2m with the Moxon Rectangle antenna. Arnie says he built it using the information provided by L.B. Cedbik, **W4NRL**, and it is very rugged and stands up to hurricane winds.

G3KJX was QRV in December as **CT1/G3KJX**. **GM4CXP** was QRV 21 December/4 January as **EA8/GM4CXP** with his FT-817ND at 5W into simple antennas. Derrick said conditions were down on 2004 and he only worked 9 DXCC (all Europe) partly due to the higher level of socialising and 20m being devoid of all signals at times. **EA3ADV** worked **VK6BN** on 10 January with 4W from his K2 and simple OCF dipole (Fritzel FD3). Vicen said the antenna was only put up a few days before with help from **EA3CKX** and **EA3AEK**

G4GXO found **PY2OHH**'s web-site at <http://geocities.yahoo.com.br/py2ohh/> recently. Ron says there are some interesting designs in the transceiver section for those who like the minimalist approach to homebrewing. Elecraft have announced that the KX1 is now a four band radio. Many owners had asked for 80m coverage and the new dual-band KXB3080 module installs in the same location as the 30 metre only module. The KX1's firmware has also been updated.

VE2EMM is thinking of building a ultra-simple QRP TX for one of the VHF bands and discovered the ICS525 chip. Martin says, "This amazing device can generate just about any frequency between 30 and 150MHz using *any* crystal between 5 and 25MHz. As is, the 525 outputs around 40mW power and a single PA can bump this up to around half a watt if required". The circuits he has seen use the chip in ARDF transmitters where PIC-generated CW is used to modulate the TX, see <http://www.qsl.net/ve2emm/pic-projects/mt525fox/mf525sce.gif> and <http://www.barc.uklinux.net/tx.php>.

G3CWI is 'gearing up' for 10GHz wideband FM this summer. Thanks to some surplus equipment and a bit of re-engineering, Richard looks set to have two viable stations shortly. He says, "10GHz wideband FM is rather out of favour these days but it has an inherent simplicity that would probably appeal to many QRPers. My Gunn oscillator runs 10mW and I'm looking forward to combining some SOTA activity with the microwave experimentation!". Martin, **2EØAYQ**, <<mwals@tiscali.co.uk> is building the Walford Kilmot DSB TX and would like to share experiences and notes with other members building it.



Dennis, G3KKQ, pictured in October 2005.

I am very sad to report the passing of **G3KKQ** on 11 February. Dennis suffered a collapsed lung recently and had grown steadily weaker. He was cremated on 28 February at Woking Crematorium. Dennis has been associated with QRP ever since I can remember and was member 877 of the G-QRP Club. He was a really nice guy and one of those people you always enjoyed talking to as he always cheered you up with that infectious smile that he always had.

JL3AMK is using a modified K1 on 160, 12 and 15m. The 160m modification was designed by **W3FPR** and the 10 and 12m modification by **VA3UXB**. Harry has also modified his KFL1-2 two-band filter board and now has four filter boards for his K1: KFL1-2: 160m and 80m; KFL1-4: 40m, 30m, 20m and 17m; KFL1-2: 17m and 15m and KFL1-2: 12m and 10m. **GØEBQ** has been using the Emtech rig on 20m with a folded G5RV in his loft and has worked W1, ZA, 7X and a two-way QRP QSO with **EA8AGF**. Congratulations to **GM4XQJ** on working **3YØX** with QRP on 13 February on 20m CW.

Please let me know how your spring goes, by 20 May, please, (snail mail to 312 Quail Avenue, Sebring, FL 33872, USA).

QSL Cards from Nasko - LZ1YE

LZ1YE has sent me details of some attractive QSL cards including the Club Log.
Members can make their orders by sending samples, explaining what they want to print, and sending the materials: photos, files...etc via e-mail: qsl@qslprint.com or qsl@kz.orbitel.bg or if no internet access via the postal address: Atanas Kolev, P.O.Box 49, 6100 Kazanlak, Bulgaria. Examples of cards and prices can be seen at **www.qslprint.com**
For people need QSL cards urgently LZ1YE dispatches three days after the payment is made. UK Members can pay via a UK address: Please send your cheque / cash via recorded delivery to: LZ1YE QSP Print service, c/o Melanie Rowe, St. Leonards House, 35 St. Leonards Road, Exeter, EX2 – 4LR, Devon. e-mail: m0mja@aol.com (make cheques payable to : Melanie Rowe)

GQRP Club Sales

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

GQRP Club Antenna Handbook - £5
HW-8 Handbook *(back in stock)* **- £10**
} plus postage per book: UK - £1.35; EEC - £3.20; DX - £3.80

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

Pair LSB/USB carrier crystals HC18U wires - [9MHz ± 1.5kHz] £6 pair } plus postage

Crystals – HC49/U wire - **3.575MHz 3.579MHz and 3.582MHz - 30p each** } (ANY quantity)

SA602AN - £1.75, MC1350 - £2.00, IRF510 FETs - £1.25 } 35p (UK),

MAR-4 RF amplifier - £1.50 (limited stock) } £1.00p EEC,

HC49U (wire) crystals for all **CW** calling frequencies – 3,560, 7,030, 10,106, 14,060, 18,096, 21.060, 24,906, & 28,060 - **£2.00** each } £1.30p (DX)

HC49U (wire) crystals for DSB on 40m – 7.159MHz - £2.00 each }

Miniature crystals (watch crystal size – very low power) – 3.560, 7.030, 10.106, 18.096, 21.060, 24.906 & 28.060 – limited quantities - **£2.00 each** } All post

Ceramic resonators – 3.58, 3.68MHz & 14.30MHz – 50p each } free

Varicap diodes – **MVM109** – 40pF @ 9v, 500pF @ 1v. **75p each** } max of 2
– **MV209** – 5pF @ 1V, 40pF @ 12v **25p each** } per member } if

CA741 op-amps 8pin DIL – **5 for £1** } ordered

2SC536 transistors (npn) fT-100MHz, hFE-320, VCBO+40V **- 5 for 50p** } with

MPSA92 transistors (pnp) fT-50MHz, hFE-40, VCBO-300V **- 5 for 50p** } heavier

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

W8DIZ freq ref kits (Sprat 116) Outputs 10, 5 & 2.5MHz - Still available at £10.00 }

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

T37-2 – 75p; T37-6 – 75p; T50-1 – £1.00; T50-2 – 90p; T50-6 – £1.10; T50-7 - £1.20; T50-10 – £1.20; T68-2 - £1.80; T68-6 - £2.20

FT37-43 – 80p; FT50-43 - £1.20; FT37-61 - £1.00; FT50-61 - £1.20; BN43-2402 - £1.00; BN43-302 - £2.00

FT114-43 – 80p each (for postage – counts as a pack of 5)

Plus postage – up to 5 packs = 35p (UK), £1.00p (EEC), £1.30 (DX); 5 – 10 packs = £0.70, £2.00p, £2.60 etc.

Sprat on CD (1 to 109) - £10 inc postage (UK); +50p (EEC); + £1 (DX).

Binders for Sprat - the original 'nylon string' binding type back in stock again! Black with club logo on spine **£3.75 each plus postage (one: UK - 80p, EEC - £1.50, DX - £2.00. More - add 55p, 80p, £1 each)**

Back issues of SPRAT are still available at 50p each. I have most issues from 78 plus a few earlier ones. UK Postage is 1st magazine – 45p, each additional magazine add 20p.

NB I am out of stock of the Drew Diamond book, also, I am out of stock of mouse mats (no more supplies expected). All the DDS kits are gone.

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

Cheques (UK) and payable to G-QRP Club. Sorry, but cheques in Euros are uneconomical to us due to bank exchange charges! Visa/Mastercard. Please quote full card number plus expiry date & security number. We can only send the goods to the card owner's registered address. Sorry, we do not accept Debit Cards such as Switch, Visa debit, or Connect.

MINIMUM ORDER for cheque or Visa payments is £5 – this will cut down on our bank charges. For orders less than £5 – please use postage stamps (any denomination £1 or less please)
We can also accept cash in GBPound, or US$, or uros – but please send securely!

You can order via e-mail to g3mfj@gqrp.com and if you wish to send credit card details over e-mail, you can send them, split into two parts (for security), to me, via my two different ISPs - g3mfj@gqrp.com and g3mfj@gqrp.co.uk. Or send encrypted - my PGP public key is on the sales page of the G-QRP website. You can check availability (or even order) on (+44) (0)113 267 1070 – But only if I am able to take the call!! Please do not expect my family to be able to discuss club sales matters or take orders – I will have to withdraw this facility if members keep calling and expect my wife, or my children, to know the characteristics of an SA602 – or even know what one is!!! You will have to call back when I am in.