SPRAT

THE JOURNAL OF THE G QRP CLUB

DEVOTED TO LOW POWER COMMUNICATION

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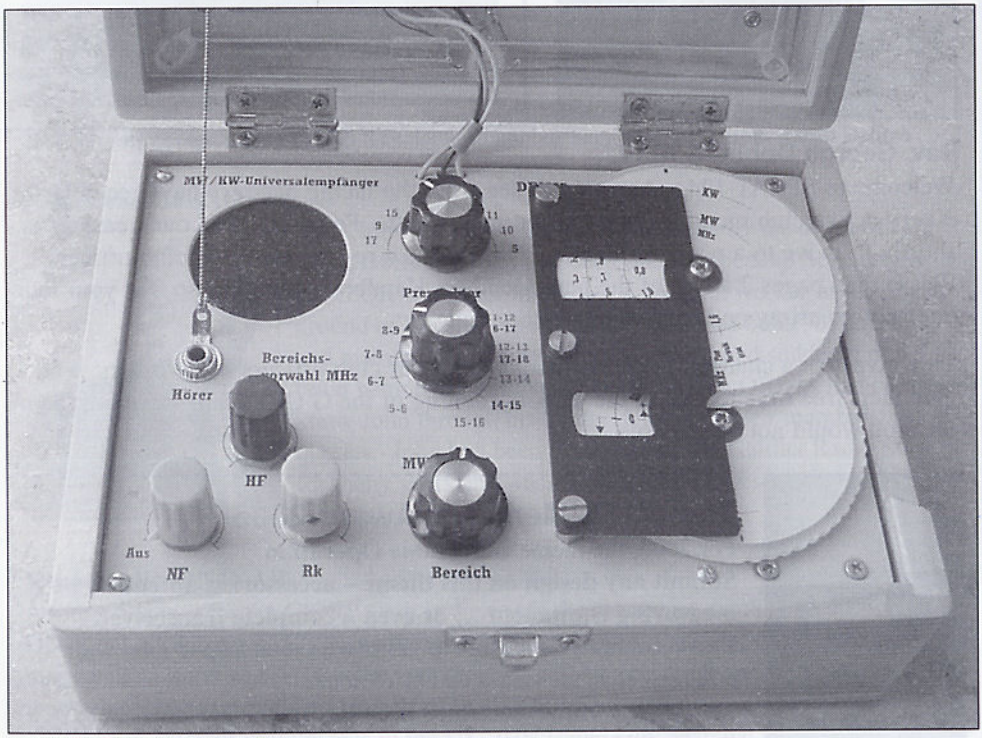

THE DF6MS UNIVERSAL PORTABLE RECEIVER

Sad News ~ ATX Power Supplies ~ Non-Grounded NVIS Aerial
Simple SWR Bridge ~ Tuning using Micro Controller as DDS
Foldback Clip Keyer ~ Active Reverse Polarity Protection
Universal Portable Receiver ~ Look at Lowpass Filters
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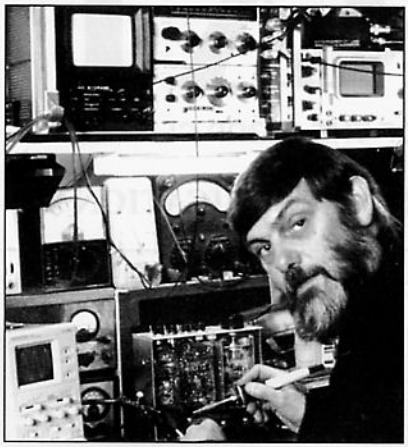
JOURNAL OF THE G QRP CLUB



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Rev. George Dobbs G3RJV

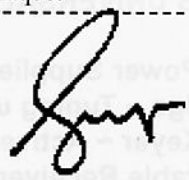
Welcome to SPRAT 124 – As you will see from the facing page we have recently lost 3 very active club members through untimely death. Peter, G3PDL, our treasurer is shortly to move to a warmer climate. This means a re-structuring of club officers. Please read pages 2 and 3 of the new Members Handbook carefully so that your mail does not go astray and cause unnecessary delays.

This gives me a chance to express thanks to all our club officers and workers, who give their free time to ensure the smooth running of the G QRP Club - without them the club would not be possible.

The W1FB Memorial Award 2005

For 2005, the theme is **Portable Operation**
Submit any design on this theme – accessories, antennas, measuring equipment … or even a complete transceiver.
Please submit your design to G3RJV as soon as possible, with circuit sketch, all values and brief notes.
The project will be published in SPRAT and the winner will receive an engraved plaque.

72/3



G3RJV

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

Sad Losses to the Club

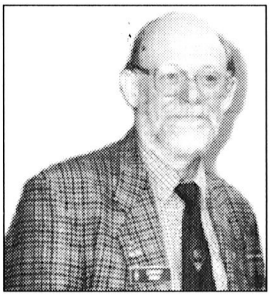
I am sorry to have to announce the deaths of three valuable members of the G QRP Club.

Peter Halpin, PH1PH

Peter has been around in QRP circles for more than 20 years and gained a reputation of being a 6 metre DXer, gaining the first ever QRP ARCI DXCC for single-band operation. He also received the ARRL DXCC for 6 metres, the G-QRP Club 6 metre DXCC and was G QRP QRP Club Master number 74. He was the Dutch representative for the G QRP Club from 1991 until last year. Perhaps Peter was best known in the amateur radio community for assisting Simon Brown, HB9DRV, in the development of "Ham Radio Deluxe".

Peter [right] accepting the RSGB Special 90th anniversary award for Ham Radio Deluxe

John Leak G0BXO.



The Club officers were greatly saddened by the death of John Leak, G0BXO. John had been the Membership Secretary of the G QRP Club for many years. A quiet worker in the background of the club, John did the "nuts and bolts" of enrolling and maintaining membership. G0BXO died suddenly of a brain hemorrhage at the age of 63. Many QRPers had come to know John through his kindly dealing of their membership queries. John had been Chairman of the Halifax Radio Society for many years and was respected as a Morse tutor.

René Anrijs, ON4KAR

Another sad loss for the G QRP Club in June was the premature death of René Anrijs, ON4KAR, at the age of 57. René was the Belgium representative of the G QRP Club for many years. René was an excellent telegraphist and an avid QRP operator. He attended many Benelux radio events on behalf of the G QRP Club and was well known through his visits to amateur radio events in the UK. His friend Guy Marchal, ON5FM, wrote, "René's passion for radio and particularly telegraphy was testified by the groove in his finger tips caused by pressing his Morse key!"

Club Changes

The deaths of John and René mean a reorganisation of club officers.
For full details please see elsewhere in this issue of SPRAT and read pages 2 and 3 of the new Members Handbook.

ATX POWER SUPPLIES

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

I'm always on the look out for cheap ways of producing stabilised DC power from the mains. I recently picked up (literally) a PC ATX power supply, and it struck me how light it was for the 300W power it claimed to produce. I thought I'd investigate further.

These supplies are produced in their tens of millions for building into PCs and therefore economy of scale makes them very cheap. A quick search for "ATX" on eBay produced hundreds of hits, and a new 300W unit can be picked up for £8.75 or cheaper. Second hand or lower power ones are even cheaper. You can even get gold-plated ones! Alternatively, you could extract one from that old PC you can't bear to throw away.

The basic ATX has stabilised outputs at: +12V, +5V, +3.3V, -5V and -12V at various currents. The output wiring of an ATX is standardised and colour-coded with a common code, so working out how to connect to one is very easy.

The colour code of the output wires is: orange (+3.3V); red (+5V); yellow (+12V); white (-5V); blue (-12V); black (0V, Gnd). There is also a green wire which provides the "remote" on/off switching of the ATX without touching the mains on/off switch. This needs to be connected to a black wire (ie 0V) for the ATX to work properly.

It's probably safest to measure the voltages on the wires coming out of your unit, just in case it doesn't follow this convention.

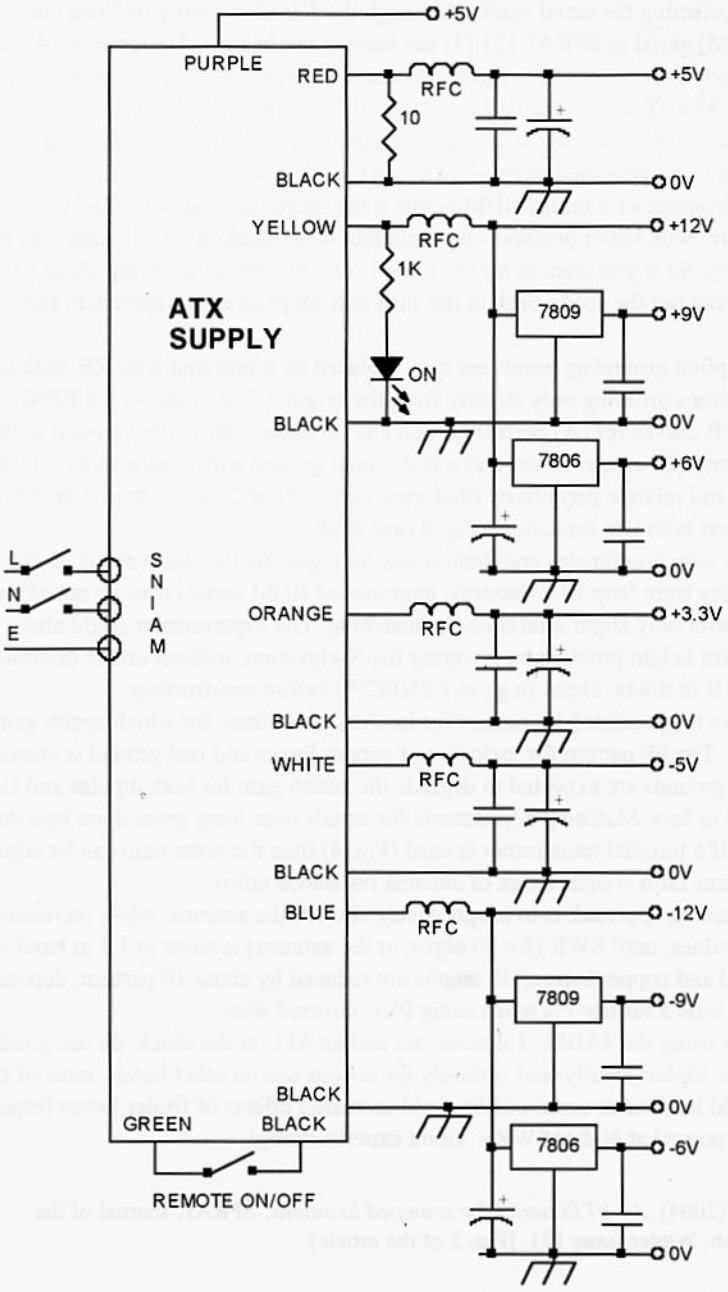
There are usually several bundles of wire, each with a connector on it, exiting an ATX. This is to allow the ATX to be plugged into a PC motherboard, hard drives, CD drives, etc in a basic PC system or as it is upgraded. Most of these wires can be cut off, since they simply replicate the voltages for the various bits in the PC.

All the above voltages are switched off when the ATX switch (if there is one) is in the "off" position, but there is often a purple wire which supplies +5V at low-ish current even when the ATX power switch is in the "off" position. There will usually be a table printed on the ATX box showing the current rating of these outputs. The 300W ATX I had will supply +3.3V at 28A, +5V at 30A, +12V at 15A, -5V at 0.3A and -12V at 0.8A, (as long as the total power doesn't exceed 300W) so there's lots of current to play with. I loaded up the outputs with some beefy resistors and found them to be very well regulated, though I didn't check anywhere near the current limits shown above.

It seems that an ATX needs to have some load on its output to switch on successfully. I connected a 5W 10ohm resistor across the +5V output (red to black wires) to provide this load.

I checked the noise on the +12V and +5V outputs on my unit. It was about 50mV peak-to-peak at 59kHz, which is typical of a switched mode power supply. This should be easy to filter out with series RFCs and decoupling capacitors. You can make the chokes yourself with about a dozen turns of 24SWG enameled wire on a ferrite toroid.

Because the output current rating of the ATX is so high, it's easy to add positive and negative regulators to get +9 volt, +6 volt, -9 volt and -6 volt outputs from the basic output voltages and use them all at the same time (on the positive rails at least) if that's what you need. I've shown in the diagram how filtering and a typical set of regulators could be connected to the various ATX outputs to produce a wide range of useful voltages



A non-grounded folded NVIS aerial for 40m

Duncan Telfer G0SIB/G8ATH (duncan@g0sib.freeserve.co.uk)

As many of us know, the effort in deploying earth posts, grounding mats, etc., generally exceeds that in erecting the aerial itself! Although the folded inwardly inclined dual monopole (IIDM) aerial in SPRAT 121 [1] has been in use at my QTH for about 4 years, the grounding points are attached to quite substantial existing earthing arrangements [2]. In the previous SPRAT article, the first and third IIDMs (unfolded) don't have this problem and can be mounted above any kind of earth, changes in the aerial's feed resistance being accommodated as required by ATU adjustment.

The main advantage of a folded IIDM is that it has more 'resonance modes' [3] in its VSWR spectrum, with better prospects for matching when used on other bands than the design frequency. So if you want to try the folded version without worrying about earthing provision, you can put the spade back in the shed and adopt an easier approach. Here's how.

In Fig. 1, explicit grounding points are now replaced by a bridging wire RS, with the element dimensions differing only slightly from the original. Fig. 2 shows the EZNEC™ predicted VSWR curves for (A) perfect ground and no losses, (B) perfect ground with copper losses, and (C) copper losses and a really poor ground with conductivity = 0.001 siemens/metre and relative permitivity (dielectric constant) of 2. Bare 2mm diameter wire is assumed. Here, both Cm capacitors (Fig. 4) are 48pF.

Table 1 gives wire coordinates and dimensions for a generic (lossless) aerial. In the interests of safety from 'trip wire' hazards, ungrounded IIDM aerials may be raised further above ground with only slight effects on the matching. The experimenter could also mitigate the extra height problem by lowering the X-elevation, without undue detriment to the FF pattern. If in doubt, check (e.g., in EZNEC™) before constructing.

Fig. 3a shows the predicted FF pattern for lossless conditions, for which zenith gain is in excess of 8dBi. The FF pattern for inclusion of copper losses and real ground is shown in Fig. 3b. Lossy grounds are expected to degrade the zenith gain for both dipoles and IIDMs to around 6dBi or less. Matching adjustments for aerials over lossy ground are best done at the aerial end. If a toroidal transformer is used (Fig. 4) then the turns ratio can be adjusted accordingly (turns ratio = square root of antenna resistance ratio).

Another matching approach is to progressively shorten the antenna, while increasing Cm capacitor values, until SWR (for 50 ohms, at the antenna) is close to 1:1 at band centre. For real ground and copper losses, all lengths are reduced by about 10 percent, depending on terrain, plus at least a further 1% when using PVC covered wire.

If you prefer using the TABLE 1 dimensions and an ATU at the shack, do use good quality low loss feeder. Ideally, and certainly for serious use on other bands, most of the matching should be done at aerial end to avoid increased effects of feeder losses (especially on transmitted power) at higher SWRs. Good experimenting!

References:

[1] Telfer, DJ. (2004). *An NVIS aerial for cramped locations.* SPRAT, Journal of the G-QRP Club, Winter Issue 121. [Fig. 2 of the article].

[2] Telfer, DJ and Austin, BA (2001). *Novel antenna design for near vertical incidence skywave (NVIS) HF communications.* Proc. 2nd International Conf. on Advanced System Design, Glasgow.

[3] Telfer, DJ and Spencer, JWS (2004). *Properties and performance of a new compact HF aerial design for multi-band operation.* Proc. 4th Int. Conf. on Advanced System Design, University of Glasgow. [PDF obtainable from www.cims.org.uk/dtelfer.htm Please note changes to web link.]

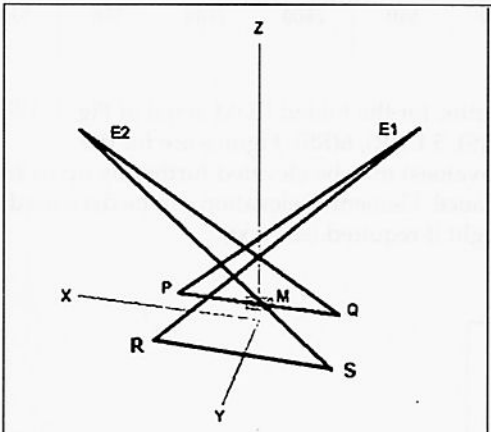


Fig. 1 Revised folded IIDM aerial without the need for explicit ground connections. PQ contains the matching unit M (see SPRAT 121). Cm=48pF and RS is a non-grounded bridging wire. All dimensions are given in TABLE 1.

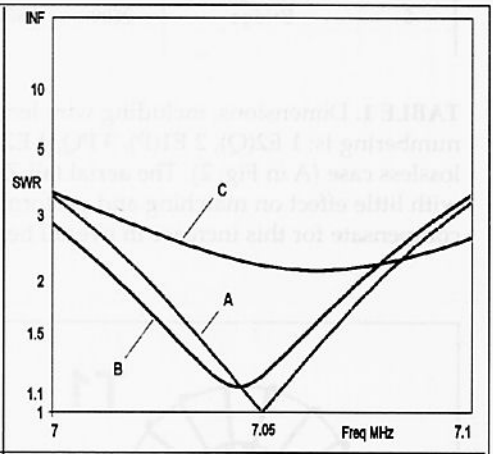


Fig. 2 EZNEC™ VSWR curve minima relative to 52 ohms for the aerial in Fig. 1. (A) perfect ground, no losses: F=7.05MHz, SWR=1, Z=52. (B) Copper losses: F=7.044, SWR=1.14, Z=59. (C) Real (see text) F=7.062, SWR=2.22, Z=110.

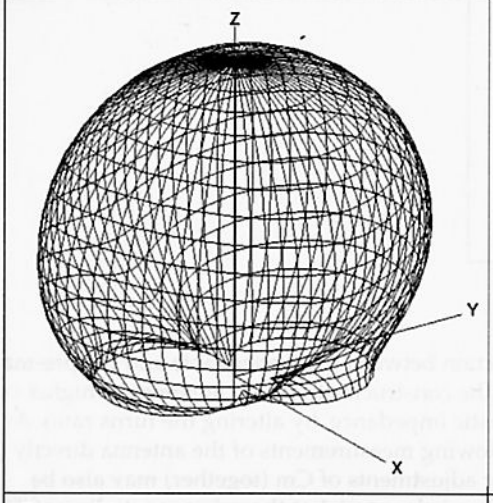


Fig. 3a EZNEC™ FF pattern for aerial of Fig. 1 over perfect ground, no losses (Case A in Fig. 2)

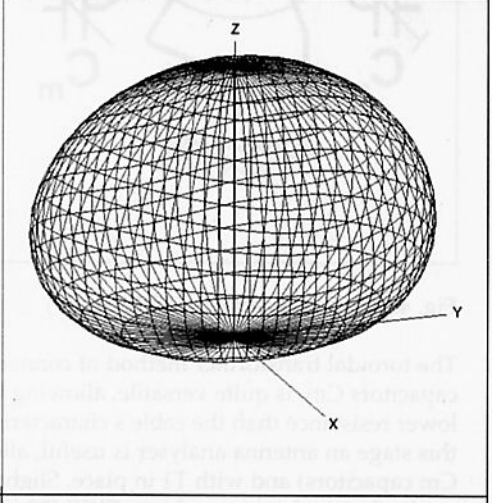


Fig. 3b EZNEC™ FF pattern for aerial of Fig. 1 over real ground and including copper losses (Case C in Fig. 2).

Wire Table for IIDM antenna of Fig 1. Units are in mm; wire diameter 2mm.							Cm=48pF	
WIRE	DESCRIPTION	END1			END2			Length
		X	Y	Z	X	Y	Z	
1	Element 2	-2600	0	560	5200	2600	9000	11783
4	Element 2	-2600	2600	560	5200	2600	9000	11492
2	Element 1	2600	0	560	-5200	0	9000	11492
5	Element 1	2600	2600	560	-5200	0	9000	11783
3	Matching unit	2600	0	560	-2600	0	560	5200
6	Bridge	-2600	2600	560	2600	2600	560	5200

TABLE 1. Dimensions, including wire lengths, for the folded IIDM aerial of Fig. 1. Wire numbering is: 1 E2(Q), 2 E1(P), 3 PQ, 4 E2(S), 5 E1(R), 6(RS). Figures are for the lossless case (A in Fig. 2). The aerial (all Z-values) may be elevated further by up to 2m with little effect on matching and performance. Element X-elevation can be decreased to compensate for this increase in overall height if required (see text).

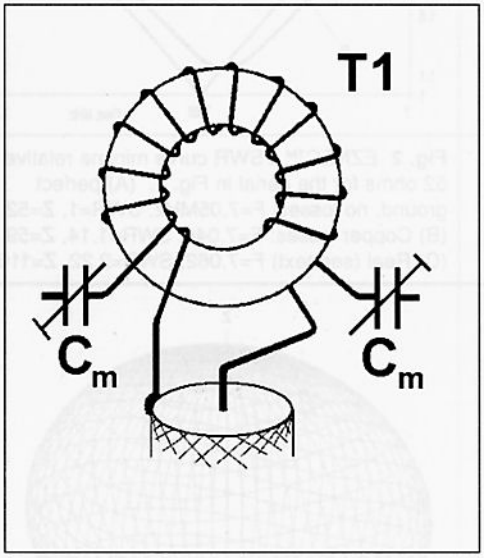


Fig. 4. (reproduced from SPRAT 121)

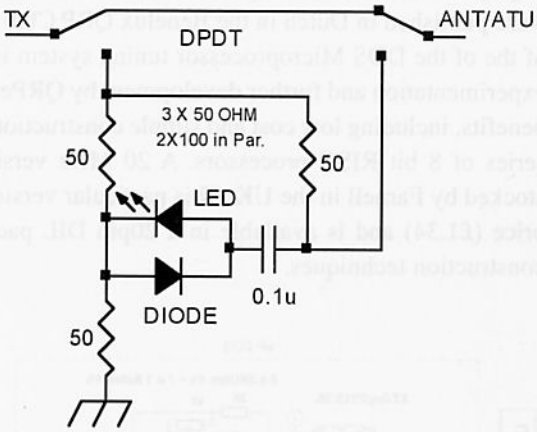
The toroidal transformer method of connection between the feeder cable and the pre-match capacitors Cm is quite versatile, allowing the constructor to match antennas of higher or lower resistance than the cable's characteristic impedance, by altering the turns ratio. At this stage an antenna analyser is useful, allowing measurements of the antenna directly (via Cm capacitors) and with T1 in place. Slight adjustments of Cm (together) may also be made, the aim being to achieve SWR (50 ohms) close to 1:1 at the primary winding of T1.

A Simple SWR Bridge

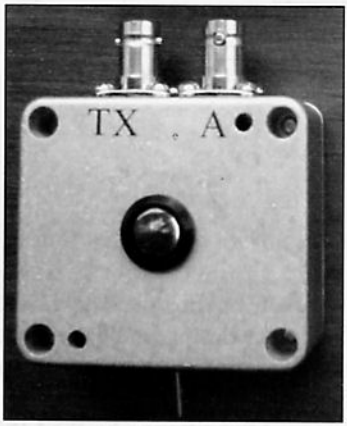
George Burt GM3OXX, Clunie Lodge, NETHERDALE By Turiff, Aberdeenshire, AB53 4GN

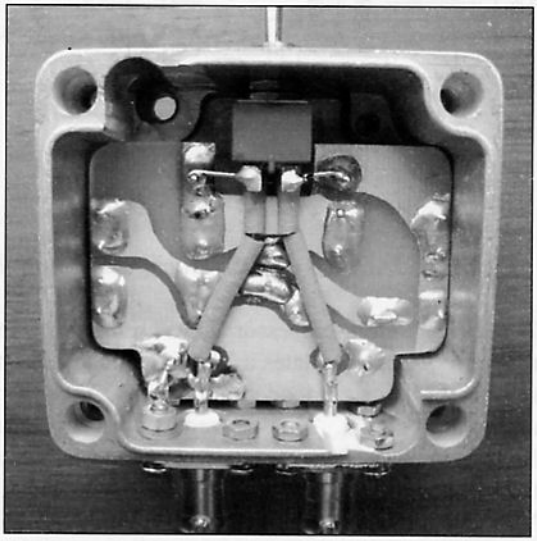
After ordering my QRP Quarterly from Dick, G0BPS, I spotted a rather nice ATU with a built in by W7DZN using a LED rather than a meter. It is ideal for nay simple transmitter and can be switched out of the circuit to prevent RF insertion loss. A quick check showed the insertion loss on 14MHz to be 20mW, so a built an ugly version on the back of a double throw switch and it worked well.

Four were then made for the local club members and all worked well. This circuit should handle 5 watts with comfort but if not switched out when transmitting it will have a 6db loss.



All resistors 100 ohm type pro2 [2w] Rapid Electronics
LED 10mm 3000mcd ultrabright + 10mm bezel panel clip
Diode – BAT85
Capacitor 0.0uF, Switch – any small two pole double throw.





The SWR Bridge on a pcb and built into a small diecast box

QRP Tuning using Micro-controller as DDS

Ton Blokker PAOKLT

Introduction:

Some time ago I started experimenting using a low-cost microcontroller as DDS reference oscillator. The performance was very respectable once I learned that the final result is largely determined by the VCO and the PLL circuitry. The results of these experiments were published in Dutch in the Benelux QRP Club Nieuwsbrief (Ref 1 & 2). A translation of the of the DDS Microprocessor tuning system is offered to Sprat readers to encourage experimentation and further development by QRPers as this circuit offers some significant benefits, including low cost and simple construction. The basic DDS is based on the Atmel series of 8 bit RISC processors. A 20 MHz version of the ATtiny2313-20 is currently stocked by Farnell in the UK. This particular version offers a high performance and a low price (£1.34) and is available in a 20pin DIL package, hence suitable for conventional construction techniques.

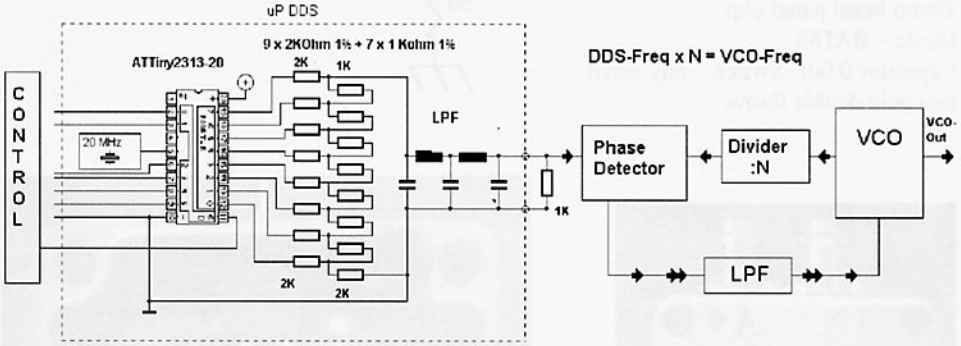


Figure 1: PAOKTS – DDS - Numerical Controlled Oscillator using a Microcontroller

The basic micro-processor DDS reference circuit is shown in Fig 1. The Atmel microprocessor calculates a 32 bit frequency sample in 10 clock-cycles of which the most significant 8 bits are loaded into port B. A resistor network converts this digital word into an analog signal. This is reduced to one sample for 20 clock-cycles when the Microprocessor also executes one of the user control functions. After filtering by the LPF the wavefrom is converted into a clean sinewave, which serves as a reference to lock the VCO via a Phase Locked Loop. With the 20 MHz crystal shown, the smallest possible tuning step of the DDS is 20 MHz/2^32 = 0.00023 Hz.

For example, if the VCO is required to tune between 14,000 and 14,100 KHz in a Direct Conversion transceiver and a :256 divider is used (74HC4040 chip) then the DDS reference frequency should be set to 54.6875 and 55.078 KHz and the smallest tuning step of the VCO will be 256 * 0.00023 Hz = 0.06 Hz. If a tuning rate of 50x the tuning step is used in the Microcontroller, the tuning resolution of the Transceiver will be 30 Hz steps.

Practical Circuit

A practical implementation of the DDS, suitable for experimentation by experienced constructors is given in figures 2 and 3. A PCB or programmed micrcocontroller chips are not offered at this time. The hexcode to program the ATtiny 2313 micro-controller is available on request, together with a full description of the User instructions (Ref 3)

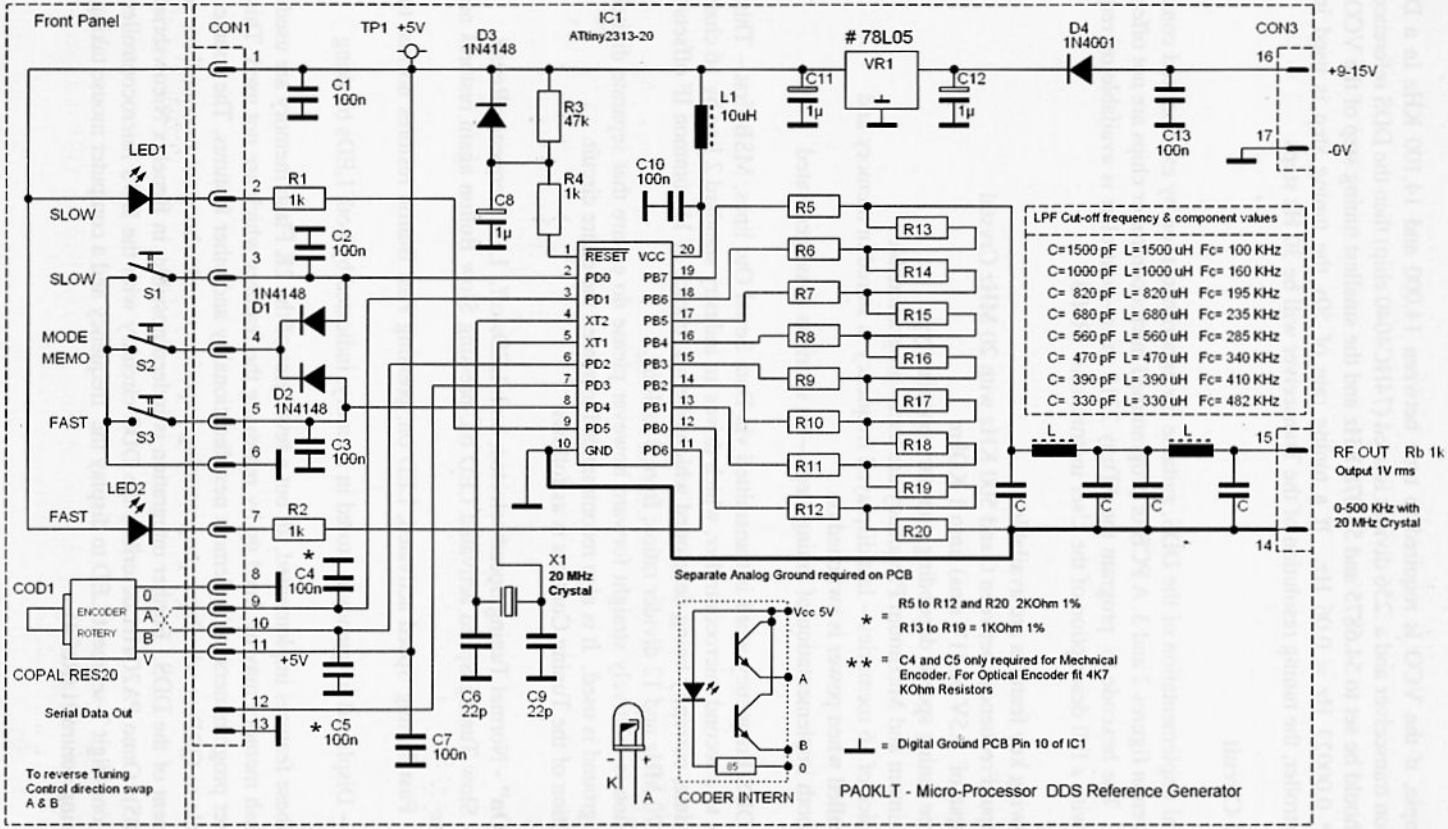
The following key features are available:

- Output Frequency between 0 and 500 KHz with 20 MHz Crystal
- Output of 2.5V pp (1V rms) into 1 KOhm
- Three tuning speeds depending on rotary encoder type
- Minimum and Maximum Frequency are user –programmable
- Choice of 16 memories – last displayed frequency is stored in memory and recalled when power is switched on
- Smooth implementation of tuning steps – no spurious noise generated

A 32 bit DDS Frequency word is transmitted via Data Serial Out lines, MSB first – This port interfaces to a second microcontroller, which drives an industry standard 2 line by 16 character LCD Module, currently being developed which offers a choice of 11 common IF offsets from 0KHz to 70 MHz and 12 divider ratios; from 0 to 4069.
Construction is relatively straight forward however please do ensure that separate digital and analogue ground is used. It is also recommended to screen the entire circuit.
A description of the Tuning Controls is as follows:

"Power On" - Normal Tuning Speed selected; both LEDs off, Last Frequency Recall
"Slow" - Slow Tuning Speed activated LED on, pressing Slow Button again restores normal tuning rate
"Fast" - Fast Tuning Speed activated, LED on, pressing Fast Button restores normal tuning speed
"Mode" – Displayed frequency is stored in memory, indicated by both LEDs blinking

With all these features implemented, all but a few bytes of the 2K Flash memory are used. Part of the Flash memory may be freed up by removing the features which are not used. This will allow other programmers to implement new functionality and other features. The source code is available to QRPers who have programming experience and who want to contribute to the development of the DDS. Further integration is indeed possible, in Benelux Nieuwsbrief 114 (June 2005) Onno PA2OHH describes the DDS circuitry with the DDS microcontroller also driving a one-digit 7-segment LED to display the frequency and a computer mouse taking care of the tuning control!! (Ref 4)


Front Panel
CON1
TP1 +5V
D3 1N4148
IC1 ATtiny2313-20
78L05
VR1
D4 1N4001
CON3
+9-15V
-0V
C1 100n
C2 100n
C3 100n
C4 100n
C5 100n
C6 22p
C7 100n
C8 1µ
C9 22p
C10 100n
C11 1µ
C12 1µ
C13 100n
L1 10uH
R1 1k
R2 1k
R3 47k
R4 1k
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
LED1
LED2
SLOW
SLOW
MODE MEMO
FAST
FAST
S1
S2
S3
D1 1N4148
D2 1N4148
RESET VCC
PD0 PB7
PD1 PB6
XT2 PB5
XT1 PB4
PD2 PB3
PD3 PB2
PD4 PB1
PD5 PB0
GND PD6
X1 20 MHz Crystal
COD1
ENCODER ROTERY
COPAL RES20
Serial Data Out
To reverse Tuning Control direction swap A & B
+5V
LPF Cut-off frequency & component values
C=1500 pF L=1500 uH Fc= 100 KHz
C=1000 pF L=1000 uH Fc= 160 KHz
C= 820 pF L= 820 uH Fc= 195 KHz
C= 680 pF L= 680 uH Fc= 235 KHz
C= 560 pF L= 560 uH Fc= 285 KHz
C= 470 pF L= 470 uH Fc= 340 KHz
C= 390 pF L= 390 uH Fc= 410 KHz
C= 330 pF L= 330 uH Fc= 482 KHz
RF OUT Rb 1k
Output 1V rms
0-500 KHz with 20 MHz Crystal
Separate Analog Ground required on PCB
Vcc 5V
CODER INTERN
* = R5 to R12 and R20 2KOhm 1%
R13 to R19 = 1KOhm 1%
** = C4 and C5 only required for Mechnical Encoder. For Optical Encoder fit 4K7 KOhm Resistors
= Digital Ground PCB Pin 10 of IC1
PA0KLT - Micro-Processor DDS Reference Generator

Notes:

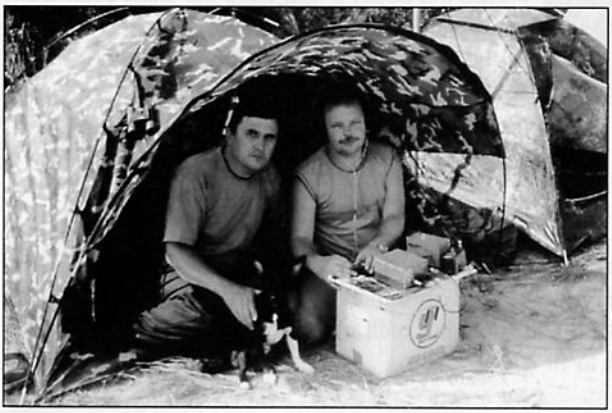
Ref 1: http://www.veron.nl/afdeling/zaanstreek/techweb/paoklt1.htm
PA0KLT Micro Processor DDS aftstemsysteem - Benelux QRP Club Nieuwsbrief nr 103 - Sept 2002

Ref 2: http://www.veron.nl/afdeling/zaanstreek/techweb/paoklt1_files/Afstem%20(3).htm
PA0KLT Micro Processor DDS aftstemsysteem (deel 2) - Benelux QRP Club Nieuwsbrief nr 112 – Dec 2004

Ref 3: Hex code to program the Microcontroller may be requested by email from Jan G0BBL (Jan.Verduyn@motorola.com) or direct from Ton PAOKLT@amsat.org
Ref 4: http://www.qsl.net/pa2ohh/04dds1.htm - Experimental Direct Digital Synthesizer based on Microcontroller and Phase locked Loop

The information was compiled for SPRAT by Jan -G0BBL

Outdoor QRP Day – 2005



Peter US1REO, Victor US1RCH and QRP dog Max

Ukrainian QRP Club
August 6-7, 2005

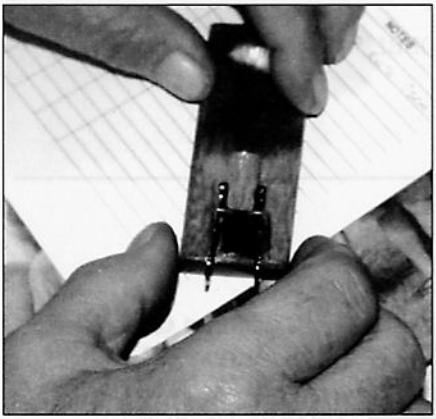
The operators (UR5RDX, UR5RJU, US1RCH, US1REO, US5RCW) of the Club station UR4RWR/P set up their camp on the picturesque bank of the Desna River in Chernihiv Region. We used a mast to which was fixed antenna 4-element Yagi for 144 and 430 MHz as well as LW and Delta for 14 MHz.
Using a NorCal-20 transceiver interesting QRP QSOs were made.with radio amateurs from Europe. The QRP holiday dedicated to the UR-QRP Club birthday was a success in spite of the thunderstorm and heavy rain which we experienced at night. The Club members had a good time in the open air and enjoyed working on QRP bands. QRP is a special world in which we are happy to live! [Peter – US1REO]

Foldback Clip Keyer

Clive Hollins, M5CCH, 56 Lovell Road , CAMBRIDGE. CB4 2QR

About three years ago I visited my old friend G3ZCD who showed me a paddle key he had picked up in the US of A. This little gadget was made from a 20mm wide foldback paper clip, a couple of pieces of wood, a standard trombone type paper clip, a scrap of very thin copper clad board and an earbud type stereo headphone cord and plug and two fancy brass buttons and it cost him $12.
Being of a curious nature I tried it and found it surprisingly good, and vowed to make one rather than spending my hard earned cash in one of the local UK shops.

Mine was made from a scrap of hardwood left behind by the builders when they installed a firewall at my former workplace, but it suits me and works just as well as the shop bought one but without the fancy brass buttons.



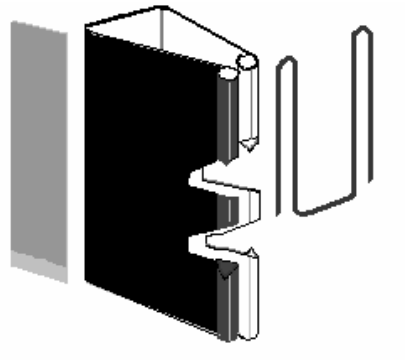
This is an ideal project for QRP operating and weighs next to nothing.
To duplicate this you need a piece of wood 9 or 10mm thick x 30mm wide x90mm long and another 22mm square x 9 mm thick (no more). Cut a goove in the centerline of the larger piece from one end to about 20mm from the other, then drill a hole at about 45 degrees through to the top side from the end of the groove so it comes out about 6 mm from the short edge on the top side. Using panel pins from the bottom of the groove and epoxy glue secure the 9 mm square piece so its front edge clears the hole.

Make sure it is on the centre line and parallel to the long edges. When all is dry, rub down the hard edges and put on a couple of coats of urethane varnish to seal the wood and make it look good.

The other bits you will need are single or double sided PCB material but thin, mine was 0.62 mm but thinner is better. I have some 0.027mm thick. A modified foldback clip, UHU rubber cement, the earbud cord and some hot melt glue. A Dremmel or similar high speed drill and a cutting disk to fit it.

Modifying the paper clip.
Remove the two spring handles by squeezing them and lifting them away. Note the inner edges of the black metal are undercut so there are points at right angles to the black metal body. The springiness of the handles normally forces them down the slope of the points so they are either forward or backwards. You need to grind the opposite slope on these bits of metal so when the handles are back in place, they tend to stick out at right angles from

of metal so when the handles are back in place, they tend to stick out at right angles from the body of the clip. In the sketch below I have highlighted one of the points cut back correctly Before reassembling the clip, scrape away the paint from the bottom inside of the clip and tin it ready to solder on the common shield braid of the earbud lead. With a bit of luck your Dremmel tool will have a burr grinder in the kit suitable for this job.



Assembly.
When the wooden base is completed, feed the two earbud wires up from the bottom through the hole just forward of the 20mm square post.

Carefully separate the insulated inner conductors from the shielding. Most of these wires will be foil spiral wound on fibre for flexibility. The easiest way to solder to these is to spiral wind a single strand of tinned copper wire tightly around the exposed copper foil for a couple of mm then tin it to form the connection. Verify the wire going to your 'dah' side is connected to the tip of the 3 mm plug. The ring is the 'dit' and the body is ground/common. Check your rig to verify this the right way round. Tin the bottom edge of each piece of PC board, then put a thin layer of UHU Power glue on the back of the board and on the rear edge of the clip. Let this dry for a few minute and carefully glue the copper board strips to the rear edges of the clip. Solder the ground shield and two leads to the prepared board, re-assemble the clip handles adjusting the springiness so they just spring out at right angles. Open the clip and set it over the 9 mm wide vertical piece while carefully pulling the cord back through the hole so it doesn't get tangled. Form the trombone paper clip into an M shape so the centre part of the M will slide down between the back of the clip and the post. Check that the keyer works OK using a continuity tester with no shorts or open circuits in inappropriate places. Finally use the hot melt glue to secure the wires in the groove on the underside.

You can adjust the spring tension by opening or closing the legs of the paddles and adjust the spacing by bending the legs of the paperclip. If anyone doesn't have suitable tools or materials, I can supply the copper clad, a pre-prepared foldback clip and a plastic coated paperclip for a small cost. Contact me initially at m5chh (at) yahoo.co.uk or by mail QTHR in QRZ.com.
P.S. You can make the base and post of any material, metal or plastic depending on your fancy.

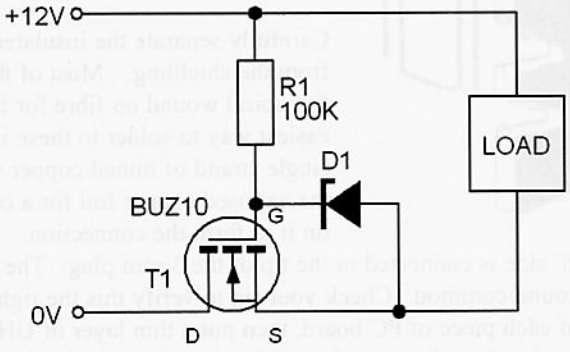
RSGB HF Convention

Dave Sergeant, G3YMC, is presenting a talk 'Making DXCC Fun with 5W' at the RSGB HF Convention on October 8th (1445hrs). The convention is at the Gatwick Worth Hotel, Crabbet Park, Turners Hill Road, Crawley, West Sussex, RH10 4ST. Further information can be found at http://www.rsgb-hfc.org.uk/index.htm

ACTIVE REVERSE-POLARITY PROTECTION

Richard Hanes G0RPH 17 Hampton Close, Chatham, Kent.

The circuit shown is a very simple reverse-polarity protection for a rig. It offers a third option to the usual series diode or relay solutions. The voltage drop is much less than that of a series diode, and the power loss is less than either of the other solutions, this being important for maximal battery life. All the parts can be obtained for less than £1 in the UK.



The circuit uses a MOSFET in reverse mode (yes, the drain is connected to the negative of the input!), enhanced by the supply in the correct connection, but remaining in the off-state when the supply is reversed. The MOSFET can be chosen to suit the power demands of the rig. The BUZ10 shown will suit most QRP applications. It has a typical on-resistance of about 60 milliohms so the voltage drop will be less than 100mV up to about 1.5A.

Using the BUZ10 much beyond 2A will see the efficiency dropping to become similar to the relay-based solution, however there is still a size advantage. Up to 3A continuous is quite safe without a heat-sink, by which time the volt drop has risen to about 200mV. For the larger currents a BUZ11 offers better efficiency, or devices may be paralleled.

The BUZ10 is rated at 50V Higher input voltages could be handled by changing to a suitable high-voltage MOSFET, but the simple series diode offers an acceptable efficiency at 50V input so there is little point in the extra complexity. The circuit works very well down at 9V input, but for even lower supply voltages a "logic-level" FET (eg IRL3103) might be a better choice, especially if the load current exceeds 1A.

The diode D1 is not really needed at 12V input but prevents excessive gate voltage when the circuit is used for higher supply voltages. It also provides useful protection against ESD effects. D1 should be bypassed by a 100nF capacitor if the circuit is exposed to significant RF fields.

A Universal MW/SW Portable Receiver

Oliver Borkowski DF6MS, Waldsassenerstr. 5,
95692 Konnersreuth, Germany

-compact and lightweight
-covers 0.5 to 1.6 MHz and 5 to 18 MHz
-easy shortwave tuning due to 13 one-megahertz steps
-coarse and fine tuning for comfortable AM, SSB, and CW reception
-no external antenna needed: ferrite rod for MW and two separate frame aerials for SW
-no external power supply needed: hours of listening with a single 9V battery
- only cheap and easy-to-get components used

General description

This radio works as a "straight" receiver for medium wave (two tuned circuits) and a single conversion superhet for short wave (variable IF 1.195 - 3.05 MHz with a CO controlled premixer stage). High gain and selectivity are achieved by the use of a regeneration stage as demodulator and BFO injection. Much of the receiver's overall gain is developed in the AF stages.

To cover 5 to 18 MHz with cheap and easily available crystals, the principle of "image frequency response" has been exploited. Some of these crystals operate both above and below the desired RX frequency. A single RF circuit (100 pF capacitor and two switchable frame antennas) provides sufficient suppression of the unwanted image band. Accurate dialling (MHz readout) of this capacitor is therefore essential; accidental tuning to this "wrong" frequency will result in perfect reception of signals 4 to 6 MHz up or down!

The main dials read "upwards" and "downwards", with a 1 MHz coverage for all ranges which means that there is equal readout, oscillator stability and bandwidth for all SW bands.

The tuning capacitors are all "polyvaricon" types with built-in trimmers. Care should be taken that for MW reception, 2x500 (2x320) pF "twin gangs" are used because there are two electrically identical tuned circuits which have to be synchronized.

Reaction control is very smooth with little frequency shift and no hysteresis. Almost any high-gain (low noise) AF/RF transistors may be used in the regen and AF stages after a bit of re-biasing.

SW Premixer

With the principal aim of simplicity in mind, no attempt has been made to employ any form of sophisticated circuitry in this stage. The values of the capacitive divider between pins 6 and 7 of the NE 612 and ground (CO), however, seem to be the best suitable for this frequency range. A gain control in this stage may seem odd, too, but it is essential to limit the amount of IF energy driving the regen stage. Strong BC stations will require an almost complete "counter-clockwise setting" of the control, reception of amateur signals demands the full gain of the mixer IC.

The actual number of windings of the two aerial coils depend of the physical dimensions of the frames. 15 x 11 cm require four windings for 5 - 10 MHz and only two windings

for 10 - 18 MHz with a 100 pF variable capacitor. The tap to pin 1 should be at about a quarter from the earthy end. Response to the desired band must be very sharp so as to suppress the unwanted image frequency. There should be a noticeable noise peak indicating proper tuning of the input stage even when no signal is present. A very carefully labelled dial with direct frequency readout has proved very helpful for pre-setting.

MW Preamplifier

There is not much to say about this stage. You will find it in many handbooks. A 1 x 12 cm ferrite rod is sufficient for very satisfactory AM pickup. About 70 + 30 windings on a paper tube around the rod will do for a start. The winding should be placed near the end of the rod which makes L adjustment easy by moving the coil tube along the rod.
A very low operational voltage of about 3 Volts will provide enough RF energy to drive the regen stage. Any increase in RF gain will result in overdriving it and must be avoided. The value of the 1k resistor may be adjusted for best performance. Compared to a middle-class communication receiver, this little radio offers good sensitivity and selectivity alike. The two tuned circuits must be synchronized. The first step is to determine two MW frequencies, one at the low end (say 700 kHz) of the band and one at the high end (preferably, for simple test generators, 1400 kHz - thus no changing of the test signal frequencies is necessary). With the receiver tuned to 700 kHz (after determining the band edges by tuning the regeneration stage to 520 kHz - inductor slug - and 1630 kHz - trimmer capacitor) adjust the ferrite rod coil to maximum signal strength. Then, tuning to 1400 kHz (first harmonic of the signal generator), adjust the trimmer of the preamp capacitor to maximum. This procedure should be repeated several times, making sure that the overall range has not changed. The "fine tune" variable capacitor must be set to a fixed (centre) position and left there during the alignment procedure.
Alternatively, suitable AM broadcast stations of constant field strength may be used (at day time) if no signal generator is available.

Regeneration & AF stages

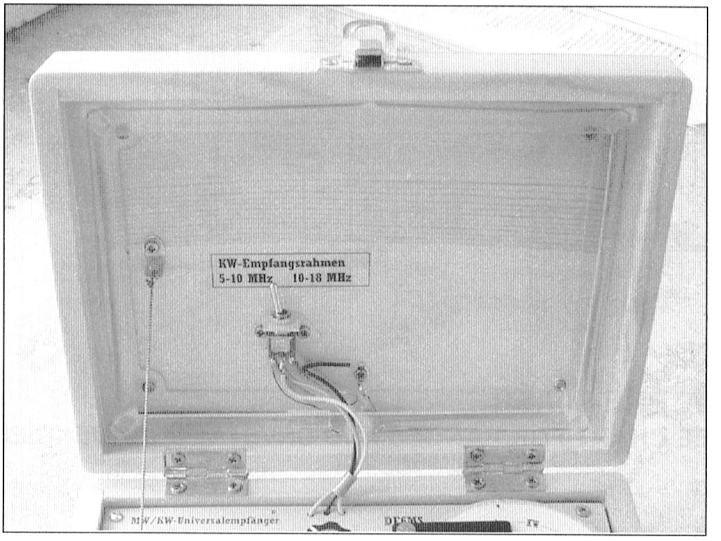
This is an almost complete copy of the "Silver Tern" receiver to be found in the Club's circuit handbook. Full credit thus goes to the designer of this ingenious little rig. Many other suggestions have been tried but there is no better one providing this high grade of sensitivity, easy tuning and, most of all, reliable and comfortable reaction control.
It is highly recommended to start building the receiver "from the end", which means that the operator has the chance to test it by itself. After the three "final" stages have been completed, very clear MW and SW reception must be possible with a few metres of wire attached to the coupling coils. The SW range (to become IF) from 1.95 to 3.05 MHz may be checked with a signal generator or a GDO. If some test equipment is at hand, some 0.5 microvolts (!!) should give a clearly audible CW signal in the headphones (secondary winding of the AF interstage transformer) or in the loudspeaker if an AF IC is used. Since the audio strip has a considerable amount of gain, all signs of instability (hiss, motor boating, or the regeneration stage generating AF signals) must be tracked down and cured.

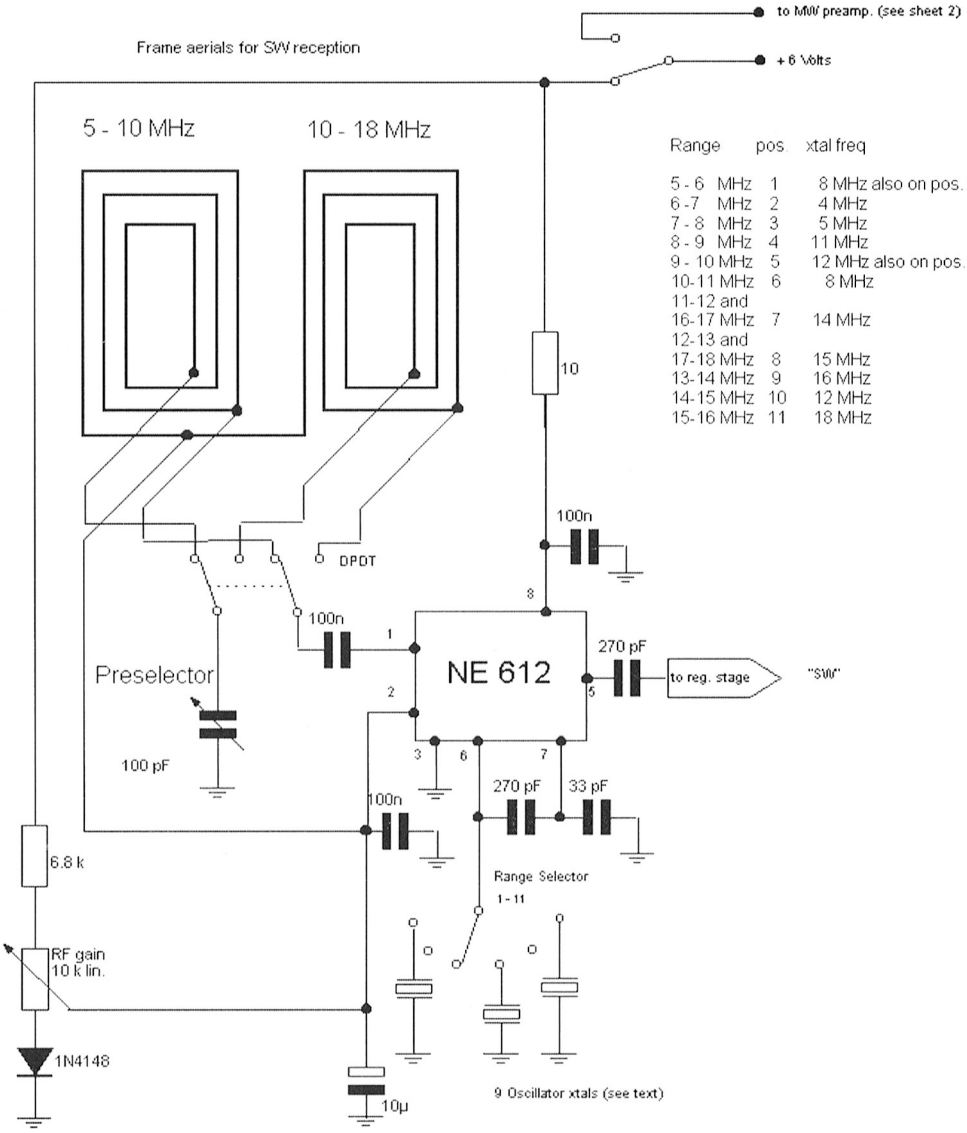
Some "tweaking" with the coils' windings and tappings and the value of the regeneration preset trimmer may become necessary. When operating the regeneration control pot, a smooth start-up of oscillation (note the increase of AF noise) is essential.
Before wiring up and connecting the preamp & premixer stages, a perfect operation of the regen and audio board must be obtained.
The audio interstage transformer is not critical; it only helps to isolate the two steps of AF amplification from each other. This seems to avoid unwanted self-oscillation.
Almost any AF final stage will do its job, depending on the amount of audio volume needed. Noisy locations, however, ask for a few hundred milliwatts on the speaker, so the LM 386 PA "booster" with a built-in hiss filter is no sign of luxury but a result of experience.

Notes
This little radio in its wooden case has indeed exceeded all expectations. Built to bring its constructor a few BC stations to his bedside table in dreary hotel rooms, it has now found its place of honour on the station desk. A great number of DX (CW and SSB) has been logged - a new form of desktop DX in the author's QRL office!

Reference:
Regeneration & audio stages : "Silver Tern Reflex Receiver" by SM 06259, the G-QRP circuit handbook , p. 44-46 (1983)
MW preamp: W1FB's QRP notebook, Fig. 1-3B, p.8 (1886)
SW premixer: M. Arnoldt, Geradeaus- und Direktmischempfänger ; Klassische Technik - neu konzipiert, p. 85 (Aachen 1997)
Audio PA: "Boosting the LM386" by Bill Currie, VK3AWC, SPRAT #110, p. 16 (Spring 2002)

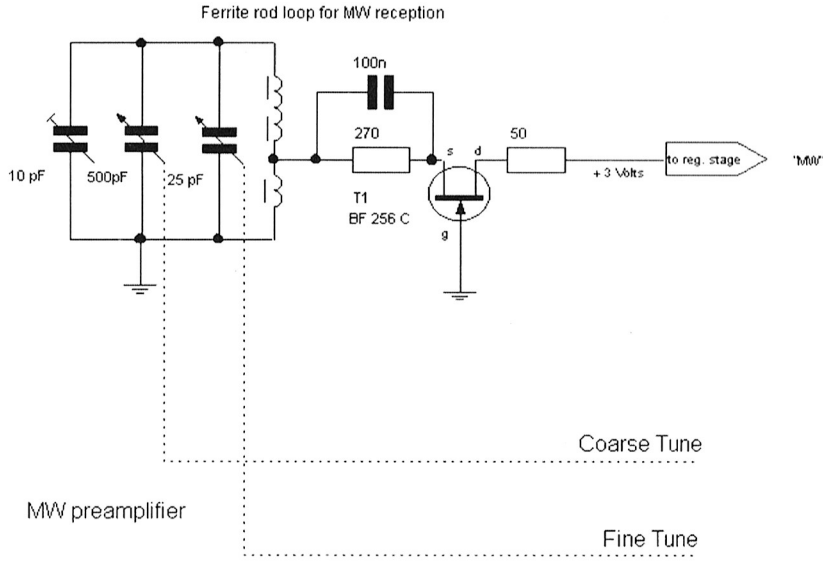
Frame Antenna in the case lid with range switch



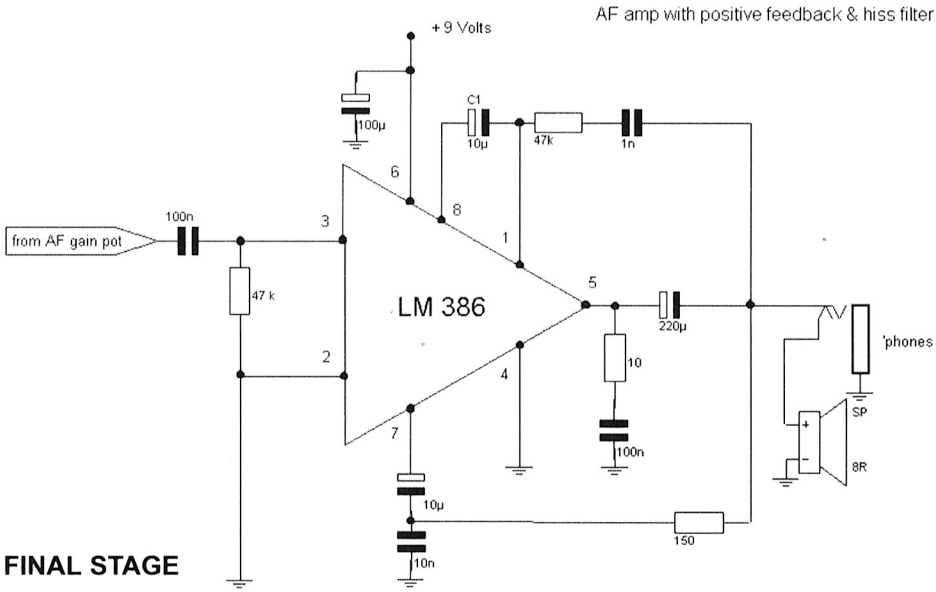


SW PRE-MIXER

SEE CHART FOR RANGES AND CRYSTAL FREQUENCIES



MW PREAMPLIFIER



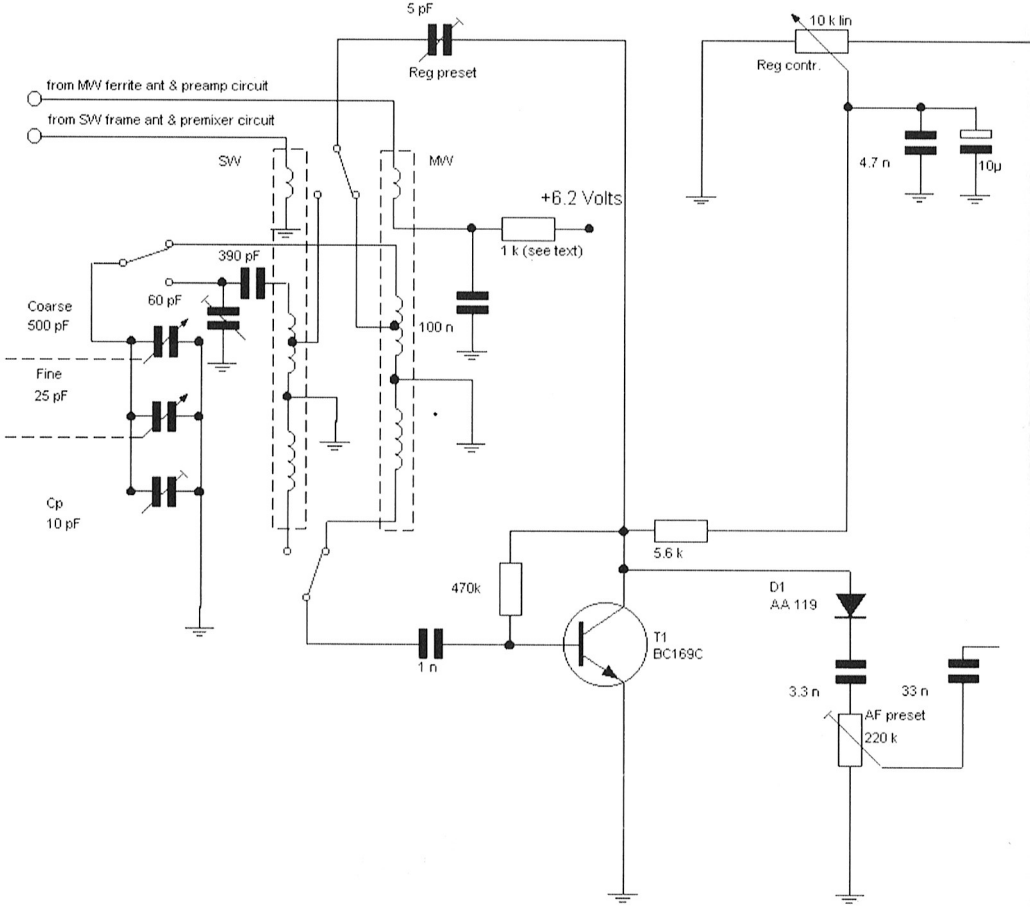
AF FINAL STAGE

Regenerative and AF amplifier Stages
Part 1

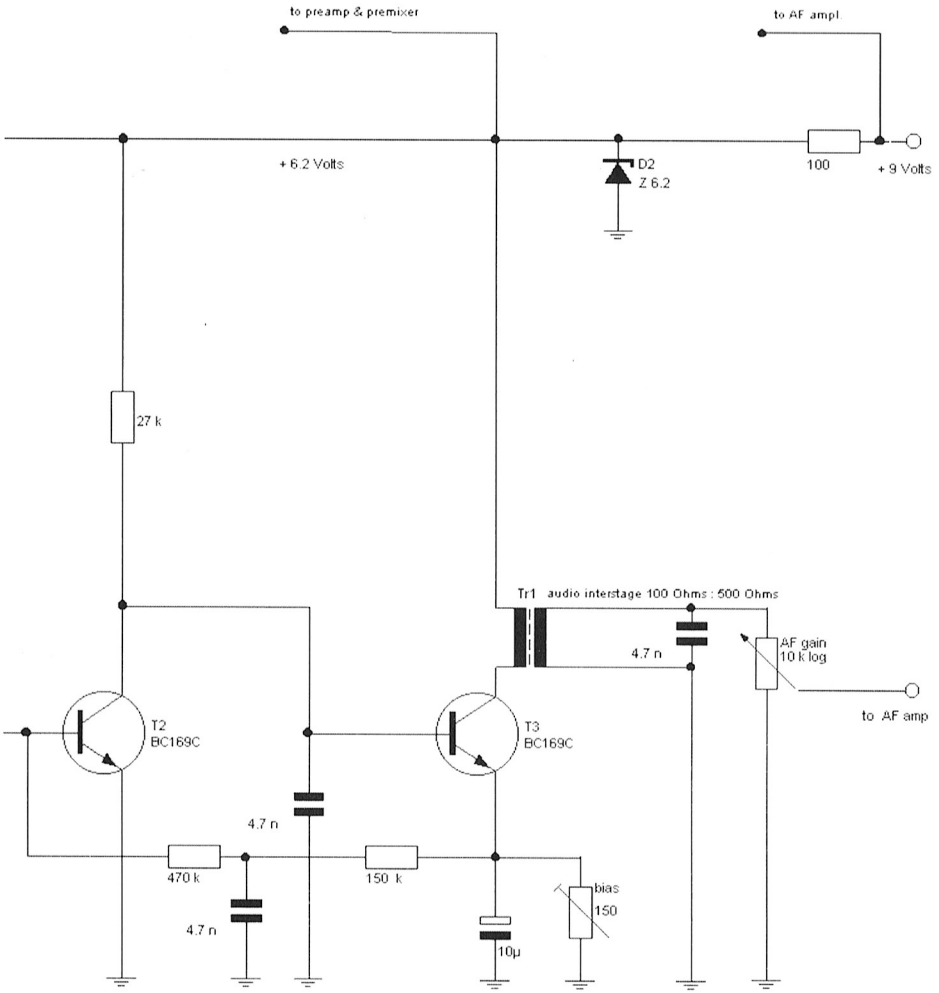
MW coil - 0.5 - 1.6 MHz on slug-tuned former

SW coil - variable IF 1.95 - 3.05 MHz dto.

windings n1 : n2 : n3 : n4 = 1 : 2 : 2 : 3



Regenerative and AF amplifier Stages
Part 2



A Look at Low-Pass Filters

Gerald Stancey, G3MCK, 22 Peterborough Ave. Oakham, LE15 6EB

This is a four part story of what happened when I decided to improve my harmonic rejection. Interesting issues kept appearing which gave me some surprises.

Part 1

Recently I made a 7-element Chebyshev LPF for 80m to one of the well known designs that appear in the ARRL Handbook and numerous QRP publications. The filter appeared to work to specification and here the matter should have rested. However a little later I needed a second similar filter but as luck would have it I did not have the necessary capacitors in the junk box. However I did have the capacitors to build a low pass filter to an older design namely the half wave filler. I cascaded three pi-sections to give a seven element filter. Both filters have the same component count, it was simply a case of making do with the components that were to hand. Figure 1 shows the circuit and values.

Out of interest I did a rough plot of their responses and was amazed to find that over the HF spectrum the old design was significantly better than the Chebyshev filter. This was confirmed by more careful "measurements. This result was most unexpected so it was deemed worthy of further investigation.

Help was enlisted and it was suggested that perhaps my Chebyshev filter was not meeting its design specification. Accurate measurements of the response curve of the Chebyshev filter were done and these confirmed that it was meeting specification! Finally computer simulation of both filters confirmed the experimental results which were:

Filter \ Frequency	3.6	7.0	10.1	14.0 MHz
Chebyshev attn.	0.1	31	51	55 dB
Three pi filter attn.	0.2	39	61	75 dB

From this it appears that the simple three pi-section filter has a better harmonic attenuation than some more modern Chebyshev designs. It may well be that the Chebyshev excels in other areas such a phase shift but it is not clear to me that this is relevant to the HF CW user. For the home constructor another advantage of the three pi-section design is that it can be made using only 1 value of capacitor.

Part 2

The above discovery was made because my junk box did not contain the desired components. Therefore it seemed worth looking at the sensitivity of the pi-section filter to variations in capacitor values. To evaluate this I made a single section filter, see figure 2. The filter was designed for 3.88 MHz for the simple reason that 820 pf is a preferred value and 3.88 MHz seemed nicely HF of 3560 KHz.

Filters were evaluated where the capacitor values were increased and reduced by about 20%. The results are given below.

Filter		1	2	3
Cpf		1000	680	820
LuH		2.06	2.06	2.06
SWR 3.5 MHz		1:1	1:1	1:1
Attn at 3.5 MHz		0.1	0.1	0.1
Attn at 7 MHz		12	6	10
dB	10.1	26	18	23
	14	36	-	32
	21	45	-	38
	28	44	-	38
Fco MHz		3.88	3.88	3.88

From this it can be seen that the filter works quite well with capacitors that are well off the required value. However if you can't use the correct value use a larger one.
A back of the envelope calculation showed that this filter is fairly insensitive to changes in the value of the capacitors. Computer simulation supported this.

Part 3
This gets a bit theoretical. The pi-section filter can be considered to be two L-networks back to back. In the half wave filter each L-network has a Q of 1. To evaluate the effect of different Q I made a single section filter with a Q of just over 2. This gave spectacular attenuation figures but had a poor performance in the pass band.

Cpf 1800.	LuH	1.64.	SWR 3.5 MHz	1:1.
Attn (dB) at	3.5MHz	21		
Attn (dB) at	7 MHz	21		
	10.1	35		
	14	37		
	21	32		
	28	32		Fco 3.88 MHz

I suspect that I got into the area of ultra spherical filters to which W7ZOI refers in his recent book (EMRFD). This is an area where spectacular filters with low component counts could be made but more work needs to be done.

Part 4 The design of classic pi-section filters.
This is very simple.
Step 1 Select a frequency.
This is not the cut-off frequency which is usually defined as the frequency where the attenuation is 3 dB. It is a frequency somewhat greater than the operating frequency. I feel comfy with making it 10% higher than the operating frequency. You may know better.
Step 2 Select the operating impedance.
Normally this will be 50 ohms and this is the value that is used in the following calculations.
Step 3 Calculate the value of C.
Use the formula

$$Cpf = \frac{10{,}000}{Pi \times F(Mhz)}$$

Check that Cpf is a convenient value. If it isn't pick a convenient value for Cpf and use it to calculate a new value for F(Mhz). Check that you are happy with the new value of F(Mhz).
Step 4 Calculate L
Use the appropriate value for F(Mhz) in the following formula:

Lmph = 25/(Pi x F(Mhz)) Pi is 3.14

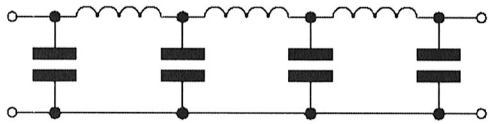
If you are using toroids for the inductor then be aware that you can't have part turns. This means that if the inductance you have calculated needs 19.5 turns then you have to choose between 19 and 20 turns. In this case the half turn rounding will alter the inductance of the actual coil by about 5%. Also the quoted Al values are only accurate to +/- 5% so that the total error in this coil could be as high as 10%. The errors could of course cancel out - some chance sez me! The best way of dealing with this problem is to put on more turns than necessary and measure the inductance then take turns off until it is close to the wanted value.

Conclusion

This investigation was the result of not having the right bits in the junk box. For many home constructors the challenge is to build using what is to hand, we don't all have a supplier down the road, and ordering small quantities by post can be rather expensive when postage and the often very reasonable handling charges are added.

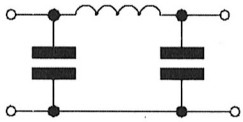
Finally I would like to thank Tony (GØOPB) and Phil (G3SES) for their help with measurements, modelling and discussions. However the views expressed in this article are mine alone. If I have got it wrong will someone please tell me and not moan about it on the Internet. I am only an OAP who dabbles in electronics; I am not a fellow of a learned institute.

FIGURE 1



Chebyshev	470pF	1200pF	1200pf	470pf
		2.43uH	3.01uH	2.43uH
3 X Half Wave	820pF	2X820pF	2X820pF	820pF
		2.06uH	2.06uH	2.06uH

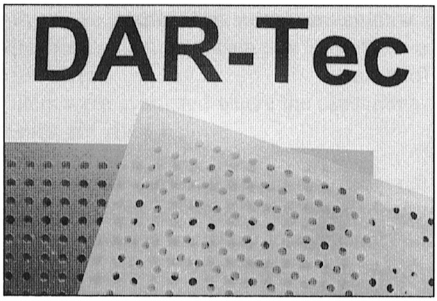
FIGURE 2



L = 2.06uH

C = see text : 680, 820 & 1000pF

New Source of Perfboard



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. They 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.

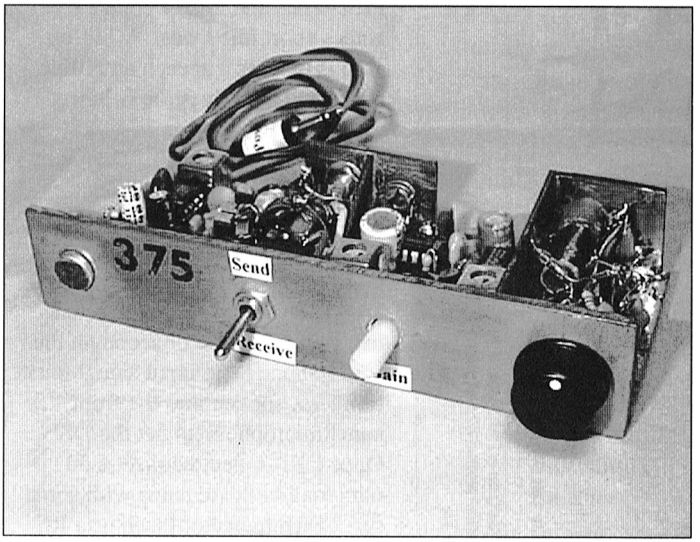
Tel/Fax 01706 215450. email sales@dar-tec.co.uk.

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

WIFB MEMORIAL ENTRY

The Wee Willy - 80m DSB Transceiver

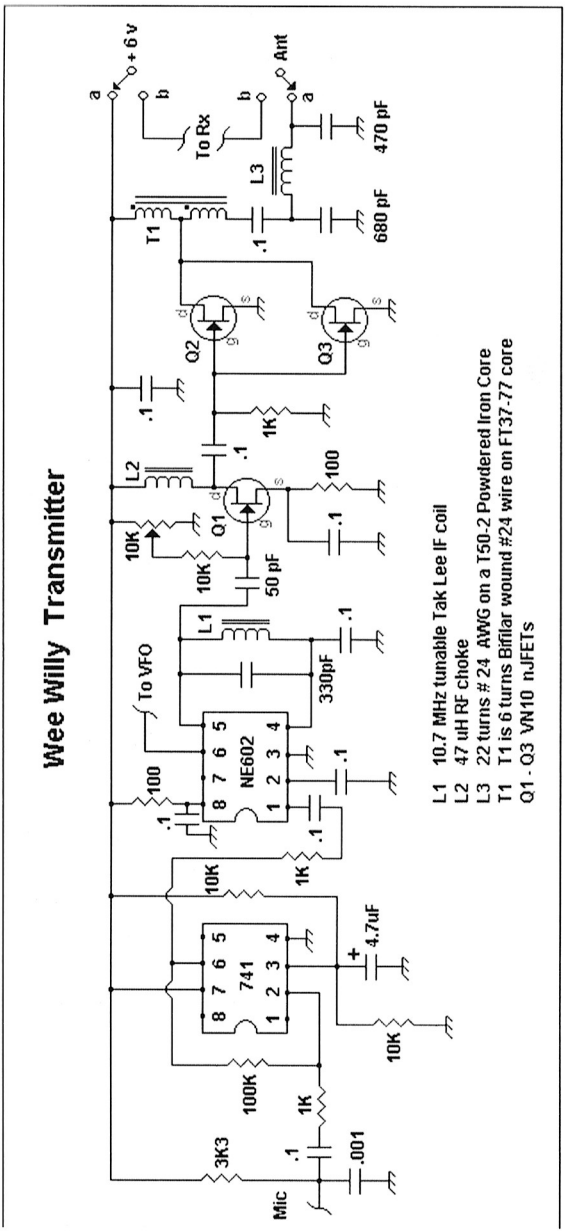
Dick Pattinson, VE7GC, 295 Price Road, Salt Spring Island, British Columbia. V8K 2E9. CANADA



"Wee Willy". is a double sideband transceiver. It has a low parts count and is easily built using non-etched PC board techniques. It has a homebrew case using copper clad PC board for the front and back panels and cardboard for the rest of the case. The set itself is in a case 1 1/4 by 2 1/4 by 5 1/2 inches. There is a separate container which holds a 6 volt rechargeable battery and speaker. The speaker/battery case is about 2 1/2 inches cubed and is not shown.

The circuits are built in three sections on the circuit board, namely TX, RX, and VFO. An electret condenser microphone is on front panel along with T/R switch, volume and frequency adjust. The back panel has the antenna jack, power input cord and the speaker jack. The electronic wiring is done on single sided PC board, copper side up. Small holes are drilled through the PC board material to allow component leads to pass through them. Then the holes carrying active leads are chamfered (countersunk) with a larger drill bit which is not run all the way through the PC board. This leaves an ground-insulated side to the hole and prevents a component lead short circuit. The copper being topside allows both convenient and short component grounding. The Wee Willy parts layout is extremely neat and compact.

The project case is constructed from 1/16th inch cardboard which is cut and bent to fit the electronic PC board. Once cut, the outer surface and edges at the front are covered with tissue paper or Kleenex (tm) type tissues soaked in white glue. The applied tissue paper and glue is allowed to dry and then additional coats are added to build up a body. Alternately, the cardboard case can be coated with lots of glue and the covering material imbedded in the glue. The air bubbles are pressed out and extra glue is added where necessary. When enough material has been added to cover up and strengthen the case joints and the glue is perfectly dry, the case is painted with Rust Coat Enamel available at hardware stores. The end result is a glossy, durable finish which looks very sharp.

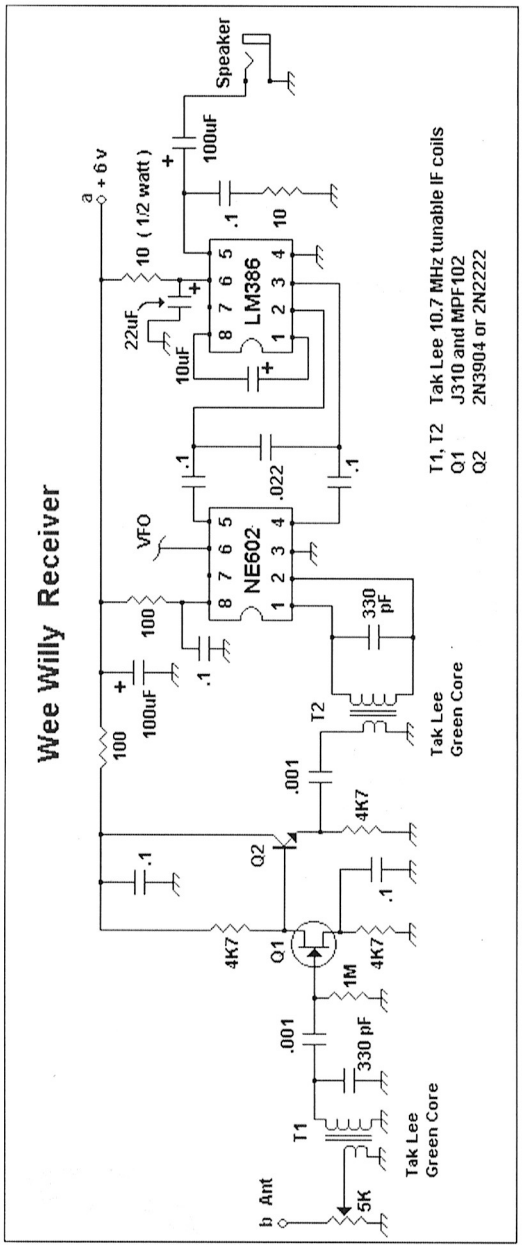


This transmitter uses an electret condensor microphone (Archer 270-90 in prototype). The mic is built right into the front panel of the chassis and this of course guarantees short mic leads. A 741 op amp is used as a speech amplifier which in turn drives the balanced modulator a Signetics NE602 doubly balanced mixer. The input and output impedance of the NE602 mixer is around 1500 ohms. To adjust the transmitter, set the bias control on the VN10 stage to ground and tweak L1 to resonance using an RF probe or scope on the VN10 input. The input signal must be audio, spoken into the front panel microphone to get the DSB. Once L1 is tuned, connect a 50 ohm load to the antenna with some sort of RF indicator (such as a RF power meter) and advance the bias control to give a watt or so output. Then speaking into the microphone should result in a DSB signal suitable for communicating on QRP! No audio input should result in no RF output. The supplied voltage should be kept at 6 volts, remembering that NE602's cannot stand voltage greater than 9 volts. With suitable voltage control such as a 6.8 volt zener diode on these chips, one could use higher input voltage with a corresponding RF output. There is another way of setting the bias on the VN10. After aligning L1, with a ammeter in the six volt supply line, advance the bias control until the input current increases about 10 mA (with no modulation). If you do not have an FT37-77 ferrite core, substitute 10 bifilar turns on a FT37-43 ferrite core for the T1 transformer.

Receiver

The receiver is a direct conversion type with a manual RF gain control in the form of a 5K potentiometer. Listening to a weak signal on the desired frequency the RF stage and the mixer core (T1 and T2) adjustments are made until you hear the loudest possible signal, keeping the input test signal as low as possible. When the receiver is connected to a doublet antenna there is no lack of incoming signal, which can be controlled by the front panel RF gain control. The antenna and 6 volt supply is switched manually from TX to RX mode and back by a front panel mounted switch.

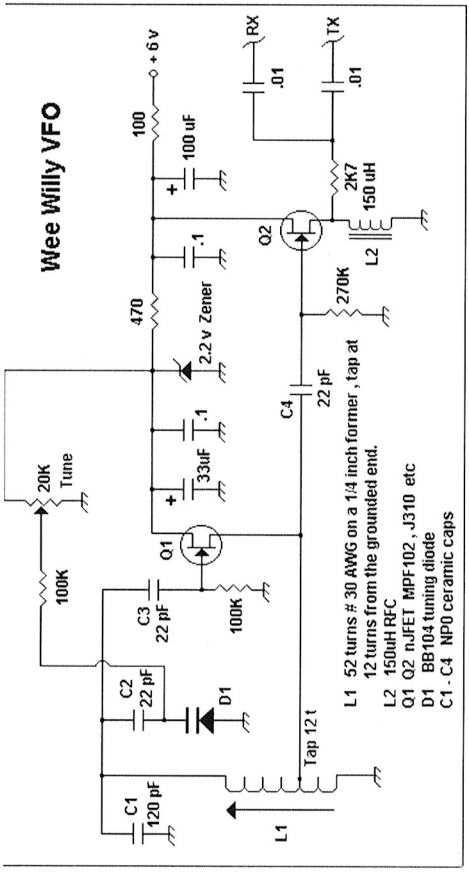
If you can not find Tak Lee green 10.7 MHz IF coils, probably any other brand of 10.7 MHz slug tuned IF transformer would work. The Mouser catalogue number 421F123 would work well and in another 80 meter project I used it with a 470 pF capacitor instead of the 330 pF cap shown. I would start with Dick's 330 pf cap and if it will not tune to resonance sharply, slightly increase the cap value up to see if a bit more capacity is required to resonate it on the desired 75 Meter frequency. Note that the secondary coil on the L1 transformer in the transmitter schematic is unused. If your 10.7 MHz IF coil has a built in capacitor at the base, remove it.



During receive, the standby drain current at 6.0 volts was 24 mA and on loud signals it rose to 100 mA. If this is too much, probably the easiest thing to do would be to put in a series resistor from positive to the LM386 to limit the drain current. To get output on the speaker it is a matter of how loud you want it for the drain you draw. If earphone only reception is okay, then the drain could be reduced considerably.

VFO

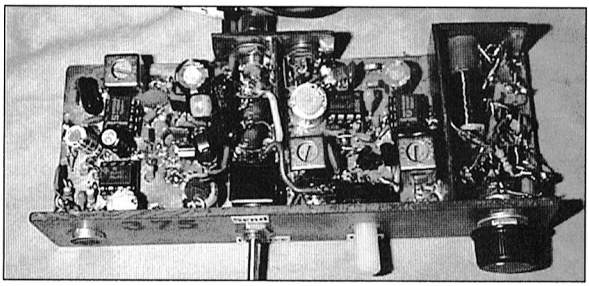
This VFO was based upon a design presented in SPRAT for summer 1995. The main inductor L1 is wound with #32 AWG wire on a 1/4 inch slug-tuned coil former. This coil would have an XL somewhere between 250 - 310 ohms, so if you cannot find a coil former as described , you could easily wind one on a powdered iron toroid and make a portion of the C1 capacity variable for adjustment. A suggested alternate inductor is 53 turns of #26 AWG on a T68-6 core powdered iron core.



Try checking an old television to find suitable coil formers. It would probably be best to distribute the 120 pF C1 capacity among 3-4 capacitors to enhance stability. These caps should be NP0 ceramic for best results with frequency stability.

The oscillator uses the slug tuned core to put VFO frequency close in frequency to where you want to operate and the variable resistor tuner on the front panel allows adjustment around the incoming signal to get the correct pitch. The desired band-edge is easily set by adjusting the slug while listening to the VFO frequency as audio on another receiver that has a frequency readout or directly with a frequency counter.

The L2 150 uH RF choke can be a simple epoxy unit which resembles a resistor. The D1 variable capacitance diode is a BB104 which has ~ 35 pF capacitance on each side. These are available in the USA at Dan's Small Parts and Kits (see website) Experimentation with other tuning diodes could produce a practical alternative to the specified D1 part.



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

FOR SALE: Morsum Magnificat magazines - No's 1 to 89 complete in as new condition!. Best offer plus postage secures.
Tom Hamilton G0HIN@aol.com or 02392 461982 Hayling Island (most times).

FOR SALE: Timewave DSP-59+ deluxe. Audio noise reduction filter. Version 3.0 All modes and CW bandwidth 25 to 600Hz in 15 steps. Complete with manual and leads.
£95 post paid - Eddie GM4EWM 01343 544234

FOR SALE: FT817, complete with charger/nicad & spare nicad plus holders, mic, handbook etc. soft carry case & strap. Original packing - As New £340.
Small HB/Yaseu 20 watt linear for above on 20 mtrs [easily modified for other bands] excellent with FT817 £45 or £375 the pair.
Almco DR112 mobile/base 2 mtr FM, 25w. mic,handbook, original packing, excellent condition. £80.
GP3 Vertical GP Antenna for 20/15/10 mtrs Very Good Condition £40.
Carriage extra on all above - Eric, Tel: 01234 768120

WANTED: TRIPOLET 0-100mA meter, Model 327-T, 3" x 3" face, round mounting to 2.75" hole. M0LOG. 01925-659946

FOR SALE: Lake DCR 7-5 built by Alan Lake – as new £70 + post & packing
Ten-Tec Century 22 with PSU. Good condition – factory serviced 04. £270 + p&p
Jim Harrison, GM0NTR, 17B High St. Oban. Argyll. PA34 4BG

22nd Yeovil QRP Convention

Sunday 9th April 2006 at the Digby Hall, Sherborne, Dorset

Doors open 10:00 am to 5:00pm
Convention Speakers

10.45am	Quantifying Grey Line Propagation by Rob G3MYM
12.00am	Chippenham DARC Mini DXpedition to Lundy by Ian G0GRI
1.00pm	Lunch break & Draw
1.30pm	Lecture to be announced

The G QRP Winter Sports 2005/6

December 26th to January 1st 2006 – inclusive

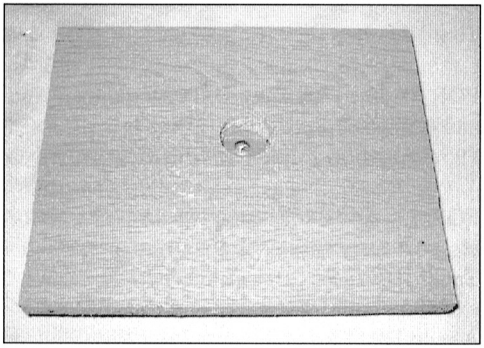
'The Friendly QRP Operating Event'

Simply call "CQ QRP" on the International QRP Frequencies at any time during the event and work as many members as possible. Logs may be submitted to G3XJS – see page 35

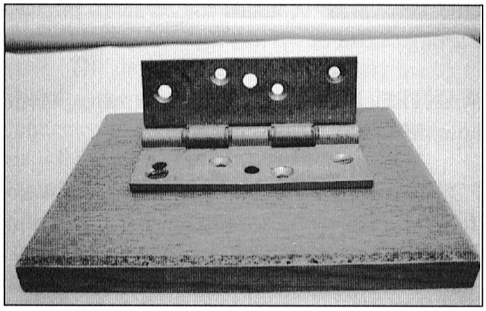
Copper Island Construction

George Woodworth, GW4ZAG, 136 Wepre Pk. Connah's Quay, Deeside, CH5 4HW

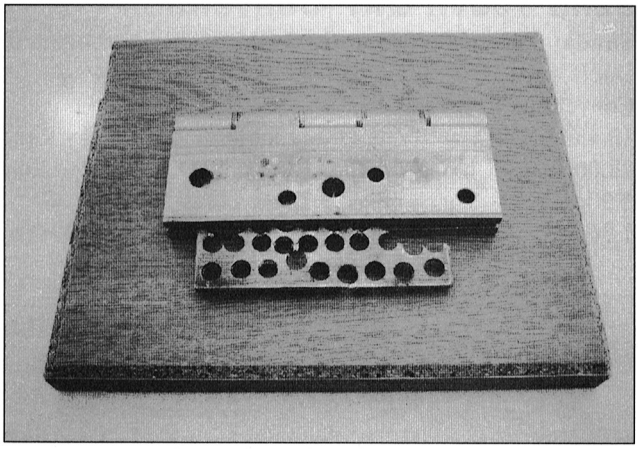
Whilst I am not a great Morse operator, I am a keen builder of simple QRP projects and over the years I have had lots of enjoyment from construction projects written by George Dobbs, George Burt and the many others who have contributed to the pleasure of QRP. In the main I have produced my own etched boards which are messy to make and take a considerable amount of time to produce unless you have professional equipment.



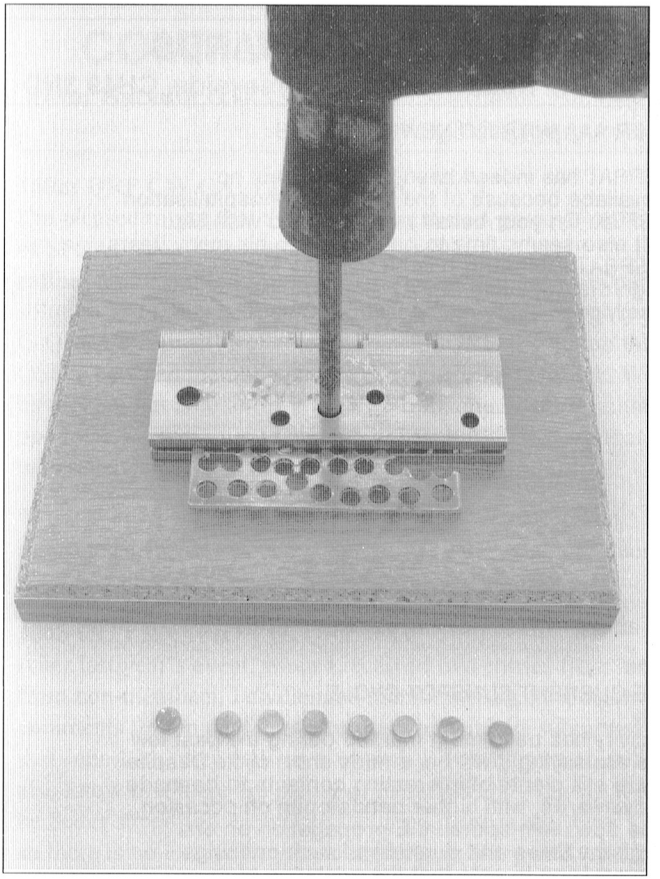
I was pleased when I saw Duncan Walters (G4DFV) Copper Island Construction kits for sale. but at that time I was having a rest from QRP and doing other things (that's my excuse). Unfortunately when I returned to construction and rang Duncan it was too late, he had finished manufacturing the kits and another great QRP initiative had died, through the lack of support.



I decided there must be a simple way to produce the islands and looked at a number of methods using a press and punch. I had seen a very good idea in the Sprat many years ago, using a vice to press the islands out which I tried, but it was a bit slow. I decided that the vice method wasn't for me and I decided to experiment with a couple pieces of metal and a punch (drift).

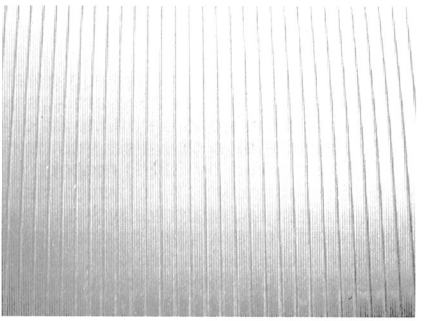


I drilled a hole in two flat metal bars and placed a piece of single sided PCB between and gave the punch a good hard bash it produced the desired effect, but it was damaging the back of the single sided board. I thought I would try to punch the islands out in double sided board, so I tried again, this time success, no damage to the islands.



I found I had to clamp the bars together and match the holes exactly to produce decent islands every time, what I needed was a method where the top and bottom holes would always line up. I had some heavy brass 4" door hinges, they seemed ideal, the space between the two leaves when closed left enough space to accommodate the thickness of the PCB board. I drilled a new hole through the hinge and mounted it on a piece of 22mm ply with a 22mm diameter hole drilled through the centre of the ply to let the islands drop through on the bench. Placing the PCB between the leaves, I could manage to move it along just missing the previous holes, therefore maximizing the amount of island from the piece PCB with little waste. Once I had the strike of the hammer right, I found I could produce 50 islands in not time at all, however, on occasions I did hit the punch a little too hard and it would get fast in the PCB. Apart from this, all that was needed was to clean the backs of the islands with a large ladies emery nail file and of course the tops before soldering. Left

The next problem to resolve was the way to mount IC's. I tried to make the pads by saw cutting a piece of PCB, but I decide it was better to use Vero Board. I had some luck at a Rally and purchased a quantity of board similar to the Vero Board without the holes, which was just the job. I am sure someone must still manufacture or sell the board pictured in the bottom photo. I glued the islands on with cheap super glue and to date none have come loose.



ANTENNAS - ANECDOTES - AWARDS

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

APOLOGIES FOR ANOTHER AAA WITH NO NEW ANTENNAS

The text for this editionf SPRAT has indeed been prepared, but no properl lustrations were availabe because of the illness and hospitalisation of our illustrator, Mac, G3FCK. On your behalf I would like to wish Mac a swift and full recovery. It also seems time to pay tribute to his many years of service to the Club as SPRAT illustrator. It is he who has for year after year turned our often rough drawings into SPRAT standard illustrations, and he has thus been of service to every member ofour Club. Get well soon Mac, we need you !

AWARD NEWS

TWO-WAY QRP

40 G3ZNR-; 10 G3GVR .

WORKED G QRP C

260 GoUTF

Congratulations to all the above

.

AUTUMN ARRIVES IN THE CURRENT SUNSPOT CYCLE

The decline in sunspot activity has been most marked during the past few months and some experts are saying it will be a fairly short cycle.Despite the current decline,there are still plenty of interesting contacts to be made on bands from 14 MHz downwards, with higher bands open on occasion. Even 28 MHz is likely to be open with sporadic E propagation on one day in every three, although the times and duration of such openings cannot be forecast. It is interesting to note that the existance of these openings was confirmed by a small team of G QRP C Members some years ago. The If bands will come into their own during the next few years, but as always the going will be tough, with stations which at a sunspot maximum may have frequencies covering a 10 MHz range crammed into a 2 or 3 MHz range at night. So the more efficient your make your receiver seletivity and antenna the better you will be able to deal with the advent of low sunspot numbers.

SPECIAL EVENT STATIONS - AN AWARD ?

These seem to be multiplying greatly, and often covering significent events.For example 20 years ago whowould have believed a Russian special event sattion woild be on the air celebarting the re-dedication of a Catherdral ! Some have also operated from fairly rare locations, an example being EO60I worked by G8PG recently (Iran but exactly what was being celebrated is not yet known). All of which makes one wonder if there would be any interest in an Award for working special event stations when using QRP ? It could, for example, be a one off Award for working 100 such stations when using the current QRP powers and modes,QSL confirmation being required. Let G8PG know if you would be interested, and if there seems to be good support the matter can be looked at further.

COMMUNICATIONS AND CONTESTS

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

160m QRP CW CALLING FREQUENCY

I'm pleased to say that there has been quite a positive reaction to the item in the last issue of SPRAT asking for comments and suggestions about the choice of a new QRP CW calling frequency for 160m. Derrick GM4CXP has been particularly keen to find a suitable solution and (amongst others) suggested 1836kHz. Largely prompted by his postings on the G-QRP Club Email Reflector, a spate of QRP activity on that frequency resulted in several QSO's between members, many of who worked Derrick. With the antenna restrictions I have, I am not able to offer my own opinion about the suitability of 1836kHz, but general opinion does seem very favourable. I therefore propose that we adopt 1836kHz as the recommended QRP CW calling frequency for 160m.

"How about a 160m QRP SSB frequency?" I hear you cry! Well, Richard G3UGF has suggested 1998kHz as being "out of the way", and a frequency worth considering. Anybody else have any thoughts/ideas/suggestions?

2005 INTERNATIONAL QRP DAY

After last year's event, when I received two entries from members, and three check logs from non-members, I challenged members to make a better showing in 2005. It seems my comments fell on deaf ears as only two members submitted an entry this year. I am aware that June 17th often falls on a weekday, making participation for some rather difficult, but also know that there are plenty of members QRV during weekdays and that the event could be better supported. However, the good news is that June 17th 2006 falls on a Saturday, and so there is no excuse for not submitting an entry next year, no matter how modest. There is no minimum score requirement, Hi.

My thanks to John EA5/G3PTO and Bob 2E0ATZ for their 2005 participation and entries. Band conditions were particularly difficult, but they both flew the QRP Flag on our behalf. John used his IC-703 with 5 watts into a 51ft centre fed (with open wire feeder) sloper at 45degs, and Bob was using his TenTec Argosy running 5 watts into a G5RV with flat top at 30ft fed via a Z11 matching unit. Their scores were almost identical, with Bob pipping John to the post by just one point! Congratulations therefore go to Bob who wins the International QRP Day Trophy, along with a book token. The Runner-up Certificate goes, of course, to John.

WINTER SPORTS

Christmas and the New Year seem a long way off as I write this column in August, when you're probably sitting in the hot sun on a beach operating your portable QRP rig, but by the time you read these words it will be time to start thinking about your Winter Sports activity. As always, December 26th to January 1st (inclusive) is the time to be on the bands with QRP. There are no rules – other than make plenty of QRP noise on as many bands as possible - and no score to work out. Just use QRP and have FUN. Let me have your logs,

with relevant details and stories, by February 1st and I will include as much as I can in SPRAT so that others can enjoy reading about your exploits. In addition, the G4DQP Trophy is awarded each year to the member submitting the most interesting log. What more can I say? The rest is down to you!
The deadline for the next issue is the beginning of November.
72 de QRPeter

VHF Manger's Report

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

Due to family commitments, foreign holidays etc, I haven't spent as much time as I would like on radio just lately. However, I have been following closely the developments of the VHF AM group, which formed earlier this year. There have been pockets of activity up and down the country, mainly on 2m & 4m. There has even been at least one Dx contact with S51 on 6m. Personally I have only managed a few local contacts on 70 cm, 2m & 4m. Most people have been using resurrected PMR rigs — Cambridges, Westminsters , Taits & the like, but some people have been rolling their own. The "Fredbox" has been given a new lease of life, with an improved audio stage and various suggestions have been put forward to give it a bit more oomph, including the stage from an automatic AM Morse encoded foxhunt transmitter.

These developments are documented at the following URL's, but for those of you who do not have access to the 'net, I can send you paper copies in exchange for a couple of postage stamps and an SAE.

http://www.hanssummers.com/radio/fredbox/index.htm
http://groups.yahoo.com/group/VHFam/
http://www.barc.uklinux.net/tx.php
http://www.qsl.net/ve2emm/pic-projects/mfox/mfx501-e.html

You will have to join the VHF am group to view the files and photos, but it's free. The updated Fredboxes are in Tom G4BYE's folder, under "Photos"

For my AM contacts I used an FT817 barefoot (except 4m where I used it on 28 MHz to drive a transverter & PA). It has been suggested that '817's only give 50% modulation (and only in the negative direction) unless modified by the engineering menus, but when I checked mine on top band with a dummy load & 'scope, I appeared to get positive and negative going modulation with the factory settings. If anything it appeared to be over-modulating on the speech peaks, though audio reports suggest otherwise. At any rate the audio quality is better than either SSB or nbfm and so far no complaints in the TVI department! 144.550 & 70.260 are the frequencies to listen.
73 de John G8SEQ.

MEMBERS' NEWS

by Chris Page, G4BUE

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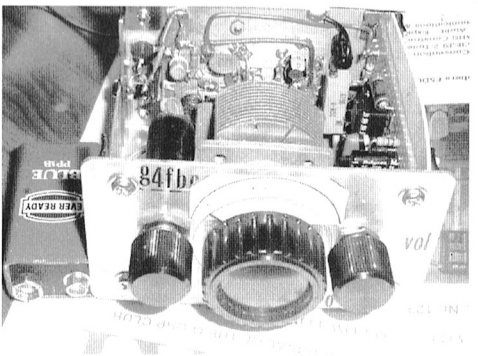
Tel: 01798 815711
Email: g4bue@adur-press.co.uk

We start this column with a big congratulations to that 'Master' QRPer **GM3OXX**. Let me tell you why in George's own words, "One of my dreams has just come true: working either VK or ZL for a WAC on 80m. I have been trying for more years than I care to think about, and early this summer I took down my delta loop and put up a slightly larger nearly square loop of 139 metres, and after reading that **G3ROO** had been lucky to work VK on 80m, and also on 160m as well, it gave me hope I still might make it some day. When calling CQ on the QRP frequency and getting no answers I went down to the DX end of the band and heard **VK6HD** calling a 4L4 and then working him. The pile-up after that was, of course, just one big rabble, but he must have QSY'd down the band and started calling CQ and working loads of stations. I then spent the next three hours non-stop trying but no luck. I noted that every night he appeared at 2230z on 3505kHz calling CQ and then working the pile-up, so I kept at it every night calling him until he went QRT. Then on 8 August when he came on the band I started calling; after he worked three stations he called 'QRZ GM' and after six minutes of trying on Mike's part, I got my 449 report, needless to say I never slept that night. I did not tell anyone as I wanted to wait until the QSL came and it arrived today. The 'big boys' were very good during the QSO and nobody called on top of me. I will now have to make it on 160m but alas, I don't have another 44 years to try! It would be good to do a WAC on all nine HF bands".

Congratulations again George. I referred to George as a 'Master' QRPer because of a combination of his QRP operating skill to work DX and his homebrew design and construction, but let **GØKYA** describe another one of George's talents, his receiving ability. Steve writes, "I Just worked **GM3OXX** on 14060kHz from Norwich - what an operator George is. His signal was weak to say the least, fading out to zilch at times. Yet he still managed to copy absolutely everything I sent at 5W to an indoor dipole. It is a shame that icons like George have to be subjected to my standard of Morse (I blame the paddle myself!), but if anyone needed more evidence that CW can get through where SSB wouldn't even be heard here it is. I think I might be preaching to the converted!".

G4FBC sends the picture below of his regenerative receiver based on the Smidgen in SPRAT 105. It has a coil on a T50-2 with an old variable capacitor and Ron found it covers 5MHz to just above 7.2MHz. He says it is quite sensitive and he can receive RAF and Shannon Voltmet, BA Speedbird, London (5535kHz) and monitors the RAF rescue helicopters on 5680kHz, as well as covering the 40m band. Ron is now building another rig just for 40m and will add an OXO transmitter inside for a "really mini pocket packer rig. It will make a change from lugging my PRC320 army manpack into the Cumbrian Fells for SOTA operations!".



The Arizona ScQRPions, <http://www.azscqrpions.org > organised a three day QRP gathering at the Arizona State ARRL Convention on 8/10 July. **2E1LOK** planned to be QRV 17 July at the McMichael Rally as **MXØEEE** with his K2 on SSB. Nicholas also had a QRO rig in case condition were poor. **GM4TOE** mentions a SSB QSO on 17 August with **G1WIA** who was running 5W from a Walford kit on 40m. Barry said **G1WIA** was Q5 throughout on the "zoo like" band and about S6-8 and "Easily outshone the performance of previous contacts using 50+W and his antenna was not of the best. I have not been on the receiving end of a QSO from this rig before and if the one with **G1WIA** is typical, then I take my hat off to Tim Walford". **GW4JMN** has been inactive for a long time but is building a Walford kit to be QRV on 40m in the autumn.

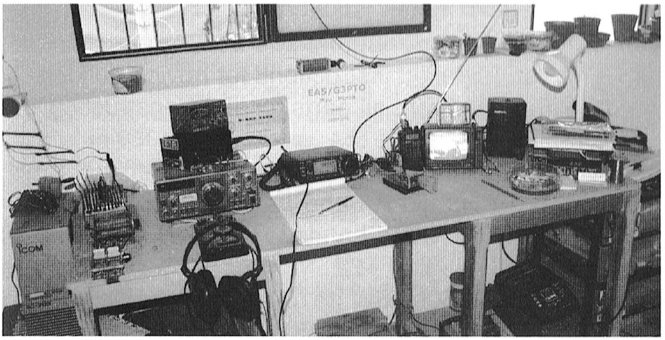
G4GZG built a DSW2 from Small Wonder Labs for 30m and found construction very straightforward, "Eight hours from heating the iron to punding the key", and despite poor conditions has worked all over Europe with it. Larry is impressed with the rig provided you understand its shortcomings, abrupt tuning unless you use the fine tuning all the time, but considering it is very cheap it has a nice stable signal from the DDS chip, has a good 3W out, good QSK, and a gain control on the receiver which is an input attenuator "That works really well with the European QRM". **G8NXD** mentions the new 40m SDR software defined receiver from AmQRP for about $28. More details at <http://ewjt.com/kd5tfd/sdr1k-notebook/sr40/index.html>.

G3LHJ made 375 QSOs in the CW WPX CW Contest at the end of May for a claimed score of 119k points with 5W. **RV3GM**, **RV3DPM**, **RW3FS** and **RX3AKL** were QRV 16/19 June as **UE3QRP/3**, the HQ station of the RU-QRP Club from near Kaluga and Smolensk. Oleg said they used a K2 while mobile on the way to the QTHs and for the operations themselves, and he now thinks the K2 is the "Best QRP transceiver; the 817 is a nice little radio but the dynamic range is poor". **G3CWI** has written an information sheet on using kite winders for portable antennas that can be freely downloaded at <http://www.sotabeams. co.uk/winders.htm>. **K5KVH** offers advice to those with an antenna that needs a certain length of ladder-line and cannot get it high enough. Steve writes, "Place the antenna as high as you can but if this is not enough, say 40 feet for the typical G5RV classic stub, you can run the ladder line out horizontal at right angles to the feed point, with a back stay guy in the other direction to give some support. I used a chimney on one end of the house and a tree at the opposite end to accommodate the ladder line. This worked as well as any antenna I ever used for DX, including beams".

G4XOU asks a question about amateur's wives; Ron writes, " Whilst at the Drayton Manor Rally I saw something which I considered outstanding and the amateur involved should be awarded the man of the year award if there is one. Not only did he manage to persuade his wife to accompany him to a rally, but she was actually ferrying back to his car (he wasn't doing any of the carrying) and some of his purchases included some heavy looking stuff! She must have watched him spending their hard-earned money and looked happy about it . I went to the Spalding Rally today and yet again I saw another wife fetching and carrying. How do these blokes do it? (Answers to **G4BUE** please for inclusion in a future column.)

The VHF AM Group have a 'Mondays at 8pm' AM activity night on 144570 and 70260kHz most Mondays for an hour or so. **G3XBM** and **MØBXT** usually participate and conduct various QRP tests on 2 and 6m and 70cms AM. There is a Yahoo VHF AM e-mail group; send an email to <VHFam-subscribe@yahoogroups.com > to join. **GM4CXP** has been QRV since 9 July on PSK31 with 2.5W and quickly worked 17 DXCC in ten days on 40-10m (including CX on 15m) with his 50 metres loop about 25 feet high. **GM4CXP** has worked 22 DXCC since 31 May on 6m CW and SSB QRP with his FT-817ND and Diamond V2000 vertical.

EA5/G3PTO has been QRV from southern Spain since March and says the success rate with QRP (IC-703 at 5W) is better there than in the UK. John uses a "less ambitious



system than in the UK" (51 feet inverted vee top, bent at one end and fed with open feeder) but still gets most of his CQs answered and very easy to work DX (70 DXCC in four months, including 9M2, TT, TU, TY and TZ). There is a lot of interest in QRP in Spain and he has received a very warm welcome from members of the EA QRP Club. On 40m John has worked **EA6/EA3ADV**, one of the founders of the EA QRP Club and **EC2AHL** running 200mW and peaking S8/9. John's shack is pictured above.

GM4CXP will be QRV 16/21 October from ON and PA during a visit to **PA3HBB** and **ON4BHP**. Derrick will also be QRV 21 December/4 January from EA8 on PSK31 as well as CW. He anticipates (like last year) that 14060 and 21060kHz will be the best QRGs for QRP. A later email from Derrick said he had been diagnosed with akalasia and is due to be operated on soon. We wish you a speedy recovery, Derrick.

PH1PH (PE1MHO) sadly became a Silent Key at the beginning of June after a long fight with cancer. Peter was given a short time to live after being diagnosed with the disease but defied all the doctors and lived for an active three years longer than was expected. **GØBPS** wrote, "Those who knew Peter will join me in the memory of a guy that loved life even though it had not treated him well". Dick gave the Eulogy at his funeral on 13 June. Our condolences to Peter's wife Jeanette.

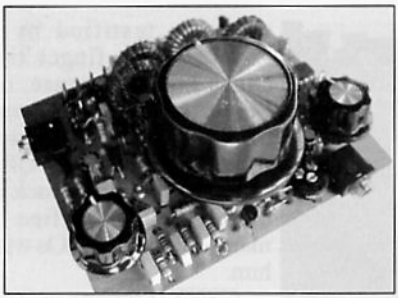
ON4KAR also sadly became a Silent Key at the beginning of June at the young age of 57. **ON5FM** wrote, "Rene was an excellent telegraphist and a QRP fan. His passion for radio and particularly telegraphy was testified by a groove in his finger tips caused by pressure on Morse key". Like many other members, Rene gave me my first two-way QRP QSO with Belgium back in the late 1970s, the first of many delightful QSOs with him.

G8NXD reports an article about a matching transformer on the Internet at <http://ourworld.compuserve.com/homepages/demerson/twelfth.htm>. Mike says it will allow you to run cheap 75 ohm TV coax between your antenna and the shack and then convert it back to 50 ohms for your rig; it's probably not much use for HF due to its bandwidth but it could be very useful above 6m.

G3VTT had a visit from Judy and **W3TS** at the end of July which included a portable trip to the North Kent marshes at Egypt Bay. Colin and Mike used a FT-817 on 40 and 80m and a short wire attached to a fishing pole with a few feet of rusty barbed wire as a ground! Colin is QRV with his K2 and a 40 metre vee dipole over the house. **N2CQR** has updated his web-site and added some new homebrew items, see <http://www.qsl.net/n2cqr/>, including *SolderSmoke*, a new program on homebrewing that he has developed with KL7R. Bill welcomes feedback on the program.

Finally, regarding the recent topic about signing /QRP, **F5VJD** suggests I have changed my view and pulls my leg about an article I wrote in SPRAT 50 *Milliwatting and Microwatting* where I wrote, 'The moment had come to try milliwatting - 21MHz and there was an SP station calling CQ - swing the beam east and "**SP2HZB** de **G4BUE** QRP pse" and, wow! He came straight back and gave me 589, and I was hooked!". Whereas I am flattered that Richard read my old article, I wish to confirm that despite using QRP (and not /QRP) after my call on that occasion, my current view is that /QRP after a callsign should not be used.

Let me know how your autumn goes, by 20 November, please.



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