SPRAT

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DEVOTED·TO·LOW·POWER·COMMUNICATION

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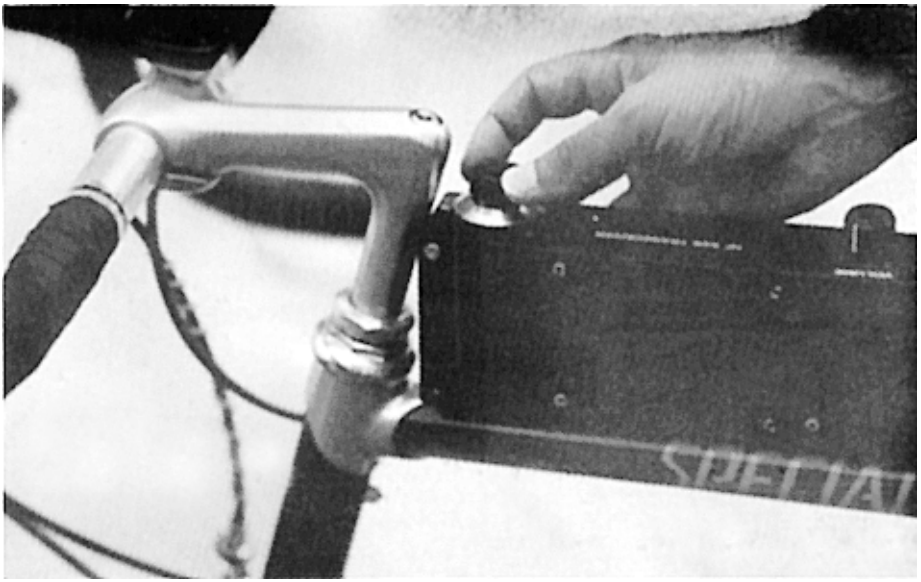

SSB ON A BIKE

K7RO USES THIS 40m SSB TRANSCEIVER ON BICYCLE MOBILE
THE TRANSCEIVER IS FEATURED IN THIS ISSUE

GREMLIN TRANSMITTER- HF9 RECEIVER - MONGREL TRANSMITTER
T2/R2 SSB TRANSCEIVERS - KK7B CARTOON - KLAT TRANSMITTER
AMPLIFIER AND VFO FOR THE EPIPHYTE - RK3ZK VALVE TRANSCEIVER
PLL RECEIVER AS TRANSMITTER - 30m VALVE TRANSMITTER
YEOVIL FUNRUN - A.A.A. - COMMUNICATIONS & CONTESTS
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SERVING QRP FOR 20 YEARS

JOURNAL OF THE G QRP CLUB

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Rev. George Dobbs G3RJV

EDITORIAL :

I am told that one of the reasons many members enjoy SPRAT is the variety and type of articles we print. The intention of SPRAT is to be a forum for the exchange of ideas between members, so we publish items which would not usually make it on to the pages of the more "up-market" amateur radio publications. We offer no promises with the articles other than this is someone's idea that you may like to try. We do not ask for well crafted technical articles : a few notes with clear diagrams is all that is required. That fits into our format. Notes can be scribbled on a piece of paper - we can do the rest. Although we do ask that the diagrams come with all components values marked and addition explanations where appropriate. Mac, G3FCK, does a fine job on the drawings, often working from very rough sketches .... but we do like his job to be at least possible!

Most SPRAT articles arrive in paper form, often hand written, but we are able to take many formats. Text can be submitted on disk in most PC formats and as MAC text. SPRAT is processed in WORD FOR WINDOWS 6.0 which will convert most computer text formats. If in doubt, send text as MSDOS txt. Text can also be sent via email to the address above or via Packet Radio to G3RJV@GB7ODM. With both of these methods I can import the text directly to my SPRAT file. Two of the articles in this issues were taken directly off email files. Although as I write this I am off Packet Radio because of antenna problems.

So..... Please keep the items coming! Share your ideas with other members
Perhaps see you at one of the summer radio events,

72/3

G3RJV

BOOK THE DATE NOW : G QRP CLUB MINI-CONVENTION : SATURDAY OCTOBER 14th

EDITED BY GEORGE DOBBS G3RJV ARTWORK BY A.W. (MAC) McNEILL G3FCK
PRINTED BY SHOREHAM COPY, 3 JOHN STREET, SHOREHAM-BY-SEA. SUSSEX

The "Gremlin" 20m CW Transmitter

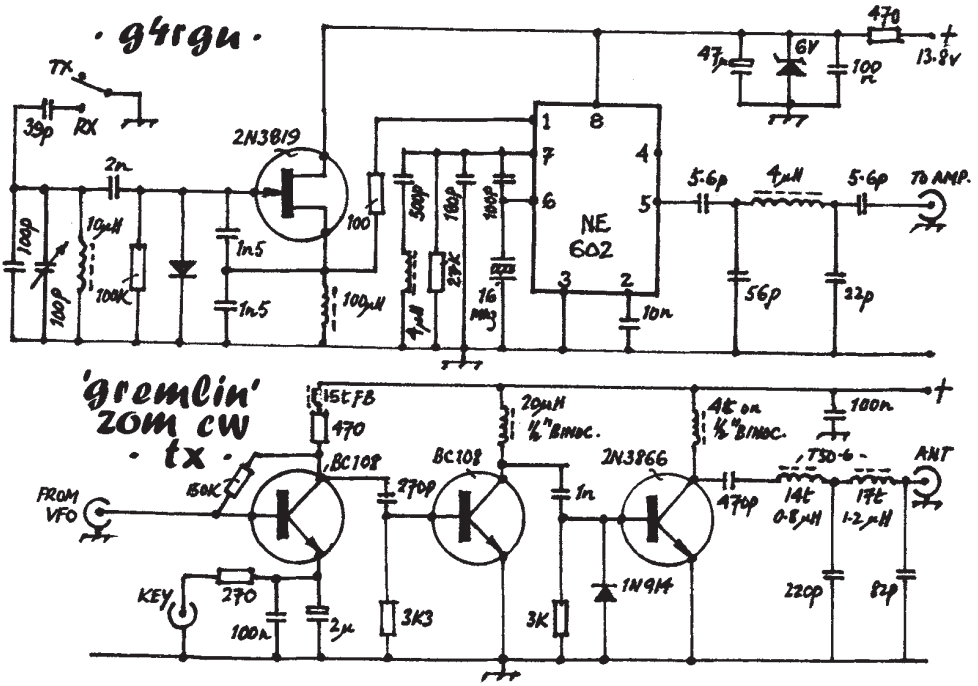
Doug Gibson, G4RGN, Marlow, Westwell Lane, Ashford, Kent, TN26 1JA

Two of my local friends have been badgering me to give them a circuit for a stable 20-metre VFO, and another two have been importuning me for a simple CW TX for that band.
I built the Gremlin about four years ago, and have had some fair contacts with it - VK5FE, ZL4HB, et.., and no problems.
It is made on two separate pieces of copper-clad, ugly fashion; the VFO, the upper circuit, is entirely boxed in, in a tiny box made from a snipped-up pea can, soldered up, with the ins and outs via feedthroughs.

The output at 14.0 to 14.1 MHz is obtained by mixing the 16 MHz crystal, (which I had in the 'odds' box) with a 2 MHz VFO in an NE602 chip. The frequency is very stable, as the only drift is that due to the low-frequency is very stable, as the only drift is that due to the low-frequency VFO; and with polystyrene capacitors in all RF applications, it is very small.

The simple shaping circuit in the keyer gives a nicely-rounded envelope, and the PA uses the diode biasing circuit which I used in the Topper (Chatterbox) design.
If care is taken in screening the tuning capacitor leads, and avoiding output-to-input coupling, there is no trace of chirp.

The inductors marked 'Binoc' use the large 2-hole ferrite beads,)the mauve ones, often seen at rallies).
The PA gives about 3 watts into 50 ohms with the 13v8 PSU when fitted with a 'halo' type heatsink.



The HF9 TRF Short Wave Receiver

Rev. Keith Ranger, G0KJK, 28 Charter Rd. Altringham, Cheshire.WA15 9RL.

Keith uses a completely homebuilt simple QRP station based upon a TRF receiver and VXO transmitter. These are both included here to present a simple complete station.

This Nicad battery powered receiver design is the only one used at G0KJK both as a Main Station RX and as a convenient portable easily put into a briefcase and yet capable of receiving a station like ZL4BO on 40m SSB using only a 10' throw-out aerial lying higgledy-piggledy on the bedroom floor!

It is called the HF9 because although being simply built on a 20 way Maplin tag-strip it will give coverage of all nine HF amateur bands from 10-160m using three coils wound on T-50-6 or T-50-2 toroid cores.

The keyboard to the selectivity of the HF9, on which other radio amateurs who have used it have commented, lies in using a Field Effect Transistor as the Detector in a Source-Follower circuit with the aerial tapped down on the tuning coil. This overcomes many of the inherent limitation of having only one tuned circuit. I have very, very seldom lost a QSO owing to the selectivity limitations of the HF9. If you want a simple RX that pulls in the DX, this SK10 (2N3819) + 3 BC109 4 transistor circuit is the one for you!

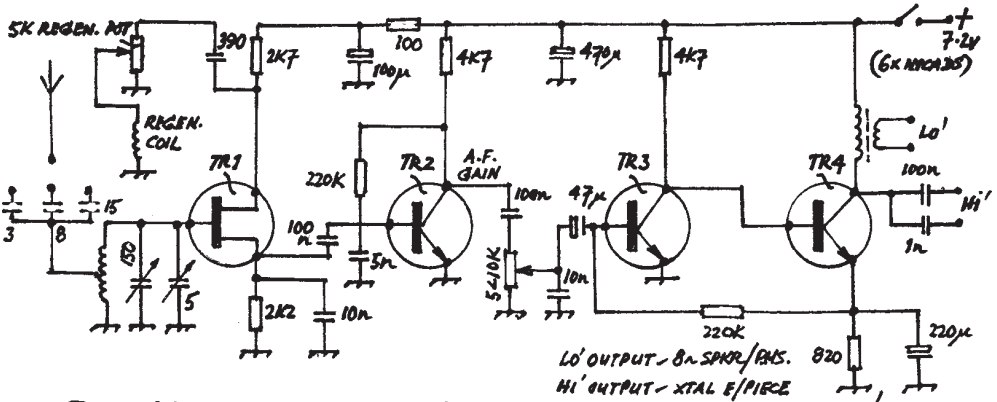
Construction should follow accepted good practice in being sequential and keeping detector and AF stages physically apart to avoid unwanted feedback that might produce instability. Both my HF9s are completely stable in this respect and the AF gain control can be fully advanced without any unwanted feedback problems. The output transformer in the final BC109's collector lead came from Tandys. There are two outputs: HI which I use with a crystal earpiece which gives excellent reception, and LO which uses an 8 ohm speaker. Battery consumption is very low - typically only some 4 mA - but there is plenty of volume from the LS despite its output of less than 30 mW!

There is little that can be called subtle in this circuit. The coils can be wound on a "cut and try" basis - try, for example, 15 turns with the aerial tap 8 turns down, with 5 or 6 turns for regeneration wound over the middle of the 15 turn tuning coil. The regeneration winding should be in the opposite sense to the tuning winding. Three possible connections are provided for the aerial - 15pf, 8pf and 3 pf. If hand capacity evidences itself when using, say, the 15 pf connection, try 8pf or 3 pf. In general, the higher the operating frequency the looser the aerial connection required - for example, 3pf at 28Mhz. This should solve the problem - even without a physical earth connection.

With a 15 turn winding, and a 150pf tuning capacitor, the 20 or 40m amateur band is likely to be found. Then coils for other frequencies can be wound, until all nine HF amateur bands are included in a three coil arrangement selected by a 3P3W rotary switch. Only the aerial tapping and one end each of the tuning and regeneration coils need be connected to the switch - the other two ends can be taken to a common point. With toroid coils, mutually inductive field problems should be small, but it is still good and wise practice to mount the three coils at right angles to each other - to minimise the risk of "suck-out" regeneration frequency jumps or dead spots. The method of regeneration control employed - a variable resistor - gives very reliable control without any backlash. Both CW and SSB are resolved with the detector just oscillating. One final and very important word - the 5 or 10pf bandspread capacitor, with which all the fine tuning is done - needs to be a top quality air spaced component. My HF9s are both built into Maplin 6" by 4" aluminium enclosures - as are my accompanying "Mongrel" transmitters. With only a 33' and 66' wire as the station aerials, a very compact QRP set-up results - and simply rests on a very small part of my study desk. See you on the bands - on the QRP frequencies!

HF9 Notes:-

1. TR1 = 2SK 19 FET or equiv (eg 2N3819)
2. TR2-4 all 13C109
3. Coils:- aerial tap half way down; regen coil 1/3rd tuning coil turns, over centre or earthing end of tuning coil. For compactness, use toroid cores (T-50-6 or T-50-2)
4. Layout:- (a) Five panel controls (Tuning, Bandspread, Bandchange, Regeneration, AF gain/On Off). (b) Keep leads from Detector stage short and well away from AF stages to avoid unwanted feedback. (c) Use consecutive stage physical layout, as above - a 20 point Maplin tag-strip provides an easy and robust construction base.
5. Three coils + 3P3W rotary switch + 150pf polycon tuning capacitor will give 10-160m in three ranges.
6. The 5 or 10pf (preferably 5) bandspread capacitor must be a top quality air-spaced component (eg Jackson 604).
7. AF gain will probably need only to be partially advanced - the three BC 109s, with Source Follower input provided for good matching, produce plenty of gain! - especially with TR3-4 direct coupler.



The HF9 TRF Receiver – KEITH RANGER – GØKJK

THE MONGREL QRP CW TRANSMITTER

Rev. Keith Ranger G0KJK, 28 Charter Rd. Altrincham, Cheshire, WA15 9RL

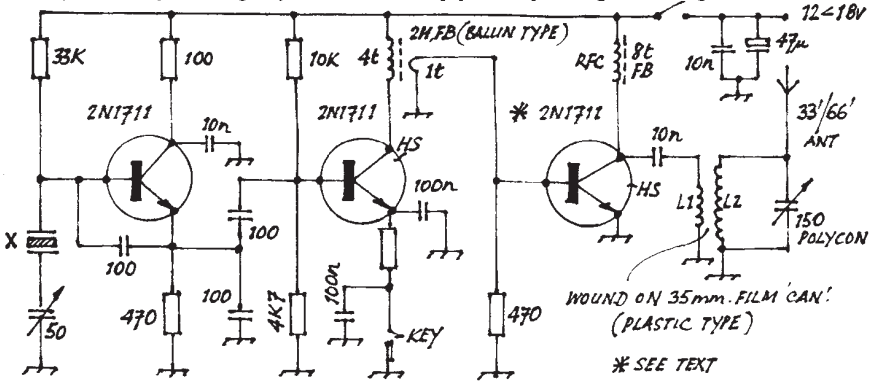
This simple three transistor QRP TX was built with two aims in view. My OXO TX just did not seem to have the necessary penetration to work the DX - excellent design although that now famous circuit is. A three transistor line-up seemed the answer - and soon proved itself when TU2JT and PY4PZ were worked on 21MHz CW with only a 33' end fed wire aerial (my OXO had never worked beyond Europe). The second target was to try to achieve with a three transistor design what a defunct Howes MTX 20 had used five to do. Of particular value were its balun cores for interstage coupling.

With great respect to dog lovers (!), the three stage circuit that has resulted is best called the "Mongrel", because in no way can it be called a thorough-bred. It has been influenced by a number of other circuits, such as the MTX 20, the OXO, the "Universal QRP Transmitter", etc., and to these I pay grateful and respectful tribute. All along, the chief aim has been a circuit that can be said to be simple, reliable and cheap, and that will obtain QSOs using the only two aerials I have - a 33' end wire for the HF bands and a 66' end fed wire for 7 and 3.5KHz. No keying transistor was found necessary - keying the driver transistor in its emitter lead was found to give a good and stable T9 note.

The PA aerial coupling can be simply wound on a 35mm film plastic container, in which holes can easily be made., A turns ratio of 1:3 works well - for example, 3:9 for 21KHz, 6:18 for 7KHz, although the builder of this circuit should be prepared for a little "cut and try" experimentation. The PA aerial coupling coil can also be placed in the collector circuit with the ferrite bead RFC omitted - in fact this is done in my HF bands version of the "Mongrel". The circuit as it stands - even with 18 volts of power supply - has never caused TVI (apart from our own TV's Video channel), if TVI is encountered, a simple output filter could be added (details of such have often appeared in "Sprat", etc.)

On the air results with the "Mongrel" have consistently been encouraging: in particular, distances I never managed to work using a two stage TX like the OXO have come within range. The "Mongrel" is the kind of circuit that lends itself to experimentation. The three 2N1711 line-up used on 80m, for example, can yield to a BD139 PA for the higher bands (the BD139 has a cut-off in the region of 250MHz, making it an excellent and chap HF bands QRP PA).

I hope that your "Mongrel" will give you the hours of enjoyment my "Mongrels" have given to me!!



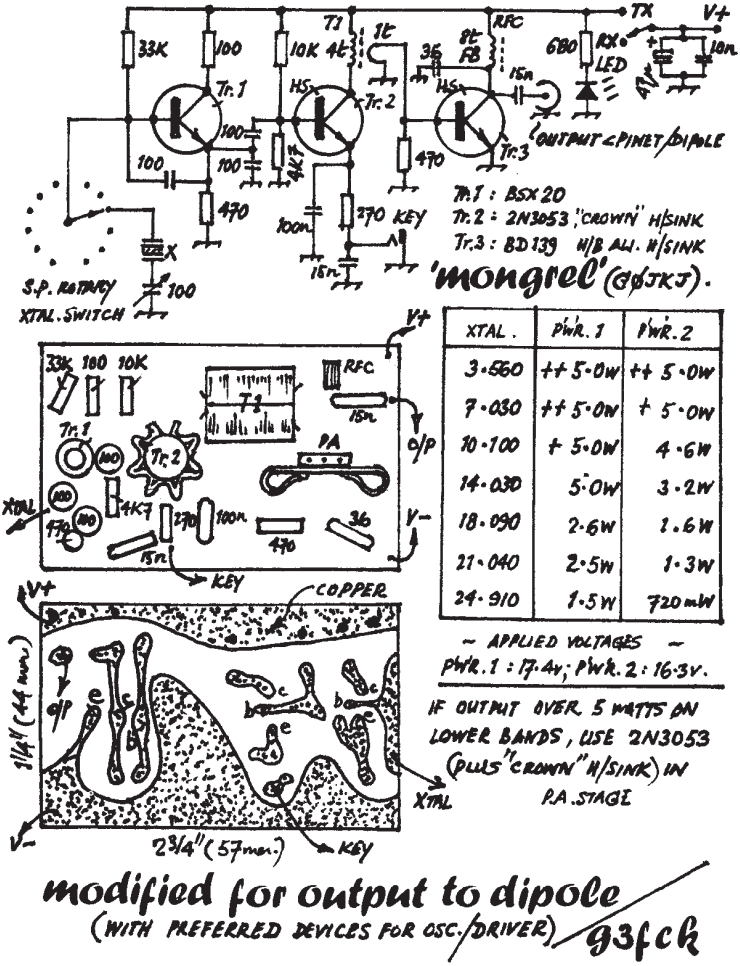
OUTPUT COIL		
BAND	L1	L2
20m.	4t	12t
30m.	5t	15t
40m.	6t	18t
80m.	8t	24t

APPROX.	
IN	OUT
12V.	1W.
13·8V.	2W.
18V.	3<4W.

A Mongrel Modified for Pi-Network Output with PCB Layout

A.W. McNeill G3FCK 40 Turnpike Road. NEWBURY. Berks

Mac, our SPRAT illustrator, decide to build the Mongrel, modified the circuit and developed this PCB layout to allow a low pass filter output.



XTAL.	PWR. 1	PWR. 2
3·560	++ 5·0W	++ 5·0W
7·030	++ 5·0W	+ 5·0W
10·100	+ 5·0W	4·6W
14·030	5·0W	3·2W
18·090	2·6W	1·6W
21·040	2·5W	1·3W
24·910	1·5W	720mW

– APPLIED VOLTAGES –
PWR.1 : 17.4v; PWR.2 : 16.3v.

IF OUTPUT OVER 5 WATTS ON LOWER BANDS, USE 2N3053 (PLUS "CROWN" H/SINK) IN P.A. STAGE

modified for output to dipole
(WITH PREFERRED DEVICES FOR OSC./DRIVER) *g3fck*

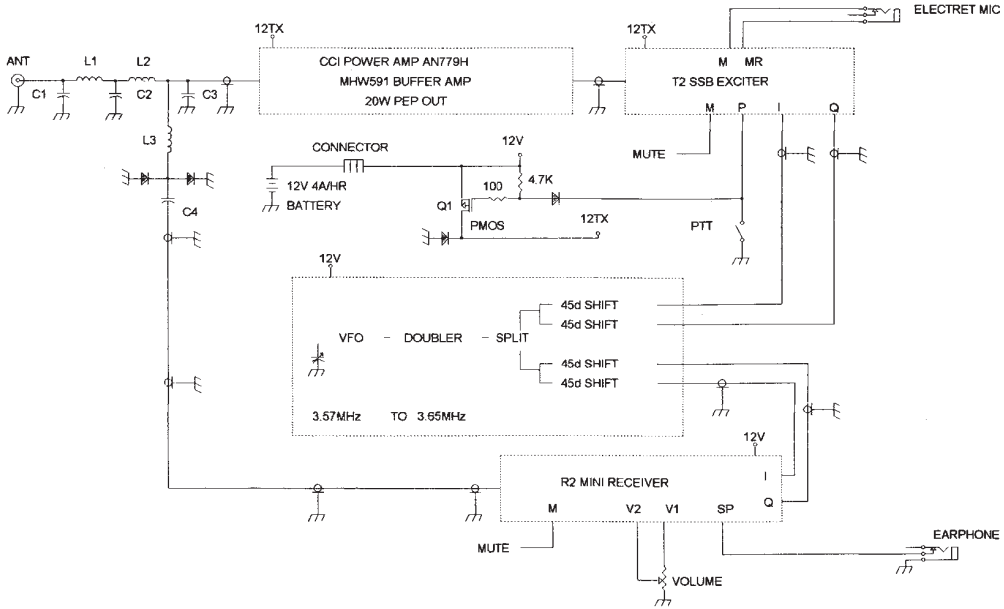
T2/R2 QRP SSB TRANSCEIVERS

John Liebenrod K7RO, 1650 NW 130 Ave, Portland OR 97229, USA

This article describes how a low power SSB rig can be assembled using readily available circuit boards. The circuits shown are proven and easily duplicated. I and my neighbor, NB7W, have both built rigs this way. This article covers the circuitry needed to put a high performance ssb rig on the air.

Rick Cambell [1,2,3,4] KK7B recently published a series of ssb construction articles in QST. Rick designed two high performance modules to generate and receiver single sideband. Rick split the design into two circuit boards; a T2 board and a R2 board. The T2 board generates ssb using the phasing method, without crystal filters. The R2 board is a complete SINGLE SIGNAL direct conversion receiver. Bill Kelsey, N8ET [11] now offers inexpensive T2 and R2 kits, including professionally done circuit boards for both the T2 and R2/mini. This modular approach lets you build a high performance SSB rig. Then expand it later as your interests and needs change. The audio quality of the R2 is amazing.

In addition to the T2, R2 boards you'll need a: VFO, T2 buffer amplifier, power amplifier, and a antenna change over circuit with filtering. The photos different single band R2/T2 ssb transceivers. Figure 1 shows the block diagram of K7RO's 40m R2/mini T2 rig for bicycle mobile. Yes, this rig is used to operate QRP HF from a bicycle. (Alley, NA0A writes a quarterly newsletter for the Bicycle Mobile Hams of America [13]. Drop Alley a note if you'd like to find out more.) The 20w pep rig is built in a 2.5" deep, 1.5" height, and 8" long box. The rig has three controls, main tuning, volume, and PTT.



K7RO T2/R2MINI 40M SSB TRANSCEIVER

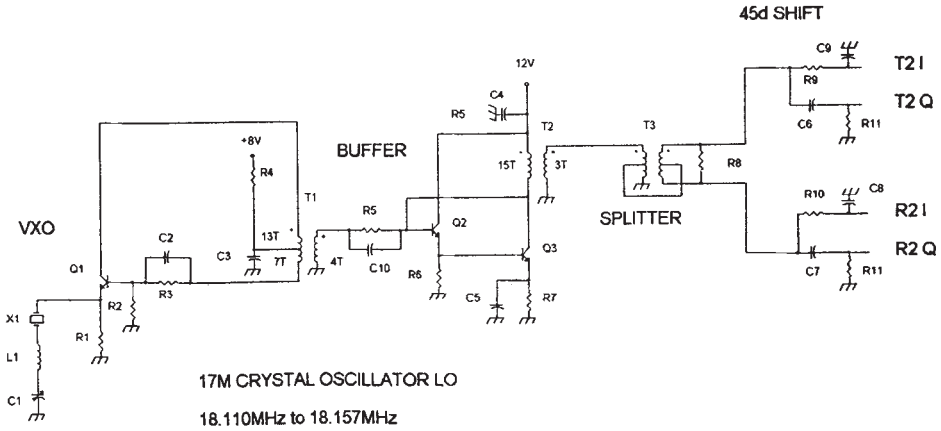
IS 80m A GOOD BAND FOR QRP SINGLE SIDEBAND?

One of the first decisions to make is, which HF band to use. Given the current solar conditions, I'd commend 40m or 80m. Both John, NB7W and I started with a single-band 80m transceivers. Building a multi-band T2/R2 rig was more than we wanted to take on for our first home-brew ssb transceiver. The second R2/T2 rig I built was also a single band transceiver, for 17M. I've since moved it from 17m to 20m to 40m. If your going to operate portable or use the rig in the evening hours, I'd recommend 80m or 40m. I've had great success operating my T2/R2mini rig on 40m.

STABLE SINGLE BAND VFOS FOR 80M, 40M, 17M

What can be said about VFOs that hasn't been covered before? It's critical you start with a proven design that can be duplicated with good results. Locate a copy of W7EL's "An Optimized QRP Transceiver for 7MHz Aug 1980 QST", 1993 ARRL Handbook Chapter 30 page 37. Make sure to package the VFO section in a separate shielded compartment. We used pieces of unetched circuit board material to form a metal box around the VFO circuitry. Adequate shielding is need to keep the PA currents coupling back into the VFO. This undesired coupling will causes FM-ing on the transmitted audio. Stable VFO construction starts with good ceramic NP0 caps (Panasonic from DigiKey), and brass plate main tuning capacitors. Another excellent technique is to boil the type-6 powered iron toroidal inductor to anneal it after winding. I've achieved good stability with Roy's LC based VFO at frequencies as high as 14MHz.

If you'd like to set up the T2/R2 on 17m SSB you'll need a stable 18.1MHz VFO. Achieving adequate stability with a 18.1MHz LC VFO can be tough. I decided to use a crystal based VFO to insure clean audio and low drift when operating the rig in the field. The 17m SSB band edges are 18.110 and 18.168MHz. Wes Hayward, W7ZOI published a broad-band oscillator circuit that starts reliably, and places one end of the crystal at ground potential, a useful feature when pulling the crystal with a variable capacitor. To insure the widest tune range the crystal's motional capacitance should be as high as possible. I purchased HC25 18.135MHz crystal from JAN Inc. with a Cm = 0.02pf, Co = 4pF. One crystal costs about $8. You'll want to select a variable capacitor with a low minimum value of capacitance ie 5pF. This insures the widest pull range. The tune rate is nonlinear, mine varied about two to one. Build the VFO with point to point wiring over a ground plane of copper foil, ugly construction.



Schematic 1 Parts List

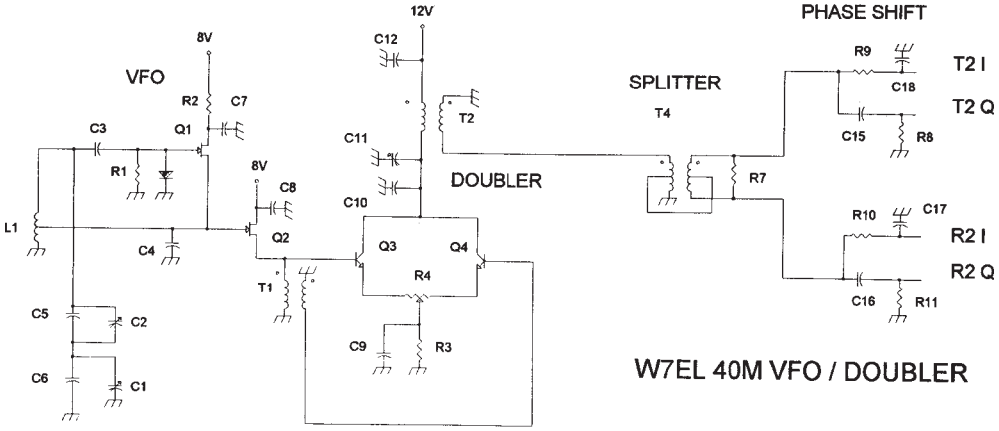
X1	18.135MHz HC25 crystal, Cm=0.02pF, Co=4pF	R1	270
L1	40Turns on Amidon T36-6 #28 guage wire	R2,R6	1K
C1	5pF to 56pF Main tune capacitor	R3	4.7K
C2	0.01uF ceramic	R4,R8	100
C3,C4,C5	0.1F ceramic	R5	10K
C6,C7	180pF adjust for min LSB content	R7	150
C8,C9	180pF adjust for min LSB content	R9,R10	49
C10	.01uF ceramic	R11,R12	49
		Q1,Q2,Q3	2N3904

T1 Broadband Transformer 5:1 ratio Pri 20T #26, Sec 4T #26 FT37-43 Pri: 13T collector, 7T base.

T2 Broadband Transformer Pri 15T #26, Sec 3T #26

T3 In-phase spitter TOKO TK2518 Power combiner, Digikey

Some DC transceivers exhibit a pulling of the VFO when going from receive to transmit. This isn't due to inadequate VFO buffering or inadequate VFO supply regulation. A small amount of the transmitter energy is coupled into the VFO tank circuit. If the coupling is excessive the transmitted SSB audio will be distorted. The most important thing to do is to connect the ground side of the VFO inductor to exactly the same point as the VFO tank capacitance. The best approach is to run the VFO at half the transmitter output frequency and double it. Roy Lewallen ,W7EL published a simple circuit to do this. Schematic 2 shows the VFO/doubler for 40m. My compact T2/R2mini 40m rig puts out 20watts pep, before I used to Roy's VFO doubler technique the transmitted audio exhibited FM-ing due PA to VFO coupling. I'd encourage you to start with the doubler approach right off! Roy also points out that using a oscillator which runs a 1/2 the receiver frequency and doubling it also greatly reduces audio feedback.

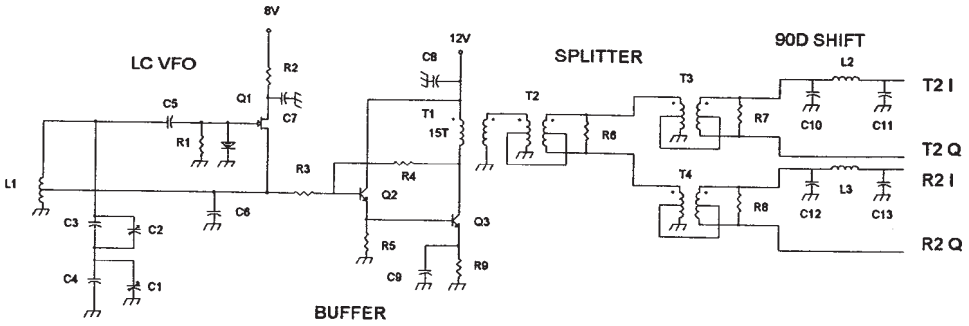


Schematic 2 Parts list:

L1 37T #28 on T44-6 core
Tap 10T from gnd end
C1 6 - 80pF Main Tune
C2 1.5 to 5pF Lower Limit set
C3 4.7pF NP0 ceramic
C4 15pF NP0 ceramic
C5 650pF NP0 cermaic
C6 680pF NP0 ceramic
C7,C8 0.1uF
C9,C12 0.1uF
C11 9 - 45pF trimmer
C10 150pF NP0 ceramic
C15,C16 470pF adjust for min USB content
C17,C18 470pF adjust for min USB content

R1 1MEG
R2 100
R3 150
R4 100 Trimmer
R12 100
R8,R9 49
R10,R11 49
T1 Twist two #26 wire together,
10T on FT37-72 core
T2 Pri 25T Sec 5T on T44-6 core
T4 In-phase spitter TOKO TK2518
Power combiner, Digikey
Adjust R4 for minimum Oscillator Freq output from TX Adjust C11 for maximum at 7.1MHz

To complete the VFO section we'll need to select a 90 phase shift network. We started with the simple R/C network shown in Rick Campbell's Jan 93 QST article. The SSB rejection measured >30dB across the SSB portion of 40m. To align the phasing network, install temporary variable trimmer capacitors. Once the correct value is found replace it with a fixed capacitor. The Toko splitters appeared to work fine on 80m all though the publish spec indicates >20MHz. Schematic 3 shows the circuit values for 80m. KK7B describes an in-phase home-brew splitter in the Jan 93 QST article. Try to find a copy of (before 1965) "Single Sideband for the Radio Amateur", ARRL. It has several articles on phasing SSB generation. One article "How to Adjust Phasing Type SSB exciters" is still quite informitive! The VFO will require a buffer amplifier to drive the T2/R2 diode ring mixers. The two transistor buffer amplifier by W7EL is more the adequate, see fig. 3. Recall you'll loss 3dB of LO power in each phase splitter network. Each T2/R2 diode ring mixer needs at least 5mW of LO drive, or 1.4V peak to peak into 50ohms



75M LC VFO , PHASING NETWORK

Schematic 3 Parts list

L1 9.25uH
L2 2.26uH Adjust for min USB content
L3 2.26uH Adjust for min USB content

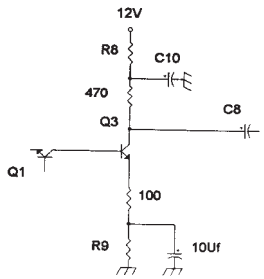
C1 6 - 80pF Main Tune
200Khz tune range 3.7 to 3.9MHz
C2 1.5 to 5pF Lower Limit set
C5 4.7pF NP0 ceramic
C6 15pF NP0 ceramic
C3 517pF NP0 cermaic 470pF + 47pF
C4 270pF NP0 ceramic
C7,C8 0.1uF
C9 0.1uF
C10,C12 903pF
C11,C13 903pF

R1 1MEG
R2 100
R3 10K
R4 27K
R5 1K
R6 100
R7 100
R8 100
R9 150
Q1 2N4416
Q2,Q3 2N3904
T1 Pri 25T Sec 5T on T44-6 core
T2,T3,T4 In-phase spitter TOKO TK2518
Power combiner, Digi-Key

In a future instalment I'll share some ideas on multi-band LO alternatives. Drop me a note if you've worked up a cleaver approach. I'd like to hear from others who pursue this. You'll need a broad-band quadrature phase shift network that maintains less than 1 degree phase error. A "no tweak" digital phase shift approach was published in QEX recently. Take a look at Peter Anderson's work in QEX September 93 " A Different Weave of SSB Receiver".

T2 / R2 TIPS AND TWEAKS..... PART I

The Rick's T2 / R2 circuit design is documented in QST. [1,2,3,4]. Read and re-read these articles, Rick packs a lot valuable information into his R1, R2, T2, and R2/mini QST articles. KK7B's R2/mini article will be published in QST this fall, the circuit board is 2.5" by 5". The 1993 T2 parts placement for C10, C3 is wrong. Double check these Elec Caps for the correct polarity. On the original R1, I adjusted the value of R20, nominal 5.6K, to lower the output quiescent voltage from 7.5V to 6V. Wes Hayward originated a simple change to improve the R1 R2 sensitivity. The circuit change improves the noise figure from 20dB down to 12dB, see schem. 4. If you notice a LO feedthru glitch when the T2 is keyed this is due to the sequencing of the 6V and 12V supplies. On the T2, R3/C3 delays the 6V from coming up with the keyed 12V line. I haven't a simple fix yet. The LO glitch isn't annoying on the air, but it's noticeable when probing the circuit with a scope.



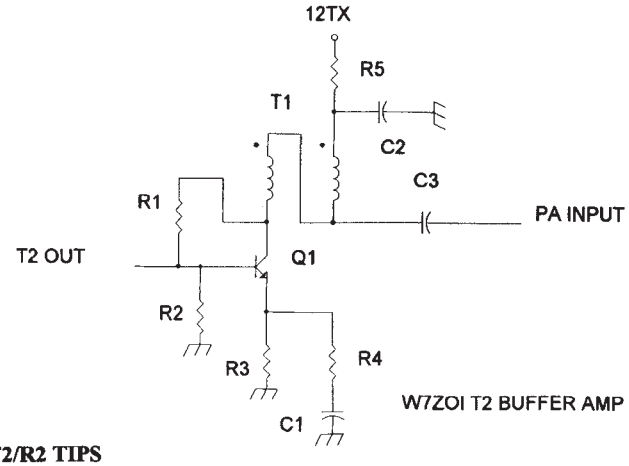
R2 / R1 W7ZOI PRE-AMP MOD

POWER AMPLIFIER ALTERNATIVES....STOKE IT UP OM!

The T2 board ouputs a low-level 2 milli-watt ssb signal. We used a proven buffer amplifier circuit published by Wes Hayward, W7ZOI to boost the 2 milliwatts to 1/2watt Pep. The buffer amplifier circuit was published in "QRP SSB/CW Tranceiver for 14MHz Dec 89 QST". For a Power Amplifier, we purchased the CCI [7] HF 20w amplifier kit, at a cost of $80. This solid Motorola design uses two MRF433 in Class AB, quiesent bias in each device is 200mA. The CCI PA draws 4 amps peak for 20w Pep out. You'll need to follow this with a output lowpass filter. A 20w Pep P.A. draws 4 Amps peak. Use a output lowpass filter after the T2 MAR-2 device, remember this is a broad band amplifier. We used W7EL's QSK antenna change over circuit to switch the antenna between the PA and R2 input. I break the speak line with the PTT switch to prevent speaker squeal on transmit. To conserve battery power I switched off the 12V supply to the PA during receive. A PMOS device (Digi-Key IRFF9130-ND) carries the 4A needed by the PA, refer to the first block diagram. This saves 1/2A on receive!

Schematic 5 Parts List

R1 1.5K, R2 470,
R3 47, R4 4.7,
R5 22, Q1 2N5859,
C1,C2,C3 0.1uF Cer.
T1 Broadband 10T bifilar #28 on a T37-43 core, observe phasing



FUTURE INSTALLMENTS OF T2/R2 TIPS

Rick, KK7B has given the QRP community and excellent design for QRP SSB. This is a fun rig to build and a thrill to operate, well worth the effort to put it on the air! John, NB7W and I had a great time collaborating of the constrution of our T2/R2 rigs.

If you would like to contact me, I can be reached in the evenings at 513-625-7745. I can also be reached via my e-mall internet address: k7ro@nwcs.org. I'd like to hear from you! I'd like to share some of your ideas in a future installments of " R2/T2 Tips and Tweaks ". Drop me a note describing your efforts.

KK7B's T2 / R2 Articles:

[1] R Campbell, "High Performance Direct Conversion Receivers" QST Aug 92
[2] R Campbell, "High Performance Single-Signal Direct Conversion Receivers" QST Jan 93
[3] R Campbell, "A Multimode Phasing Exciter" QST Apr 93
[4] R Campbell, "Single-Conversion Microwave SSB/CW Transceivers" QST May 93

Related Articles, T2 / R2 Part sources:

[5] Wes Hayward, "A QRP SSB/CW Transceiver for 14MHz", QST Jan 90
[6] Wes Hayward, "A Progress Communications Reciever" QST Nov 81
[7] Wes Hayward, "Stable HEXFET RF Power Amplifier" QST Nov 89
[8] Jim Wyckoff, "30Watt Power MOSFET PA for 80m" QST Jan 93 page 50
[9] Roy Lewallen, "An Optimized QRP Transceiver" QST Aug 80
[11] T2, R2, R2mini Kits: Kanga US 3521 Spring Lake Dr Findlay OH [Bill N8ET 1-419-423-4604]
[12] CCI Communciations Concepts Beavercreek OH 513-426-8600 Sells a line of HF PA amplifer kits.
[13] BMHA Bicycle Mobile Hams of America, Editor NA0A, P.O. Box 4009 Boulder CO, 80306 quarterly publication

PUTTING IT ALL TOGETHER.... PHOTO GALLERY
Three T2/R2 based HF Transceivers

Top Rig: K7RO's 40m T2/R2 Bike
Middle Rig: K7RO's 80m T2/R1 into a "gutted" HW7 case.
Anyone need a free HW-7 circuit board {:-) grin ?
Bottom Rig NB7W's 80m T2/R2 Bandblaster

K7RO 40m T2/R2 Biker
==========
Size: 2.5"deep, 1.5high, 8"long
DC 12V: 50mA Rx, 4Amps Tx
KK7B Boards: T2 R2mini
Pep Output: 20watts LSB
VFO: 7.15MHz to 7.3MHz 3Turns
Audio: Headphones only
RIT: none
AF Bw: 1, 300Hz to 3Khz
Controls: Freq,PTT,Vol

NB7W 80m T2/R2 BandBlaster
==========
Size: 4"tall, 10.5"wide, 7"deep
DC 12V: 100mA Rx, 4Amps Tx
KK7B Boards: T2, R2
Pep Output: 20watts LSB
VFO: 3.5MHz to 4.0MHz 20turns
Audio: 8ohms 1/2watt
RIT: CW offset only
AF Bw: 3 Bandwidths
Speaker: Internal
Metering: V, I, P, SWR, S-meter
Controls: Freq, PTT,Vol,
AF Bw,Cw/Ssb,Meter

KK7B SPRAT Technical Cartoon #2
A "Minimum Component" Phasing Receiver Front End

Rick Campbell, KK7B, Rt.1, Box 195, Chassell. MI 49916.

Sprat Technical Cartoon #1 (hereafter STC1) describes a nice LO phase-shift network that works well with diode ring mixers such as the ones in the R2, T2 and miniR2 boards. The QRP spirit requires that we examine our radio circuits to see if there is a way to do the same job with fewer parts. (I suspect the spirit is a Scot.)

A phasing receiver front end consists of an RF filter, an in-phase splitter driving the RF ports of two mixers, a quadrature LO splitter driving the LO ports of the mixers, and a means of tweaking the phase shift for maximum opposite sideband suppression. A "minimum component" phasing receiver front end is shown in figure 1. The quadrature hybrid is used to drive the mixer LO ports directly. The RF ports are driven by a lumped-element Wilkenson two-way splitter. Squeezing the turns of one of the toroids in the Wilkenson splitter will provide a small phase adjustment. Since the lumped-element Wilkenson splitter is a low-pass structure, it serves as the low-pass filter needed on the input of a direct conversion receiver.

This phasing receiver front end may be used with the R2 and miniR2 circuit boards by leaving the TOKO in-phase RF splitter off the board. Connections from the circuit in figure 1 are made directly to the mixer LO and RF ports. This may be a desirable option for frequencies below 20 MHz, as the on-board TOKO splitter becomes increasingly lossy as the frequency goes down.

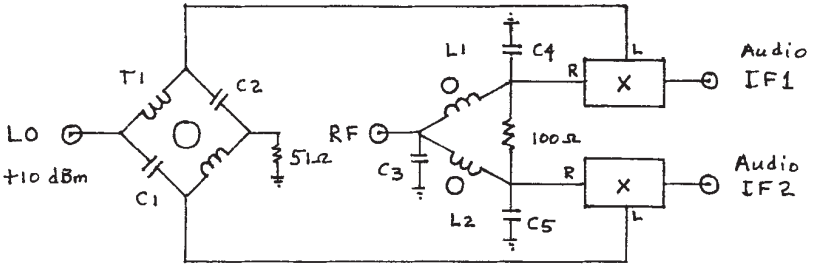
Included in figure 1 are the element value equations. Table 1 shows the element values for the 160 through 6 m amateur bands.

The QRP spirit can be kept particularly happy if the R2 or mini R2 circuit board is viewed as a "component" rather than a "receiver with a bunch of parts missing." Think of it as a big, expensive IC. Figure 2 is the complete circuit diagram of a "minimum-parts-count" receiver using the miniR2 as a component. The VFO circuit is from Wes and Roger Haywards' "Ugly Weekender" with a U210 to get the output level up a bit. The VFO shielding is a necessary part of the circuit. One reason that commercial rigs use superhet receivers with all their images and birdies is that they can get away with an unshielded VFO. Shielding is expensive if you are building ten thousand radios, but free if yqu are building only one.

One final comment: if the TOKO RF splitter is already soldered on the R2 or miniR2 board, it is easier to use the Lo phase-shift circuit in STC1 and an RF tuned circuit than to remove the 6-pin TOKO RF splitter from those plated-through holes. The QRP spirit awards no points for making lots of extra work just to reduce the parts count.

Table
Component Values for Amateur Bands

fo MHz		T1 uH	#turns	Core	L1,2 u	#turns	C1,2 pF	C3 pF	C4,5 pF
1.8	4.2	29	T50-2	5.9	35	820	2200	1200	
3.7	2.2	21	T50-2	3.0	25	390	1200	560	
7.1	1.1	17	T37-2	1.6	20	220	680	330	
10.1	0.79	14	T37-2	1.1	17	150	470	220	
14.1	0.56	14	T37-6	0.79	16	100	330	150	
18.1	0.44	12	T37-6	0.62	14	82	2702	120	
21.1	0.38	11	T37-6	0.53	13	68	220	100	
24.9	0.32	10	T37-6	0.45	12	56	180	100	
28.5	0.28	10	T25-6	0.39	12	56	150	82	
50.1	0.16	8	T25-6	0.22	9	27	100	47	



Minimum Component Receiver Front-end Fig.1.

Design Equations

C1, C2 = 100Ω capacitive reactance $C1, C2 = \frac{1}{100\omega}$

C3 = 35Ω capacitive reactance $C3 = \frac{1}{35\omega}$

C4, C5 = 70Ω capacitive reactance $C5, C4 = \frac{1}{70\omega}$

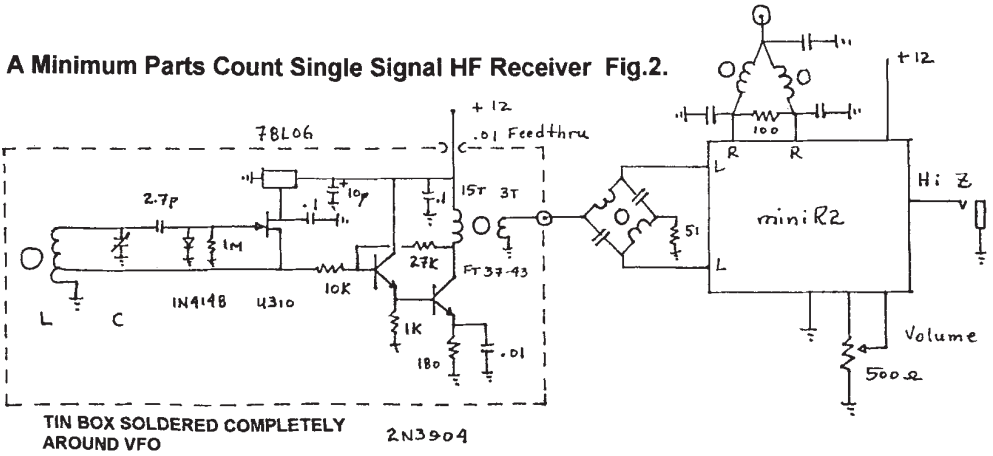
T1 = 50Ω inductive reactance $T1 = \frac{50}{\omega}$

L1. L2 = 70Ω inductive reactance $L1, L2 = \frac{70}{\omega}$

where $\omega = 2\Pi fo$ fo = design center frequency

Notes; Wind T1 with a pair of enamelled wires side-by-side. The #turns for T1 is the number of times the pair is wound through the centre of the core. The same core type is used for T1, L1 and L2.
Capacitors C1 and C2 are the nearest lower standard value, to help compensate for the capacitance between the windings of T1.
Other capacitors are the nearest standard value.

A Minimum Parts Count Single Signal HF Receiver Fig.2.



TIN BOX SOLDERED COMPLETELY AROUND VFO

For 40m L is 24t T37-6 tapped at 6t. C is series/parallel combination of air variable & junk box NPO ceramic to obtain desired range. For Lo Z phones add 150Ω in series

The KK7B Boards and Kits

The articles in this issue by K7RO and KK7B refer to the R1/R2/T2 boards. These are available as kits from N8ET. For non-USA readers, copies of the original QST articles on these boards are available from our Data-sheet Service at £1 per article. from :
REVD. TREVOR WALKER, G0TWE, THE RECTORY, BINBROOK, LINCOLN, LN3 6BJ

The KK7B kits are supplied with professionally done double sided plated through hole glass epoxy circuit boards. Also included are all parts that mount on the board (except audio filter components for the R1 and R2 as noted below), a parts list, parts layout, and a copy of the original QST article that includes the schematic. Note that you supply the local oscillator signal along with front end filtering for the receiver, and output filtering for the transmitter. That is the only reasonable way we could produce a kit that will cover from 1 to 500 MHz. For optimum performance, the diode ring mixers require a +7dbm local oscillator signal. You will also need to supply your own enclosure, connectors, power, etc.

R1 Module - High Performance Direct Conversion Receiver

The R1 module is a 6.5 x 9 cm (2.5 x 3.5 inch) circuit board containing an SBL-1 diode ring mixer, bandpass filtering and low distortion audio amplifier. With an appropriate local oscillatorand input tuned circuit, it can serve as a direct conversion receiver for frequencies between 1 and 500 MHz, or as the last conversion stage in a superhet. Detailed circuit description and construction data is in August '92 QST.

R2 Module - High Performance Single Signal Direct Conversion Receiver

The R2 module is a 9 x 13 cm (3.5 x 5.1 inch) circuit board containing an RF splitter, I and Q SBL-1 diode ring mixers, matched bandpass diplexers and audio preamplifiers, a 90 degree audio phase shift network, summer, bandpass filtering, and an audio power amplifier. With an appropriate quadrature local oscillator and input tuned circuit, the R2 module is a single sideband or single signal CW direct conversion receiver for any frequency between 1 and 500 MHz. The R2 is also an excellent last conversion stage in a superhet system. The wide frequency range of the R2 board permits construction of single conversion microwave SSB and CW receivers and up-conversion HF receivers without the usual limitations on IF imposed by the need for narrow band crystal filters. Detailed circuit description and construction information is in January '93 QST.

T2 Module - A multimode Phasing Exciter

The T2 module is a 6.5 x 9 cm (2.5 x 3.5 inch) circuit board (same size as the R1) with a +3 dbm output multimode phasing exciter, sine wave CW sidetone generator, and TR switching on the circuit board. This board will provide USB, LSB, DSB, AM, NBPM, or CW from 25 KHz to 1000 MHz, with appropriate choice of mixer and RF combiner. All that is required to build a high quality low power exciter is a +10 dbm LO and a phase shift network operating on the desired output frequency. The T2 board was designed as a companion to the R1 and R2 boards to facilitate construction of direct conversion SSB transceivers for frequencies below 1 GHz. Typical performance is +3 dbm USB output with carrier and opposite sideband 40 db down and distortion products more than 30 db down at 144 MHz. The T2 board is described in April '93 QST.

miniR2 - High Performance Single Signal Direct Conversion Receiver

The miniR2 is a smaller version 6.5 x 9 cm (2.5 x 3.5 inch) of the R2 described above with some modifications. The main differences are: smaller diode ring mixers (TUF-1) are used, and the audio amplifier is now only big enough to drive a pair of headphones. An article will be appearing in QST in the near future describing the miniR2 in detail.

Audio Filters

All the receivers require some audio filtering. The R1 and R2 pc boards are laid out to take any one of three different sets of filter components. The filters are a 4 kHz 5th order Butterworth LP filter (audio BW 3700 Hz), a 3 kHz 7th order Elliptical LP filter (audio BW 2700 Hz), and a 1 kHz 7th order Elliptical LP filter (audio BW 750 Hz). The miniR2 comes with a 2.5 Khz LP filter included.

Pricing

PC Board with parts list and parts placement diagram:

R1	$10.00	R2	$20.00
T2	$10.00	miniR2	$20.00

Kit with PC Board, parts list, parts placement diagram, copy of QST article, and all on board parts (except the audio filter components for the R1 and R2 as noted above)

R1 ..... $70 R2 ..... $105

T2 ..... $70 miniR2 ..... $90

Filter components for the R1, R2

4 kHz LP.... $10 3 kHz LP.... $13 1 kHz LP.... $14

Note that you can mount one set of filter components on the board, and switch them with one (or more) off board filters if you wish.

Ordering: My standard shipping charge is $4.00 per order, regardless of how many units are ordered/shipped. The cost to ship to **Europe is US$ 15**, which covers **airmail and insurance**.

To order - send your check, money order, or credit card info (**VISA or MasterCard**) to: **Kanga US, 3521 Spring Lake Dr. Findlay, OH 45840. U.S.A.** [0101] 419-423-4604 (this phone is in my shack and will get answered) only if I am in there! The most likely time is between 7 and 11 pm Eastern Time. The rest of the time it will go to an answering machine) Let me know which kit(s) you are ordering, and if it is an R1 or R2, which filter components you are ordering.

The G QRP Club : Credit Card Payments

The club is now able to take payments on MasterCard/Access and Visa

For CLUB SALES to G0OKY and SUBSCRIPTIONS to G0BXO

PLEASE TO NOT MAKE CREDIT CARD PAYMENTS TO OTHER CLUB OFFICERS

When Placing Credit Card Orders - We Require:

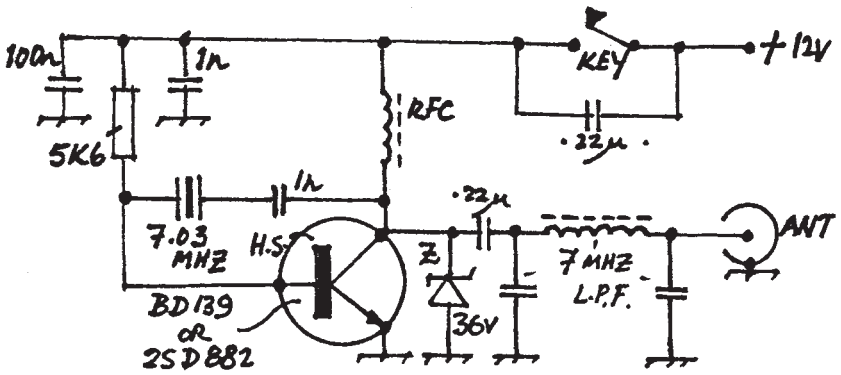
Your Name - Club Number - Full Address

Full Card Number - Date Card Expires

The KLAT 40m TRANSMITTER

Keral L. VU2KLA, P.O.Box 903, COCHIN, 682 006, India

The KLAT was built for a recent trip to southern India. I did SWLing with my pocket SW RX and then decided to come on the air using a simple transmitter. ZL, EA and VK went into the log on the first night!



'KLAT' 40M TX - VU2KLA

A 5 WATT AMPLIFIER FOR THE EPIPHYTE

Derry Spittle VE7QK, 1241 Mt. Crown Rd. N.Vancouver, BC, Canada. V7R 1R9
e-mail : jds@freenet.vancouver.bc.ca

The Epiphyte, a simple QRP SSB Transceiver, appeared in SPRAT 81

The Epiphyte 80m SSB Transceiver was designed primarily to enable backpackers to communicate with the nightly BC Public Service Net. In this respect its performance has lived up to expectations. Still, in deference to those who wish to run a bit more power - which means just about everyone - here is a simple 5W amplifier which uses and inexpensive IRF510 Mosfet. It is designed as a "stand alone" unit which may (a) be left connected to switch in or out as desired, (b) be used with any other 80m transmitter in the 1W class, or (c) be left at home whenever you wish to remain "true to the cause"

During receive, K-1 by-passes the amplifier leaving the Epiphyte connected directly to the antenna. During transmit, the relay closes to connect the Epiphyte and the antenna to the amplifier RF input and output respectively. At the same time the PNP switch, Q2, applies B+ to VR1 to forward bias Q1
LED1 lights when the amplifier is on. LED2 lights when the Q1 is forward biased. LED3 lights with RF current to monitor the modulation. LED1 and LED2 may either be mounted on the panel or directly to the PCB. The Epiphyte PTT switch also controls the amplifier. D1 and D2 prevent DC from feeding back through a relay coil when either unit is switched off

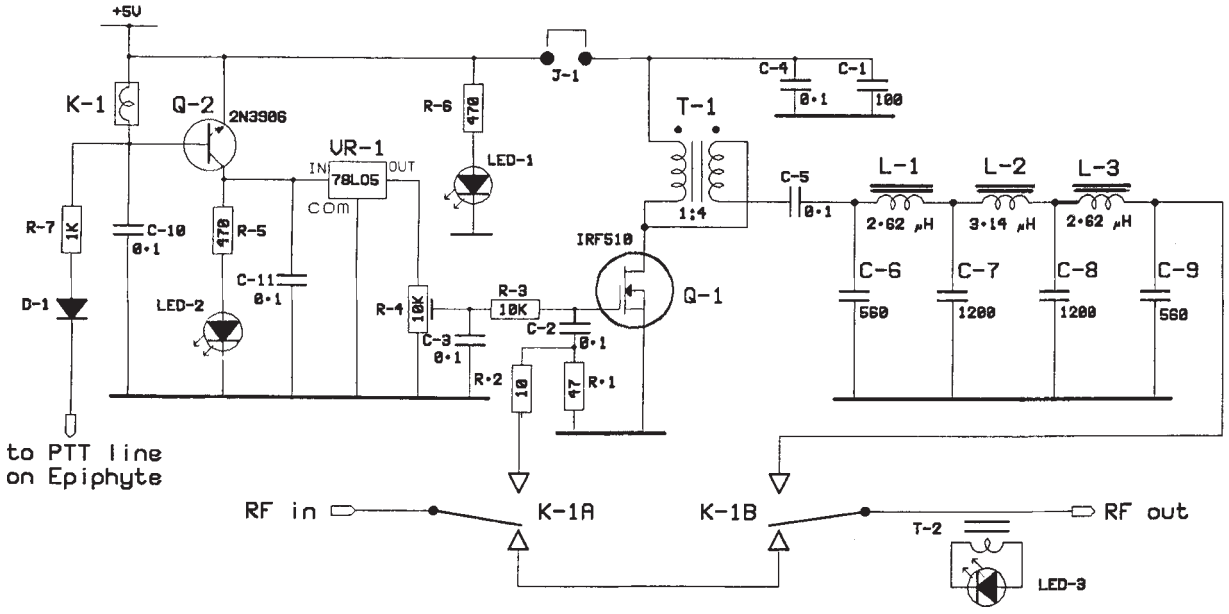
Before attempting to monitor the current in Q1, remove the shorting jumper and set the bias to around 2.5v with R4. Then with the meter installed, adjust the bias for an idling current of 20mA. The current will rise to 500 or 600mA with modulation. The amplifier board is drilled to accommodate Molex connectors if you so wish and, as in the Epiphyte, negative leads may be omitted if the PCB is securely mounted on a metal chassis. Once the components and the PCB are on hand it can easily be put together in a couple of evenings.

While the 7-element Chebyshev LP filter will further attenuate any out of band spurious responses it will do nothing to reduce IMD within the passband. The input signal must therefore be free from distortion. The amplifier output should be monitored with an oscilloscope to verify that it is not being overdriven. It requires about 0.5W drive to give an output of 5W. A 2A power supply will comfortably handle the Epiphyte, amplifier and an LED digital readout. With normal usage, 1 7Ah gel-cell will provide a week or more of portable operation between charges.

PARTS LIST

R-1	47	L-1 & 3	2.62µH (22 turns on T44-61 toroid)
R-2	10	L-2	3.14µH (25 turns on T44-61 toroid)
R-3	10K	Q-1	IRF 510 + heat sink
R-4	10K 10-t. pot.	Q-2	2N3906
R-7	1K	VR-1	78L05
R-5 & ,6	470	D-1 & 2	1N914
C-1	100µF electrolytic	LED-1, 2, 3	
C-2, 3, 4, 10	0.1µF	J-1	0.1" shorting jumper & header
C-6 & 9	560pF	Power plug , socket and fused lead	
C-7 & 8	1200pF	1 & 2	BNC connectors
T-1	1:4 step-up transformer (5 bifilar turns over a pair of FB 43-2401 beads)		
T-2	3 turns on FT37-61 toroid		
K-1	DPDT relay (Clare LM44D00 or equivalent)		
Chassis	Aluminium sheet c. 3.5" x 6". 1" panels along the short sides		
Molex connectors and terminal housings. 1 x 3-pin & 2 x 2-pin			
Heat sink on Q-1			

FIG 1 - 5W AMPLIFIER FOR THE EPIPHYTE

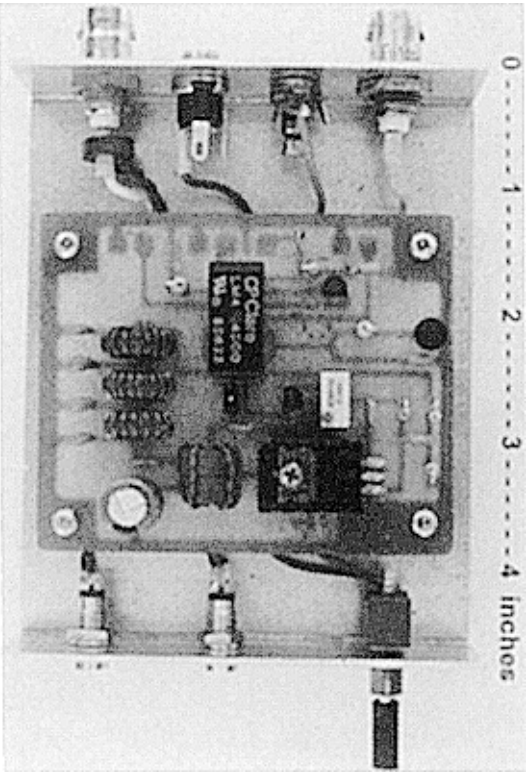


5 WATT AMPLIFIER FOR THE EPIPHYTE

Derry Spittle VE7QK

LAYOUT OF THE 5 WATT AMPLIFIER

PCBs : Hands Electronics
see advert this issue
Parts : JAB Electronics
0121 - 366 - 6928



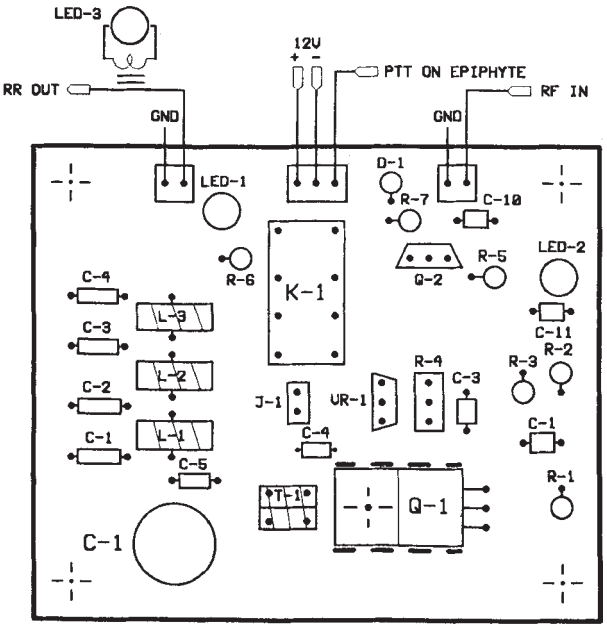


FIGURE 2 - COMPONENT LAYOUT

A VFO For the Epiphyte

Doug Hendricks, KI6DS, 862 Frank Ave. Dos Palos, CA 93620. U.S.A.

Notes based on an article which appeared in QRPp for December 1994

The Epiphyte by VE7QK uses a ceramic resonator on 4.19MHz as a VXO to cover 3725 to 3775KHz. This Vfo is based upon the NorCal-40 VFO by Wayne Burdick, N6KR. The first attempt produced a VFO was prone to drift and the varactor tuning was replaced with capacitor tuning. The values given here give a VFO which tunes from 4.355-4.420MHz to give coverage of 3.9-3.987MHz [This range would not be suitable in the UK]

The frequency can be set by monitoring the signal on a receiver [or counter] . Remember the Epiphyte has an IF of 455KHz, so the VFO must run at a frequency of 455KHz above the desired tuning range.

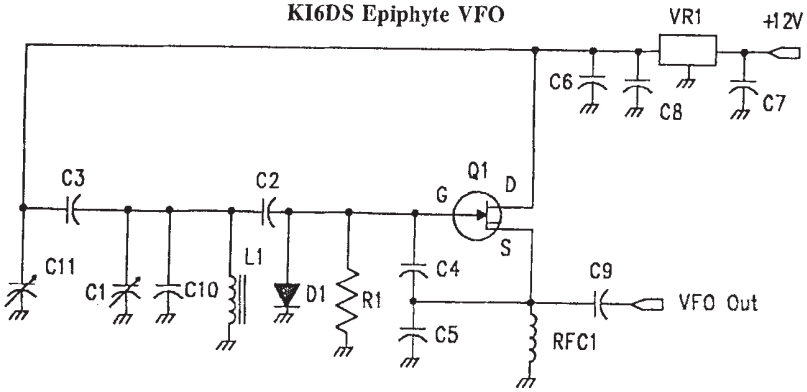
Note from VE7QK : The best way to use this VFO is to remove the on board ceramic oscillator leaving the buffer and feed Doug's VFO into the buffer. I recently modified one for W6MMA who has worked New Zealand and Japan with his Epiphyte.

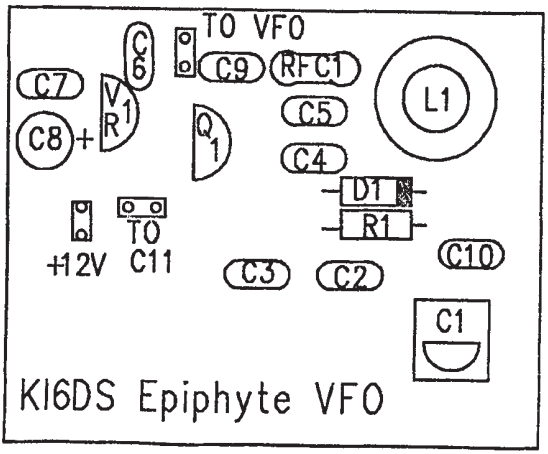
Parts List:

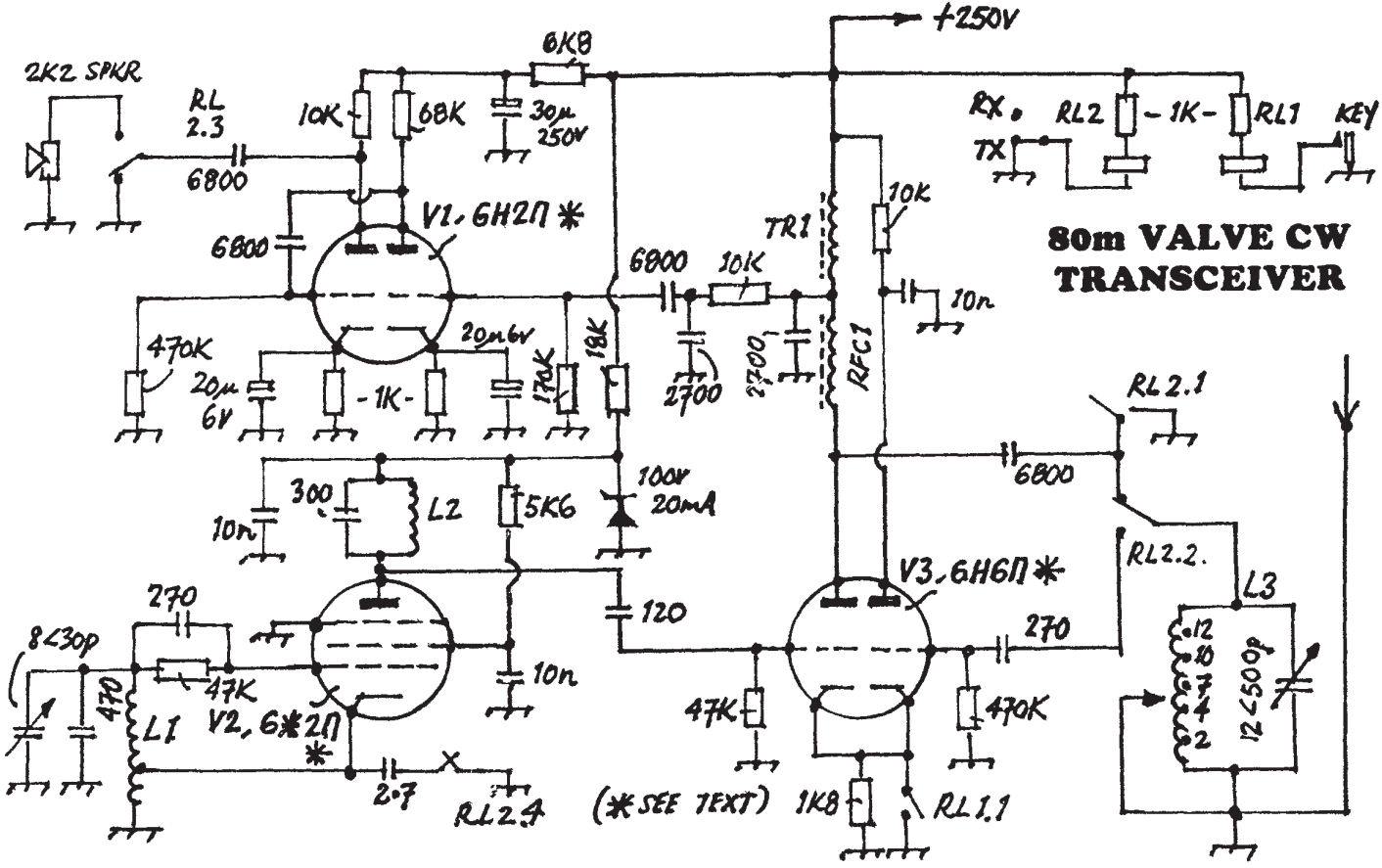
C1 - 25p Airspaced Trimmer	C2 - 180pF sm	C3 - 30pF NPO
C4 and C5 - 1200pF Poly or sm	C6 - 0.047u Mylar	C7 - 0.1uF Disc
C8 - 1uF tant or Elect.	C9 - 100pF Disc	C10 - 68pF NPO
C11 - 5-40pF Air Variable	R1 - 47K	D1 - 1N914
Q1 - J310, MPF102, 2N4416	VR1 - 78LO8	RFC - 1mH Miniature Choke

L1 - 32 turns #26 enamel on T68-7 toroid [white]

KI6DS Epiphyte VFO






80m VALVE CW TRANSCEIVER
+250V
2K2 SPKR
RL 2.3
6K8
10K
68K
30µ 250V
6800
V1, 6H2П *
6800
TR1
6800
10K
RFC1
10K
10n
RX
TX
RL2
- 1K -
RL1
KEY
470K
20µ 6V
- 1K -
20n 6V
17K
18K
2700
2700
RL 2.1
6800
300
L2
5K6
100V 20mA
10n
V3, 6H6П *
RL2.2.
L3
270
120
270
8-30p
470
47K
L1
V2, 6*2П *
10n
47K
470K
2·7
RL2.4
(* SEE TEXT)
1K8
RL1.1
12-500p
·RK3ZK·
IGOR GRIGOROW #6363

An 80m CW Valve Transceiver

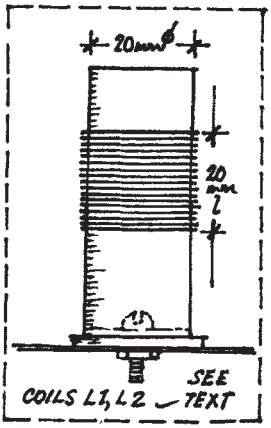
Igor Grigow RK3ZK Box 68, Belgorod-15 308015, Russia

It is possible to build this transceiver in one evening using surplus parts. It has a sensitivity of near $5x10^{-6}$ volts and an output power on 3.4 - 3.6MHz of nearly 1 watt. The RX/TX changes the function of V3, the Mixer and Power Amplifier. L3 provides tuning in the transmit and receive modes.

I used an old cabinet from a valve broadcast receiver, also using its power supply and audio transformer. If L1, L2 and L3 are tuned for the band, the transceiver should work straight away.

PARTS:

RL1 and RL2 : Old Telephone (60 volt) Relays
TR1 : Audio Transformer from old valve broadcast receiver
L1 : 40 turns 0.5mm wire on 20mm former, winding length 20mm
L2 : 20 turns 0.7mm wire on 20mm former, winding length 20mm
L1 and L2 were wound on old plastic shotgun cartridges !
L3 : 17 turns 1mm wire on 50mm former, winding length 50mm
L3 was wound on a glass.
RFC1 : 400 turns 0.2mm wire on an old pencil (8mm diameter)



POSSIBLE ALTERNATIVE VALVES :					
6H2П		6Ж2П	6Н6П		
B9A	I.O.	B7G	B7G	B9A	I.O.
12AX7	6N7	6AK5	6J6	12AT7	6SN7
ECC83	6SC7	6AM6	-	12AU7	-
-	-	6AU6	-	ECC81	-
-	-	-	-	ECC82	-
V1		V2	V3		

THE R.A.T. (Receiver As Transmitter)

A World-Band PLL Receiver Modified to become an All Band CW Transmitter for Transceive or Stand Alone with External Receiver.

Derek Bundey C.Eng FIEE, G3JQQ, 217 Bloomfield Rd, BATH, BA2 2AY.

1. INTRODUCTION. Those of you who remember the immortal James Cagney in the film 'White Heat' may recall the agent who modifies a valve radio receiver to produce a beacon transmitter, enabling the gang to be tracked down? This is a modern-day version of the theme. A world-band PLL receiver is modified to become an all-band transmitter drive unit. This experimental project is aimed at the more experienced QRP enthusiast and is intended to allow development to suit individual needs.

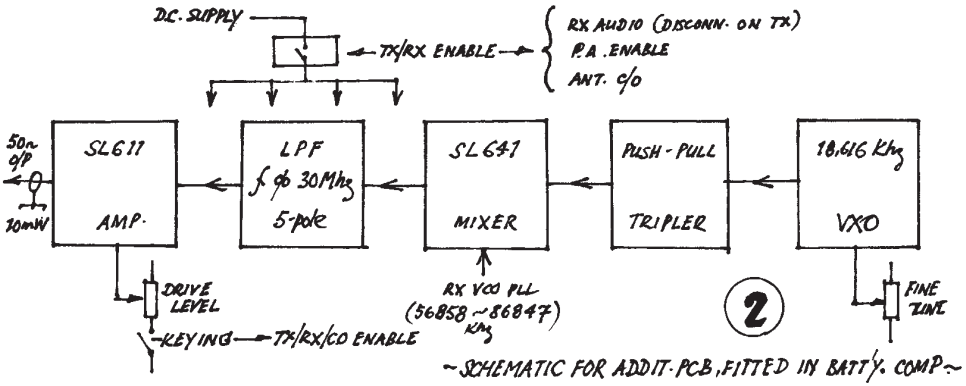
2. SUMMARY. The receiver used by the author is the MSATSUI MR4049. The SANGEAN ATS803 and TATUNG TMR 7602 are thought to be identical. The modification converts the receiver into a transmit drive unit in a way that enables the displayed frequency on the LCD to become the transmit frequency. This is tuned in the normal way or may be keyed in using the pad. Fine tuning is provided by the added VXO control. The stores may also be used to retain frequencies as in the receive mode. The only significant receiver modification required is a connection to the receiver VCO local-oscillator output link and audio output disabling if used in transceive mode.

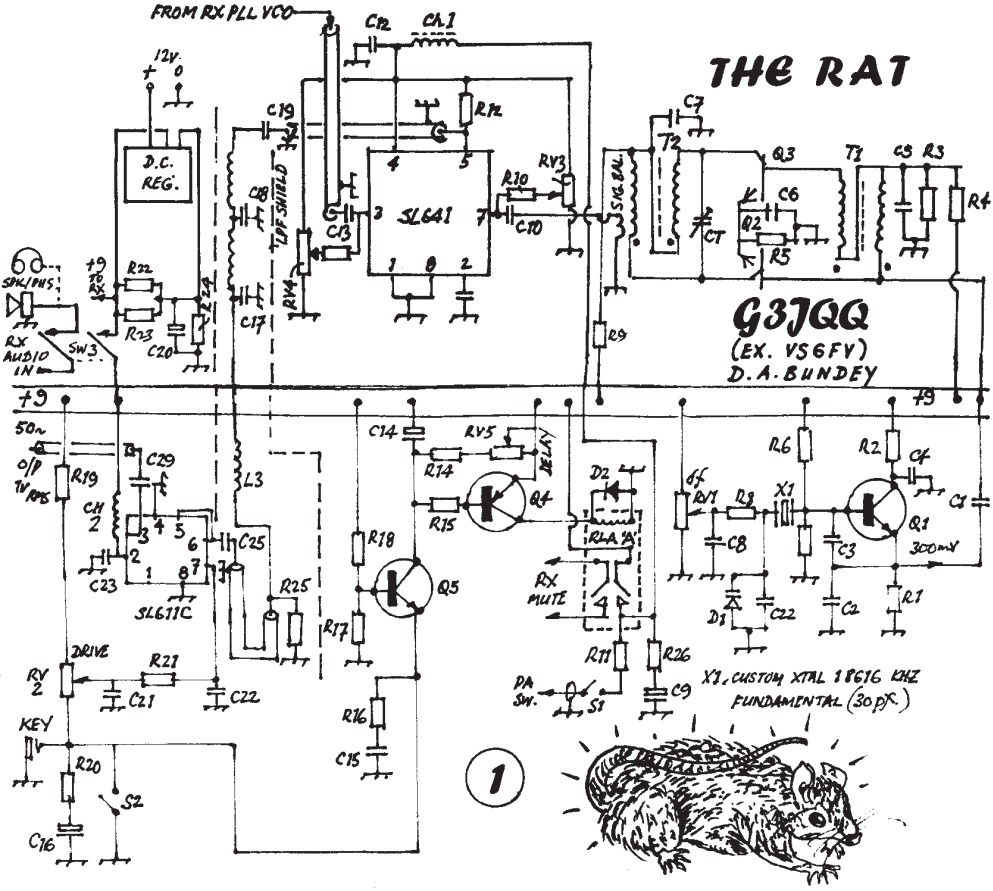
3. TECHNICAL DETAIL. Use of the receiver VHF VCO (phase-locked loop) is the basis of this modification. It is used between 56868 and 86847 KHz for this application, with 1 Khz steps selected by keyboard pad, manual tuning or stored channel. The added circuitry, on a single PCB, generates a VXO signal at 18616 Khz, controlled by varicap and pot over a range of about plus/minus 4 Khz. This is tripled and mixed with the receiver PLL output using an IC double-balanced mixer. The difference frequency is selected and unwanted products removed with a five-pole low-pass filter, rolling off at 30 MHz. The resultant signal is amplified by another IC giving variable-drive output by use of a potentiometer controlled DC feed to its AGC port. Keying is also applied via use of this port, after much experimentation with other options.
An external 12V power supply is used, reduced to 9V by an internal regulator. This supply is kept separated from other DC supplies used to feed external power amplifiers.

4. CONSTRUCTION. A single-sided PCB is used with 'VERO' or equivalent p ins driven into isolated pads to locate wired junctions. Holes are drilled undersized with the foil cut clear using a small drill bit or tool. The pins are pressed in using a pedestal-drill-stand chuck as a press. Other techniques are possible, of course. The board may be fitted within the receiver battery compartment by removing some plastic, or arranged externally in a suitable box.

5. RECEIVER CONNECTION. The link to the receiver VCO ;is located carefully and soldered direct to the co-axial feed from added PCB. The screen is connected to the VCO metal enclosure at the point of connection. The added controls may be accommodated on the receiver front panel or arranged externally if the receiver front panel is to be left intact.

6. OPERATION. The drive unit may be tuned manually to within 1Khz of the required frequency and then the VXO control used to zero beat/offset as required. alternatively the frequency required may be entered into the keyboard pad. Operation of the NET function is used to check zero beat or offset as required. Selecting the TX command prepares the driver for operation. Operating NET and TX command prepares the driver for operation. Operating NET and TX together gives a continuous output for tune up. For transceive operation the manually-operated switch may be located near the key. However. if an external receiver is used (preferred by the author) automatic TX/RX occurs on operating the key the c/o switch and audio muting being unnecessary with this arrangement. Receiver volume is set to zero


D.C. SUPPLY
TX/RX ENABLE
RX AUDIO (DISCONN. ON TX)
P.A. ENABLE
ANT. C/O
50Ω O/P
10mW
SL611 AMP.
LPF f c 30Mhz 5-pole
SL641 MIXER
PUSH-PULL TRIPLER
18.616 Khz VXO
DRIVE LEVEL
KEYING
TX/RX/CO ENABLE
RX VCO PLL (56858 ~ 86847) Khz
FINE TUNE
2
~SCHEMATIC FOR ADDIT. PCB, FITTED IN BATT'Y. COMP.~


THE RAT
G3JQQ
(EX. VS6FV)
D.A. BUNDEY
FROM RX PLL VCO
12V.
D.C. REG.
SL641
SL611C
RX AUDIO IN
SPK/PHS
SW3
RX MUTE
PA SW.
KEY
DRIVE
X1, CUSTOM XTAL 18616 KHZ FUNDAMENTAL (30pfx.)
1

If configured as a transceiver, the VXO control, together with RX BFO, is used to give the required offset between TX and RX tracking. This may be set using a separate receiver or alternatively, the frequency of the audio 'chirp' heard at changeover (in transceive mode only), may be used to assess offset

7. PRACTICAL EXPERIMENTATION. Since any frequency in the HF range can be generated, car is necessary when testing/tuning that the frequency is set within the amateur bands and clear of an on-going QSO's. The unit will drive a small PA unit for QRP operation (the author used up to 10W) but appropriate filtering should be provided where popular wide-band amplifiers are used. A little phase noise may be detectable on some frequencies but this has not proved to be a problem for CW QRP operation.
The more experienced constructor will appreciate that component substitutions are possible, the author used components readily to hand. One difficult area proved to be obtaining a reasonable keying characteristic.

8. REFERENCES

1. ARRL-SOLID STATE DESIGN FOR THE RADIO AMATEUR.
2. ARRL H/B - Filter Design Tables.
3. Siemens/Plessey - Integrated-circuit databook.

MEMBERS ADS AND WANTS

INFORMATION WANTED : 9M8ST has a Racal HF SSB Transceiver Type TRA 922 (49 crystal channels but can also be converted for use with synthesizer). Manual states it requires inputs at 10.7Mhz and 12.7 to 18.7mhz. Can anyone offer possible synthesizer operation advice and circuits. Joseph Siong, 9M8ST, 171D Cookes Drive, 93150 Kuching, Sarawak. Malaysia.

FOR SALE : Howes 40m, 3 watt Transceiver, fully built and working £50 with all paperwork.
Lake Tu2 MK2 ATU/SWR Meter, fully built and working £45. Peter Waite, G0PWZ, 0325 - 284176.

CAN YOU HELP ? There is a great need in Romania for Radio Amateur literature of any kind, especially of a practical nature - back issues of SPRAT, Radcom, books such as old Radio Communications Handbooks, ARRL books, Amateur Radio techniques etc. These can be sent via Paul Howett, G4MD, 12 Arne Road, Walsgrave, Coventry, CV2 2BY to passed on to the Romanian FRR for distribution through their network of clubs.

US COLLECTOR of QRP Anything and Everything seeks rigs, accessories, kits, literature. I am interested in anything QRP related. Please quote asking prices in your local currency. tnx. Jim Cates, WA6GER, 3241 Eastwood Road, Sacramento, CA 95821. U.S.A.

FOR SALE : TenTec ARGOSY Analogue version, not digital. Perfect condition with audio filters. Semi-QSK plus RF attenuator. Ray Pascoe G3IOI : QTHR.

FOR SALE : or offers : Tiny Tim 160m SSB Transceiver. Needs slight attention. G0LHM 0302 - 859451.

FOR SALE : Lionel US Army Sig Corps Bug Keyboard J36 (1942), also A.M. Morse Keyboard Type D. Offers please to G3PBQ 0121-373-2282 [evenings]

FOR SALE: Tektronix 547 Oscilloscope with plug-ins. Tube nearly new. Excellent clean condition. Complete with circuit and full manuals. £60. Delivery by arrangement.
Richard, G4ICP, 01376 - 584478

FOR SALE: Howes 10/15 metre dual band SSB/CW Transceiver, built, cased and working, inc these modules : DXR10, HPA10, DS2, HTX10, VF10, CS14. The Transceiver has a dual bandwidth filter for SSB/CW. £140 ono. Nicky TRF built and working, just needs tuning capacitor, case and reduction drive for regeneration [it have used it well with this] £12.50 ono. Bag of potentiometers and other goodies bargain at £2. Call David on 0181-317-2223 - evenings and weekends.

A 30m QRP CW TRANSMITTER

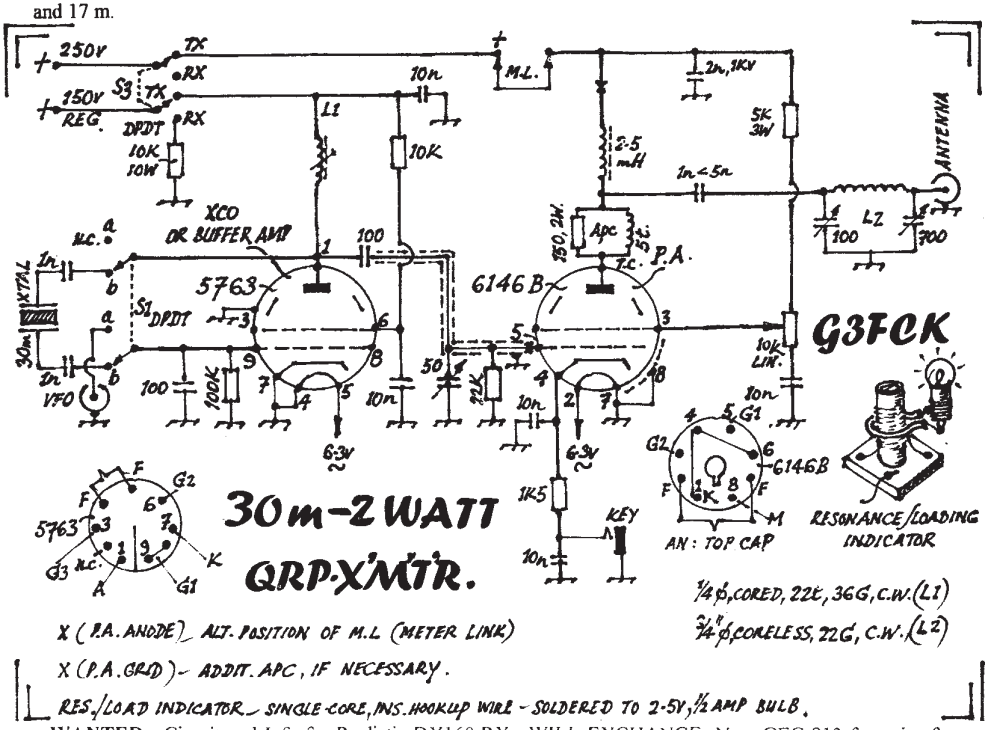
A.W. McNeill G3FCK 40 Turnpike Road. NEWBURY Berks

A Home-brew unit, utilising a couple of redundant QRO beam tetrodes, built chassis/panel style, measuring just 7" x 4" x 3 1/2".. No V.C. was used, and HC 25U xtals were found to register about 10 to 11KHz above fundamental.

On completion, a " CQ" air-test was made, answered by an EA, with an 56 report, in the midst of 59 plus auto QRM.

Makes a reasonable standby TX for the valve fan who has a few "big-gain" bottles lying idle in the junk box.

The 5763 anode could be switched to other coils, and the pinet coil tapped, to provide other bands; e.g. 20 and 17 m.



WANTED: Circuit and Info for Realistic DX160 RX. WILL EXCHANGE: New GEC 813 for pair of 6146 B's. FOR SALE: Sony s/manual Betamax SL-C5UB & SL-C5E, offers. G4HMV, QTHR. Tel: 0922 - 415078.

WANTED: SPRAT no.s 36, 37, 38, 39. Reasonable prices paid. Ian Liston-Smith, G4JQT, 48 Swansea Rd. Reading. RG1 8HA. Tel: 01734 596806.

WANTED: Two "LOCTAL" 8 pin valve holders [not international nor other 8 pin types] price inc. Postage or source of supply to : A.W. McNeill, G3FCK, 40 Turnpike Road, Newbury, Berks, RG13 3AS. Tel: 01635 - 40750.

HELP: Growing group of Novices would like to make their own 6m dipoles but cannot locate **X** or **V** black mouldings to fix to 1" masts. Info or offers to their instructor : GW8AWT, W.J. Mainwaring Tyle Bach, Manordeilo, LLANDEILO, Dyfed SA19 7BA

THE GQ TRANSCEIVER KITS

This new club kit project is now in the final stages of bench and air testing - so far the results are very good! In the next issue we hope to feature the transceivers and offer the kits. They will include:

Superhet Transceiver - 6 pole 500Hz Crystal Filter - SBL1 First Mixer - Three Stages of Input Bandpass Filtering - QSK Operation - Output adjustable to well over 5 watts RF Output - Very Stable Linear Power Amplifier - PCB with Screened Overlay - All Parts and a Ready Punched Case

All Offered at a Special Member's Price !

A Message to French Members from F5OQO:

Le G QRP Club accepte maintenant les reglements directs (GØBXO) par Carte Bancaire (Visa ou MasterCard). Les membres francais qui le souhaitent peuvent regler leur costisation en France par l'intermediairre de J.M. Yeromonahos, F5OQO, 2 allee d'Hamadan, 91400, Orsay. Pour se faire, lui adresser un cheque de 60.00 France (soixante) libelle a son ordre. Cette somme include une contribution aux frais additionels (transferts bancaires courriers divers).

MEMBERS ADS AND WANTS

G3BMO QRP EQUIPMENT FOR SALE: **80m VFO TX**, 1.5w RF in Minnfford Case, KL7IAK circuit from Solid State Design p.220. Circuit enclosed, Frequency shift keying for use with separate RX, Keyed driver stage. £20 + carriage, **20m Transmitter**, 2 xtals freqs: 14050 & 14060. 1.75w RF out, Minnfford Case, "Teme" circuit. Osc on/off for use with separate RX. £20 + carriage. **Howes 40m VFO** [CVF40] osc on/off switch, 2 outputs both 2v p-p into 1.5K, built in case, RIT control ± 1.5KHz, £20 + carriage. **Homemade Antenna / +Vcc Change Over Unit**, Switches antenna from RX to TX, 2x +V to RX, 2x +V to TX, 2 key sockets, solid sate switched relay with delay adjustment, £15 + carriage. **10FM Transceiver** [phone only] converted Harvard CB, 4w RF out, 40 chan. [chan 1 = 29.310 - chan 40 = 29.700. 10KHz steps] 2 digit chan readout, mic and power lead, £30 + carriage. **2m FM Transceiver** [phone only] converted "Nova" PMR. 10w RF out, 8 position thumb wheel xtal selector. R0, R1, R3, R7, S14, S18, S20, S21 [note- S14&18 need RX coils tuning to freq] Full service manual with cct diagrams and voltage checks, mic and power lead. £35 + carriage. **QRP Calling and Other Crystals**, 3550, 3560, 7025, 7030, 21060, HC25U, £3 inc carriage. G3BMO, Bert Speed, 45 Willow Glade, HUNTINGTON, York, YO3 9NJ.

HELP WANTED BY VU MEMBER: Looking for a 1750KHz USB filter for Marconi CH 150 Transceiver. Manufacturer's number for filter: 246-730014-001, or suitable replacement. Mani, T.K. Model Engineering College, Thrikkakara, BMC PO, Kochi, India, 602021.

WANTED: Back issues of SPRAT. I need numbers 1 - 41, 43-4, 46-7. If you have, or know of, available copies, please contact: Ted Kell, KC5CUW. Box 58702, Houston, TX 77258, U.S.A.

SILENT KEY SALE - QRP EQUIPMENT: SAE for list to Brian Alderson, G3KJX, 43 Brompton Road, Northallerton, N. Yorks, DL6 1ED.

The 11th Yeovil QRP and Construction Convention

QRP FUNRUN 1995

FUNRUN BONUS STATIONS GB2LOW at QTH of G3GC
G0LKX located in Fareham, Hants
G3DYY located in Earith, Cambs.

RULES

When Tuesday 9th May to Friday 12th May.
8.00 pm to 10.00 pm UK Clock Time each evening.

Frequencies 3560 Khz and 7030 Khz both +/- 10 Khz.

Contacts CW Contacts must be between QRP stations maximum 5 W output.
Stations may be worked only only on Each band during the Funrun but Funrun Stations (all operating each evening randomly for one hour on each band) may be worked once each evening on each band.

Call "CQFR"

Scoring Each QSO with another QRP station scores 10 points.
Each QSO with Funrun Bonus Stations G0LKX and G3DYY scores 25 points.
Each QSO with the Yeovil Club Funrun Station, GB2LOW scores 50.

All duplicates must be marked and no points claimed. Points will be deducted for unmarked duplicates at twice the QSO value.

Exchange RST, Special Number (see below), Output Power, Name.

Serial Number The three figure serial number should start at a random number of your choice not less than 100 and must then be incremented by one for each QSO. However the three Club Funrun Stations listed above will all commence at 001 in the usual way.

Entry Sheets Separate log sheets for each band, with sub-totals for each evening, preferably in RSGB format. Also a separate signed RSGB style cover sheet stating Output Power, Rig and Aerial used. Send your entries to G3CQR, 9, Quarr Drive, Sherborne, Dorset, DT9 4HZ to arrive not later than Certificates for the highest score on each band, the highest total overall score and to the station consistently using the lowest power will be presented at the Convention on 21st May.

Note:- Apart from the Club's GB2LOW "FUNRUN BONUS STATION" this year's other two "FUNRUN BONUS STATION" were selected from last year's winners. It is our intention that in future this status will be offered to the previous year's leading stations.

TWO NEW QRP CLUBS :

GW QRP CLUB

The GW QRP Club was founded in June 1994 by Leighton Smart, GW0LBI, and Dave Griffiths, GW0JUJ, with the aim of creating a QRP grouping within Wales to encourage and foster in low power operating amongst Welsh radio amateurs. The club is of an informal nature - no subscriptions, no structures etc., merely a grouping of QRP enthusiasts brought together by common interest. The only costs are postage costs and members are asked to send a minimum of 6 2nd class stamps to cover the cost of the quarterly newsletter. The club also issues free awards. Further details can be had for a SASE to:

Leighton Smart, GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan, Wales.

I QRP CLUB

Details can be had from **Franz Falanga, I7FFE, P.O.B. 243, 70059 TRANI (BA), ITALY**. They also have a Packet radio Server on **IQRP@IK7NXQ**. G3RJV is member number 100 !

FERRITE BEAD TIP : Patrick Smith GW0VMR

I have used the cores of old car radio variometer tuners to make ferrite beads. Hold the core and file around with a needle file and snap to a suitable length.

THREE CLUB MEMBERS WIN TECHNICAL AWARDS

Once again G QRP Club members have been taking national awards:

Rick Campbell, KK7B, has been awarded the **ARRL Award for Technical Excellence** (again) and has also be given the **Chambers Award** for his work on microwaves. **Ian Keyser, G3ROO**, has received the RSGB **Wortley-Talbot Trophy** for "outstanding experimental work" for his article on the mini-synth (which first appeared in SPRAT). **John Hey, G3TDZ,** received the RSGB **Ostermeyer Trophy** for "the most meritorious description of a piece of home constructed amateur radio equipment" - his White Rose project, which also first appeared in SPRAT. Well done to all three !

BOB PUTS IN THE WORK !

In a note from Bob Hudson, G4JFN, our internal QSL Manager, I was surprised to find that he handled **19,320** cards in 1993 and **14,510** in 1994. On your behalf I thank Bob and his wife, Anne, for all their hard work.

QRP EXPEDITION NEWS

G0STR expects to be operating from **J3** from April 8th-19th. Bill has no confirmed callsign yet but hopes to operate mainly between 1000-1200z. He will use a Scout Transceiver into a W3EDP mainly around 14060 but will also keep an eye on 14285 and perhaps 15m.

FY/DJ0PJ hopes to be active in 1995, but as yet, no dates have been fixed. If you have news of an unusual QRP operating location, please contact **The G QRP Club Expedition Information Officer: Peter Barville, G3XJS, 40 Watchet Lane, Holmer Green, High Wycombe, HP15 6UG**.

THE MILITARY WIRELESS AMATEUR RADIO SOCIETY

is an organisation devoted to the acquisition, overhaul and usage of any military radio (ground sea or air) equipment. It has some 160 members mostly in the UK but some overseas. Details can be had from: **John Taylor-Cram, 2E1COC, 7 Hart Plain Ave. Cowplain, Waterlooville PO8 8RP.**

THE G QRP CLUB ON INTERNET

A G QRP Club Mailing List has been founded by members of the G QRP Club as a focus of QRP Activity for QRP Enthusiasts who have access to the Internet in the UK and further afield. Its formation is mainly due to the skills and loaned resources of Peter Bowyer, G4MJS. The list exists for the discussion of technical matters, QRP operating, QRP events and other QRP related topics. It is intended to be UK oriented and is not designed to replace the over subscribed USA based QRP List at netcom.com.

To join the list send mail to **"majordomo@insite.parasoft.co.uk"** with the following command in the body of the email message: **"subscribe gqrp-l"** (The last figure is L). Send mail to **"gqrp-l@insite.parasoft.co.uk"**and the mail will then be sent to everyone on the list. The list has a few basic rules. Messages should be of direct interest to QRP enthuiasts. Users are asked to not over-quote in replies and whenever possible reply direct to the sender rather than the list. It is hoped that the mail will add to the sum total of information on QRP related amateur radio rather than be personal remarks and messages. My view, without seeking to be unkind, is that the QRP List in the USA on net.com is spoiled by an excess of trivial messages. Anyone subscribing to the list will receive guidance on use of the list and how to unsubscribe.

TWO INTERESTING EUROPEAN INVITATIONS

DO YOU WANT TO OPERATE QRP IN ROMANIA?

Vasile Ciobanita, YO3APG, has issues a general invitation for a team of 3 or 4 British radio amateurs to take part in the "YO QRP Contest". This event takes place near the Black Sea resort of Constanta on the first weekend in June each year. Basic accommodation and food are provide for 3 days/2 nights and up to 30 teams take part. The contest takes place on Saturday for 2 to 4 hours [depending on entrants]. Stations are randomly assigned operating positions within a 5Km radius and given special event (YO0..) callsigns. Stations work each other only, duplicates allowed within one hour spacing. Stations must be HOME BUILT powered independently from mains supplies, and operate within the band 3510-3575 Khz with a maximum power of 5w. certificates are presented on Sunday for the best performance and the best home brewed equipment. If someone would like to act as a team leader please contact YO3APG direct : Vasile Ciobanita, YO3APG, Box 22-50, R-71100, Bucuresti, Romania. Further information and help can be had from **Paul Howett, G4MD, 12 Arne Road, Walsgrave, Coventry, CV2 2BY. Tel: 01203 613213**. Paul is a member of Radio Amateur Relief Expeditions.

SLOVAK QRP AND CONSTRUCTION COMPETITION

27-28 May 1995 at Zeleznicne uciliste Priekopa, in Vrutky, Slovalia. Easy to reach by Rail, Coach from London, or Air. Accommodation included at £4 per person per night. Convention Entry fee £2. Closing date for booking to G4FDC [below] is 1st May 1995. The convention could be combined with a holiday in Slovakia and extended accommodation is available. Good local attractions, inc. mountain walking. Or you could stay to operate special event station OM9QRP from a mountain top during HF Field Day on 2-3 June!

Every QRP and Home Construction Enthusiast is invited to submit a paper or lecture in person (Slovak, Czech or English). Send your paper to G4FDC and, if time permits, it will be read in your name. maximum duration of talks is 20 minutes. Submitted papers one side of A4 paper typed. Bring and Buy Stall, Exhibition of Home Built Equipment with a prize for the best submission. Please bring home built equipment and your amateur radio licence. FURTHER DETAILS AND INFORMATION FROM: **Alex Korda, G4FDC, 5 Windmill Ct. North St. Royal Tunbridge Wells, Kent, TN2 4SU. Telephone : 01892-541733**

ANTENNAS - ANECDOTES - AWARDS

Gus Taylor G8PG 37 Pickerill Road, Greasby, Merseyside, L49 3ND

MOBILE ANTENNAS are the subject of an interesting paper by Byron, WU2J (430 Plant Avenue, NE Palm Bay, FLA 32907), who gives the results of 4 months work. (Note; dBd = with reference to a full quarter wave antenna). The modified CB antenna was only 3.5 dBd down from the front of the car. All antennas were an additional 2 dB down when measured from the side of the car. From the back of the car the CB antenna was down 6.3 dBd. Even the full quarter wave off the back of the car was 6dB down. All measurements were in the 18 MHz band. The feed impedance of the full quarter wave was 63 ohms, which requires investigation. To improve the mobile antenna five different antennas of heights between 45 and 87 inches were made, with loading coils in positions varying from near the top to near the base. In each instance loading coil Q and radiation resistance were calculated. Initially all antennas were measured at ground level using a W2FMI system of radials. Each antenna was then car mounted and carefully tuned (transmission line transformers being used if necessary), after which measurements were made.It was found that ground loss resistance IS NOT A CONSTANT but that it varies directly with the height of the antenna. The quarter wave had a ground loss (Rg) of 26.5 ohms, and a 45.75 inch antenna an Rg of 10.4 ohms (both car mounted). This could be reduced to 7 ohms by using a 40 inch antenna with the coil 4 inches from its base, but this produced lower Rr and gain. Measured from the front of the car the 45.75 inch antenna was 1.8 dBd down, and an 87 inch two thirds loaded antenna was only 0.5 dBd down. The best design to date is only 0.2 dBd down, with a height of 52 inches (it looks different to conventional mobile antennas). It appears to give much better results than the original modified CB antenna. Measurements have shown that the suggestion that the car body contributes to radiation are incorrect; it only acts as a ground plane. Computing the efficiency of a mobile antenna usually assumes an Rg of 10-12 ohms. This is incorrect. The reason that a short antenna can be so efficient is that its Rg can be much less than that of the full quarter wave antenna, even though there will be coil loss and lower Rr to be taken into account. All my measurements were made at low angle, line of sight, at a distance of seven wavelengths. To see what is happening with a trunk mounted antenna place a small vanity mirror on a table with its short side towards you, then place a 1.5 inch nail on the end of the mirror furthest from you. Move your head until you can see the whole of the image from the nail in the mirror. Observe and note your viewing angle with respect to the top. Repeat the process,but now using a half inch nail. You will find that you are looking at the mirror from a much lower angle. We can relate these results to the angle of radiation and an image plane quite easily. If for example, you preferred the second angle, using the shorter nail, you can approximate the amount of ground plane needed for the angle by how many nail lengths make up the length of the mirror (assuming a 2x3 inch mirror to be used). You can also use trigonometry if you wish. All this proves that the shorter antenna gets greater benefit from the limited ground plane provided by the car, and why higher verticals require much larger ground planes for efficient operation.

A LUCKY BUY IN A SECONDHAND BOOKSHOP made Brian,GoNSL, the proud owner of an antenna book by the great American expert John Kraus, W8JK. Written for professional engineers, it contains a section on loop antennas, both large and small. Small loops are well covered in many books, but the Kraus book also gives information on how to calculate the radiation resistance (Rr) of large loops (loops with a perimeter length of a quarter wavelength or more) and also a graph illustrating Rr against perimeter length for lengths up to 10 wavelengths. This graph shows the following approximate Rr for the lengths indicated.

¼wave 3 ohms ; ½ wave 30 ohms ; ¾ wave 60 ohms

1 wave 150 ohms ; 1½ wave 650 ohms ; 2 wave 1 000 ohms;

3 wave 2400 ohms ; 5 wave 3 000 ohms; 10 wave 6500 ohms.

From the above one can see that the rise in Rr flattens out in longer perimeter lengths. Brian was quick to spot that the Rr for a loop with a perimeter length of ¼ wave could provide a reasonable match to co-ax cable, so he erected a 14Mhz version. This gave an acceptable swr, and a CQ call with 5W of ssb produced a reply from a W4, so it certainly worked ! Although co-ax feed is useful for single band working, if the two ends of the loop are connected to an atu multi-band operation is immediately available. This may mean making the ends of the loop into what loooks like a open wire feeder by using spacers. The shape of the loop can be circular, square or rectangular. Such loops are particularly useful in confined areas, as they require much shorter runs than straight wires (an 80m straight wire becomes a 20m square for example.)Also they really work well as multi-band antennas.

THE 50TH ANNIVERSARY CELEBRATIONS OF D DAY AND THE LIBERATION OF BELGIUM have produced some very interesting operating and construction work. In Belgium, Joe, ON5LJ has produced a beautifully made reconstruction of the "Parset" used by so many Resistance "pianists" (radio operators) and is using it on the bands. His friend non-member Pierre,F6HPX, has made excellent reproductions of the "Paraset" and the MK A1, and has had dozens of QSOs with them. Ex-member Paul, F3IM has been going great guns with a B2 suitcase set that arrived in France on the end of a parachute in 1943. Much further east, our new member Janos , HA2MP is an expert on German and East European clandestine radios (his interest in radio stems from having a German signal detachment billeted in his house when he was 11). He has sent the circuit of a Russian partisan radio of 1942 vintage, using 6AG7 CO/6L6 PA, and a 4 tube RX with 470 KHz if and reaction on the demodulator to allow cw reception. A second 6L6 is used to neutrailise the PA in an unusual circuit. Janos has been sent constructional info on the "Paraset" and is to build one. The range of expertise amongst QRPers never fails to amze me. Long may it continue !

INCIDENTLY, if anyone has valves type HL23 or Pen25 (or equivalents) for sale,contact ON5LJ, rue de la Passerelle 3,4031 Angleur-Liege, Belgium. He also wants two female antenna plugs for a BC342, and an 80m coil for an HAC one valve RX.

OUR MAJOR CLUB AWARDS FOR 1994 ARE AS FOLLOWS:-

THE G2NJ TROPHY (services to international QRP) goes to "Mac" McNeill, G3FCK. Mac has been our SPRAT illustrator for many years, serving all our world-wide membership.

THE PARTRIDGE TROPHY (best antenna article) goes to Ha-Jo Brandt, DJ1ZB, for his paper on the use of two co-ax cables as a tuned feeder. A summary was published in SPRAT. Copies of the full text have gone to many countries by request. The DJ1ZB "MAY" compact multi-band antenna will appear in our next issue.

THE SUFFOLK TROPHY (best SPRAT constructional article) goes to Byron C. Weaver, WU2J, for his BLT SSB transceiver and linear amplifier articles. One must also mention his Resistive Bridge, which has also elicited favourable comment from readers.

Sincere congratulations to all three on this well-merited recognition of their efforts.

OPERATING AWARDS

Congratulations to the following on their Awards.

QRP Countries; 125 OK1DKR ; 50 GW3SB ; 25 G3FNM, GoADH.

Worked G QRP Club; 700 G2DAN (great work); 600 G3DNF, 500 G3INZ; 400 G4XVE ; 280 G4NBI ; 200 OK1DKR; 120 G4ICP, G3ZHE ; 100 GOADH ; 80 GoTHA, GoTUE ; 20 GoSTF, G3FNM, Gi4SRO, DL1KSW; GoPMY.

Two-way QRP ; 60 DJoGD (Nice Peter!); 30 OK1DKR ; 20; GoADH; GoTUE; G3FNM; GW3TKZ; 10 GoSTF; GoTHA; G3ZHE ; GoSWU.

A LITTLE ADVICE FOR THOSE preparing for the R.A.E. (U.K. licence examination). Many do not seem to know that the Pass mark for paper 1 is higher than that for paper 2 (60% as against 40%). Bearing this in mind it is essential that candidates have a good knowledge of Regulations, Interference suppression, and EMC when attempting the examination.

JUST HOW MUCH DOES COUPLING INTO THE ENVIRONMENT help to radiate a signal from an upstairs shack ? During recent tests with a short, loaded indoor wire tuned against the central heating system as "ground", it was found that the central heating radiator in the shack, its connecting pipes, and the radiator in the ground floor room below were doing a great job as a vertical antenna. This raised the interesting question of whether the loaded antenna was working against the heating system ground, or vice-versa ! In this instance no problems with EMC etc as QRP was being used, but QRO might have been very different. The whole question of exploiting existing metalwork in buildings to help radiation from indoor antennas is a fascinating one which needs much more investigation, particularly as every building is likely to produce different results. It would be nice to hear from members with interesting experiences in this area.

...._._ ...._._ ...._._

COMMUNICATIONS AND CONTESTS

Gerald Stancey G3MCK 14 Cherry Orchard, STAINES, Middsx. TW18 2DF

WINTER SPORTS

Again the amount of activity clearly showed that this is one of the most popular events in the QRP calendar. 46 logs were received from 17 different countries. The general view expressed was that conditions on the HF bands could have been better. The winning station was Gedas LY3BA with an outstanding score of 218 points, the runner up being Jim G0TDK with 109 points. Entries varied from 2 to 218 points with a typical entry being 20 to 40 points. I put this in to encourage people to submit logs; you don't have to make a big score to submit a log. May I thank all those who submitted logs; the letters or comments appended made each log a pleasure to read.

QSOs were made on all bands from, 1.8 to 21 MHz with the majority of the activity being on 3.5, 7 and 14 MHz. A total of 45 countries covering three continents were logged. An interesting log was Ziem's SP6GB who concentrated mainly on 1.8 MHz. Quite a few European stations made it to the States on 14 MHz where Mike W3TS kept the flag flying and was the highest scorer in N America so earning a certificate of merit. Other noteworthy DX was worked by Peter G3XJS who got into 8P9 and FM5 on 14 MHz.

Chris G4BUE was again running GB0QRP and concentrated on 3.5 MHz where his efforts got him to the USA on most mornings around 0700.z. He worked W3TS several times but his best QSO was with Bill N4AR, this QSO earned them both certificates. Incidentally it was nice to see Bill's XYL Betty KC4DWT taking time off from bird watching to give some 14 MHz QRP QSOs.

A very comprehensive SWL log was submitted by Bill #5300 who receives a certificate.

Finally, and I know this will surprise him as he only entered a check log, a special certificate to Gus G8PG. For 15 years Gus has adjudicated this contest and has been unable to enter until this tear. The certificate is in recognition of his efforts over the years.

ERRATA

Sack cloth and ashes; the gremlins got out again.

CZEBRIT: The date should have been 24 to 26 February and logs due by 15 April. Correct dates were published in Rad Com and we tried to publicise them by other routes.

Coast Stations: The call of Niton is GNI1 and the longitude is W 01 18 and GNK's longitude is W 01 02.

AGCW - DL SUMMER QRP CONTEST

Summer Contest - 3rd complete weekend in July. 1500UTC Saturday to 1500 UTC Sunday, 9 hours min. rest time,in 1 or 2 blocks are obligatory.

Participants: single OP in CW mode on 3,5 - 7 - 14 - 21 - 28 MHz. Only one TX and RX or TRX may be operated at the same time. QSO with stations outside the contest are valid, too. Reception of RST is sufficient from non-contest stations. contest stations exchange RST + serial number/category.

Categories: VLP - very low power; up to 1 watt out or 2 watts input

QRP - "classic" QRP; up to 5 watts output or 10 watts input

MP - moderate power; up to 25 watts output or 50 watts input

QRO - above 25 watts output or 50 watts input (QSOs - between QRO-stations are not allowed.)

Points: Every QSO with a station on the same continent counts 1 point, with DX-stations 2 points. The contest manager will calculate 4 points for QSO with VLP, QRP and MP - stations submitting a log.

Multipliers: Each DXCC - country counts 1 multiplier per band. The contest manager will calculate 2 multiplier points for each DXCC -country worked for every QSO with a VLP, QRP or MP - station having sent a log.

Final score: total QSO-points multiplied by total multiplier-points. Necessarily the final calculation will by done by the contest manager.

Logs: Please list QSOs separately for every band and mark your claimed multipliers. The obligatory rest time(s) outputs (inputs respectively) of all operated transmitters must be mentioned, more station details are appreciated. Please do not forget your full address - and an IRC if a result list is wanted. Your QSO partner will net full account of points only if you send in your log! **DEADLINE:** 15th September.

Send your logs to: Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228 Salzgitter, Germany.

NOVICE NEWS

Steve Ortmayer G4RAW
14 The Crescent, Hipperholme, Halifax. HX3 8NQ. Tel: 0422-203062

Novice member Tom 2EOACY won the RSGB QRS Contest so congratulations to him. Tom complains that the Novice allocation of frequencies does not allow him to enter as many contests as he would like but a class A call is on the way so watch out you top contesters you may soon be pushed down the ladder a bit. Tom has taught his daughters Katie (7) and Eve (11) Morse and they have both passed the Novice 5wpm test. Katie is the youngest person ever to pass the test. So congratulations to both and we hope to hear you on the band soon. Tom's son Ben (5) is now learning Morse and hopes to pass when he is six! I heard Tom going great guns in the RSGB LF Cumulative and managed a QSO with him. Ron 2EOAIS writes to say it can be a bit of a struggle at first with 5 wpm on the bands when most are going much faster. I am sure there will be some local members who would give Tom a few QRS QSO's it soon gets easy with practice Tom. Tom has sent a nice QSL card produced by his grandson which features the crooked spire at Chesterfield. Tom was also pleased to work into DL land on 70 cm's

Tony 2EOAIR writes to say that there have been reports of USA stations calling slowly on 3570KHz at midnight looking for UK Novice stations so keep trying folks and let me know if you have any success. Tony contacted 1K2YCR who sent a nice world map QSL card and a 2000 lire note with a picture of our hero Count Macaroni (I think that should read Marconi Ed) Tony (and others) have asked about extending the Novice frequency allocation. Phil Mayer GOKKL is now RSGB Project YEAR Co-ordinator and Phil has our interests to heart regarding more frequencies, so let Phil have your views to put to the RSGB Licensing Committee.

George G3ICO has written with details of the Yeovil Amateur Radio Club QRP Convention. This year there is to be a special "Novice Corner" with simple home brew equipment and details of the Novice Course so please go along to help make the "Corner" a success.

Handy Hints for a Happy Shack.

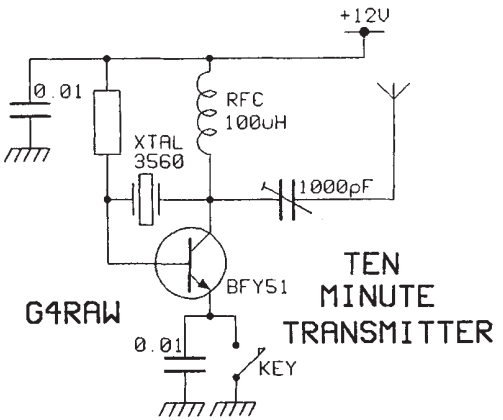
Only one hint this time from Malcolm G6UGW. Malcolm uses Airfix polystyrene glue tope to make BNC caps to protect the BNC socket on a rig or scanner. The cap is attached with this flexible wire to rigs handle.

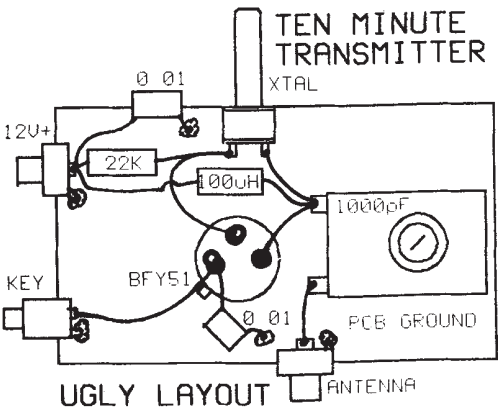
Ten Minute TX

What is the world record for building a simple transmitter and making a QSO well I understand that it stands at 15 minutes. It was achieved with the famous Oner when 15 minutes after tipping the components out onto the bench a QSO was made with the completed transmitter.

You may have a chance with Ten Minute TX make it in ten minutes which give 5 minutes for a QSO. The circuit comes "ugly" fashion on a bit of PCB. Well I did not break the 15 day to make a contact! Adjust the trimmer for best note consistent with power out. (J Birkett has the 1000pF trimmers).

That's all for now keep sending news and handy tips.





VHF MANAGER'S REPORT

John Beech, G8SEQ
124 Belgrave Road, Wyken Coventry CV2 5BH Tel. or Fax 0203 617367.

No news to report this quarter, so I have included a QRP QSK circuit of general interest to readers.

QRP QSK Notes:

R1 and R4 can be omitted if the circuit is used to feed DC to RX and TX

C1,2,3 can be 10n to 100n; for UHF/VHF use 100pF to 1000pF chip capacitors.

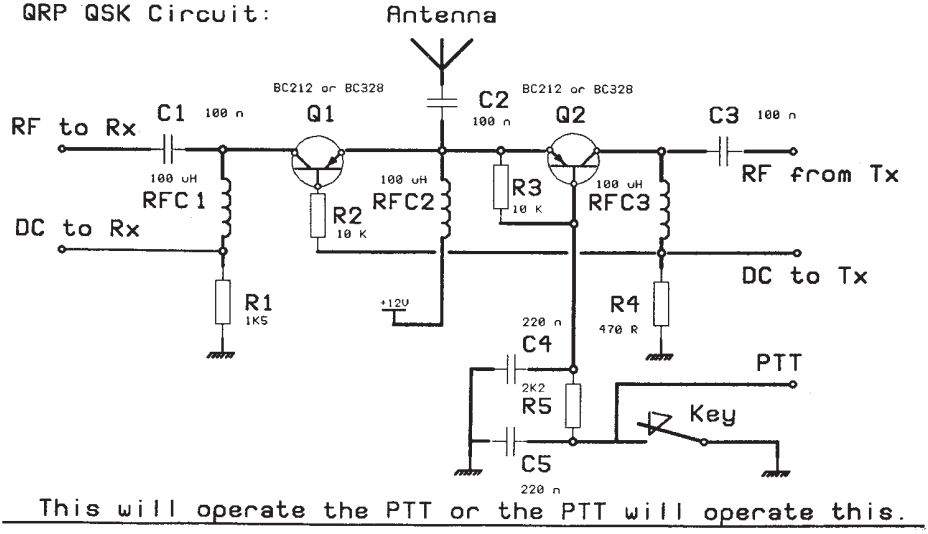
R3, R5, C4, C5 are key shaping and can be varied to alter envelope, but keep R3 close to 10K.

RFC values listed are for 7MHz and above; for LF use higher values; for VHF/UHF use high-Q self supporting coils.

For up to 5W CW operation. If R1 & R4 are varied or omitted ensure current in Q1 >10mA, Q2 >20mA.

If you use this circuit to supply DC to the RX and TX and omit R1 and R4 then your rig will draw NO extra current. With the transistors specified, TX currents of up to 100mA can be supplied - I usually key only the driver, leaving DC on the Class C PA.

Almost any PNP will work in this circuit. If you need to supply more current then use a 1A device, e.g. BFX31, in TO5 can, with heatsink. This circuit should prove useful with Trx - Transverter combinations.



SSB COLUMN : Dick Pascoe G0BPS

Seaview House, Crete Road East, Folkestone. CT18 7EG. Tel: 0303 891106

Dick has received no letters on SSB during the last three months ! With all the recent SPRAT items on SSB, where are all the QRP SSBers ? Perhaps next SPRAT ?

MEMBERS' NEWS

by Chris Page G4BUE

"Alamosa", The Paddocks, Upper Beeding, Steyning, West Sussex BN44 3JW.
Tel/Fax: 01903 814594
Packet: GB7VRB or the UK DX PacketCluster

In this edition of SPRAT I have usually given details of the Summer QRP Party that Pam and I have been holding since 1984. I regret to tell you that there isn't going to be a party this year; the reason is that Pam and I are separating! In common with a rather more famous couple (with Royal connections!) we have grown apart in recent years to the point where we have no common interests. It is a very amicable separation and Pam and I intend to remain friends. She is moving to her own house at Lancing, West Sussex and I will stay at "Alamosa". Many of you have attended the QRP Parties since 1984, or visited here on other occasions, and met Pam. I mention our new circumstances merely to save any embarassment for you or us in the future and to explain the absence of a Summer QRP Party. Thanks from both of us for all your support over the years.

Welcome to new member **G4LQO** who, after 13 years of running QRO, has been bitten by the QRP bug. Bill boxed up his two old TS530s and used an old FT101ZD with the drive cranked back to 5W. His wife "allowed" him to order the Index Laboratory QRP Plus and he has been putting it on the end of his Cobwebb antenna for the HF bands and bent 66 feet end-fed for the LF bands. Bill wonders where the SSB QRPers are as everyone he works on the QRP frequencies seems to be QRO?

G3JUD is considering the purchase of a SuperScaf audio filter and wonders whether they are still made. I used one back in 1988 but changed it to the Smart Filter made by MSC of Huntsville, Alabama, USA. Since the SCAF (switched capacitor filtering) filters were developed in the late 1980s, DSP filtering has evolved. I currently use the Smart SCAF filter permanently and the Timewave DSP9 (made in the USA but available in the UK from Nevada Communications) when the going gets rough! I don't think you can find a better audio filter combination in the current commericl range.

F5NZY has recently moved house and is temporarily using a 66 feet end fed between his kitchen window on the second floor and a neighbour's window on the fourth floor! Stephane also uses an inverted L between his bathroom window and a tree on the avenue where he lives! Both antennas have 300Ω open-wire feeder under the carpet and work DX, as contacts with 5T, OD, VP2E, JW, FY, TU and W7 verify. Makes you wonder what Stephane's going to work when he gets his permanent antennas up doesn't it? **G4VPM** will be QRV from Guernsey for a week from the 28th May. The trip is primarily a holiday, but Andy do some QRP operating. Congratulations to **G3XJS** - I've just spotted on the DX PacketCluster that he worked Dave, **FY/DJØPJ** on two-way QRP on 15 metres this afternoon (26th February).

HB9ANW (G3OQF) tried the passive RF phase-shift network mentioned by KK7B in SPRAT 81 on 160 metres in his simple SSB (phasing) direct conversion receiver. Richard found it worked well and he could hardly find the unwanted sideband at all! He did without the two output networks and nulled the quadrature hybrid with a 100Ω pot in place of the 51Ω terminating resistor. One effect of the transformer is to make the inductances half the impedance they would have to be if they were completely separate. The source impedance is 50Ω, and so are the two loads (SBL21s directly connected). The network's four components replace 15 used in Dick's previous RC with FET buffers circuit.

DK9EA has been using CW since 1937 when he became a radio operator in the

former GAF and since 1975 when he became a radio amateur. Walter is working towards his WAB Award and is looking for new squares. He visited the UK last October and attended the AGM of RAFARS where he met many friends from the 'CW gang'. **DL2BQD** has sent in a photcopy of the "21 Years Ago This Month" section of a 1946 edition of QST. Dieter thought the following part of it may be of interest to 'younger' members: "In QST for May 1921, a western amateur challenges our claim that a c.w. set can be put in as cheaply as spark, mile for mile. Editor Warner accepts the challenge in 'The $100 C.W. Set' recommending four UV-202s, push-pull in pairs, self recitifying, in a Hartley circuit, as being capable of out-performing any 1KW spark. Incidentally, each tube requires a $2 rheostat and a $1.75 socket" In the same article, the station of 3XM is described as having a 40,000 volt transformer weighing 500 pounds, a glass dielectric condenser weighing 300 pounds and an anetenna slung between a 150 foot steeple and a 100 feet stack. 3XM's signals had been copied in all but eight states!

G1LHW (2EØADM) monitored the 28MHz beacons during December and heard the ZS6 and SM one five times and the LA one twice. Les also heard the DL and S5 beacons one day and then made QSOs with two DL stations in Berlin. Despite only using a sloping half size G5RV at 30 feet, Les says 28MHz is still worth keeping an ear open for. **GWØNSR** has been having a lot of fun with a Codar AT5 transmitter, PSU and a Heathkit SB301 receiver which he bought for a total cost of £35! Tony says it is extremely QRO at 14 watts and would like to find a mod to vary the power down to one watt or less. After a wait of over 18 months, he was pleased to receive a QSL card from VKØLL, Heard Island with a 339 report from his 3W on 80 metres. Tony was using a 120 feet end fed wire 40 feet high. In the 1950s, Tony was one of the operators at ZB2A and wonders if there are any other operators from there in the club?

Congratulations to GØKCA on receiving the European CW Association's award endorsed for QRP. The certificate is numbered 002 so John presumes there is only one other QRP certificate. He has been given a second hand Diamond CP5 antenna which he has cleaned up and resonated at ground level with an MFJ Antenna Analyser intending to mount it on a redundant chimney stack in the spring. **LA7QO, LA3KY, LA3NP, LA3IW** and **LA8PO** all reside at the inlet of Hardangerfjord on the west coast of Norway. Club meetings are difficult as they live on several different islands but they use QRP to keep the group together on the air. They are looking for a transceiver project to pass the winter evenings.

You are never too old for QRPing , so says **VK5LG**, who is "still chasing the elusive DX and still very QRP" at 90 years old. Leith's pride of a joy is a certificate from the ARCI for a QSO across Australia to Perth (2,700km) and endorsed 37,033 miles per watt using a rig of G3YUQ's one transistor circuit. **NE3I** would be interested to arrange skeds or communication tests with members. Bob uses a TS440 powered down, with bent dipoles in a third floor attic, deed restrictions preventing outdoor antennas. He has built a 624 Kits one watt Universal Transmitter for 40 metres, a Oner for 20 metres and is currently building the NorCal 40 for field operations. Bob is also interested in trading postage stamps with members who have a similar interest.

G4FDC has sent details of the Slovak QRP and Construction Convention to be held in Vrutky on the 27th and 28th May. Alex invites papers from members, (in English) about QRP matters and he will submit them to the Convention. Papers will be published in the convention bulletin. There will be a bring and buy stand, an exhibition of homebrew equipment culminating in a prize giving for exhibits judged to be the best. If you want to attend the convention, and perhaps combine it with a holiday in the area, Alex will be pleased to help you and supply more information.

That clears the files. I'm looking forward to meeting the ARCI gang at Dayton in April and catching up with news from the USA QRP scene. Let me know how your spring goes, by the 20th May please.

NEW! DTR7 – 40m CW TX·RX

The DTR7 is building on the success of its companion, the 80m DTR3. Featuring module construction, with no less than five PCB's, the rig incorporates all the essential features of a transceiver without indulging in expensive gimmicks.

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AF output, up to 1/2 watt, is for 8 ohm 'phones or speaker.
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The PM20 is a combined 50 ohm Dummy Load and direct-reading milliwatt meter. Designed specifically for the QRP enthusiast, it accepts any frequency from 10kHz to 150MHZ. VSWR is less than 1.5:1 at 150MHz, about 1.1:1 at HF.
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The latest kit from George RJV is the RF activated changeover, a nice unit on a tiny board. It operates at just 100mW on 160m and 500mW on 10m. Easily handling full QRP power levels. The G3RJV RF QSK kit is just £9.00

The Stockton Power Meter / Wattmeter is a firm favourite around the world. With two meters it indicates accurately the power up and back down the line. No setting up including meters is £29.95

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