SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED·TO·LOW·POWER·COMMUNICATION

ISSUE NR. 36 | © G-QRP CLUB | Autumn 1983

Force 3 Transceiver. Computer Programmed Amplifier
SX1-ppl Circuit Helical Antenna Experiments
10MHz Modifications. LIAM 10MHz Transceiver
Miniature 2M. FM Transmitter.
SSB, VHF, Award and Members News

SPRAT The Journal of the G QRP CLUB

Rev. George Dobbs
G3RJV
17. Aspen Drive,
Chelmsley Wood,
Birmingham.
B37 7QX. 021-770 5918

Dear Member,

Three years ago I received the invitation to attend the ARRL National Convention in Houston this October. At that time it seemed a long way off but as I write this it is just weeks away and by the time you read this I may be there or even returned home. Further excitement has been added by the fact that I will not be the only G QRP Club representative from the UK. I am being joined by George (GM3OXX) and Chris (G4BUE). We all look forward to being part of the first major QRP Forum at an ARRL National Convention. We will doubtless bring back news, photos and ideas. May I repeat my request from the last issue for member to go easy on writing to me during October. I am away for the whole month and in that time I would normally receive about 150 letters.

As I write this the reprint of the G QRP Club Circuit Handbook is with the printers and is expected to be completed sometime in September. The reprint has kindly been handled and financed by the RSGB who will also distribute. So if you missed a copy the first time whatch out in Rad Com or future issues of SPRAT.

73 fer nw hpe cu qrp

G3RJV

Subscriptions

Renewal (Rates now £3.50 or $9 US) to Alan Lake, G4DVW, 7 Middleton Cl. Nuthall, Nottingham. NG16 1BX. PLEASE QUOTE MEMBERSHIP NUMBER. Cheques to 'G QRP CLUB'. European members may use Giro Cheques. A reminder will automatically be stamped in sequence onto copies of SPRAT, if you have already paid ignore this notice.

Due 155-177, 233-253, 326-350, 445-466, 934-1000, 1391-1463.

Overdue 121-154, 223-232, 293-325, 419-444, 573-615, 833-890, 1158-1209, 1315-1375.

THE A.R.C.I. FALL QSO PARTY

This annual event is being held from 1200 22 October to 2400 23 October with 24 hours of operating permitted. Members of ARCI will give RS(T), State/Province/Country and QRP ARCI NO. Non-members will give RS(T), State/Province/Country and output power. Stations may be worked once per band and mode. Multiplier as follows:- x 2 for 4 to 5 watts output with CW or 8 to 10 watts P.E.P.; x 4 for 3 to 4 watts or 6 to 8 watts PEP; x 6 for 2 to 3 watts or 4 to 6 watts PEP; x 8 for 1 to 2 watts or 2 to 4 watts PEP; x 10 for less than 1 watt or 2 watts PEP Bonus multiplier x 2 if 100% natural power or x 1½ if 100% battery power. Scoring is QSO points (total of all bands) times total of States/Provinces/Countries times power multiplier times bonus multiplier (if any). Imternational QRP frequencies and Awards will be sent to highest scoring station in each State/Province/Country. Separate logs for each band and to be sent to William W. Dickerson, WA2JOC, 230 Mill Street, Danville, Pennsylvania, 17821, U.S.A. by 20 November.

"FORCE THREE" 7MHz Transceiver

EI0CF

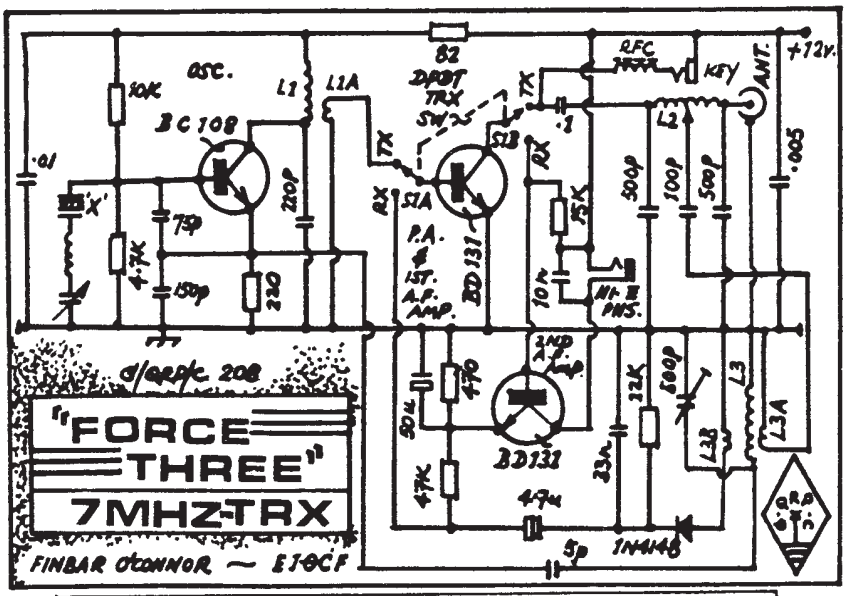
This three transistor transceiver for 40 metres, which runs about two watts output, has been developed from the many circuits in Sprat, notably The JU6 and the rig by SM6DWO.

The aim is for a transceiver which gives a healthy RF output with a very simple construction and sensitive receiver. The frequency coverage is approximately 20KHz with the VXO. The PA transistor, which also acts as the first stage in the AF amplifier, is a very rugged transistor type, though a homemade heatsink is recommended.

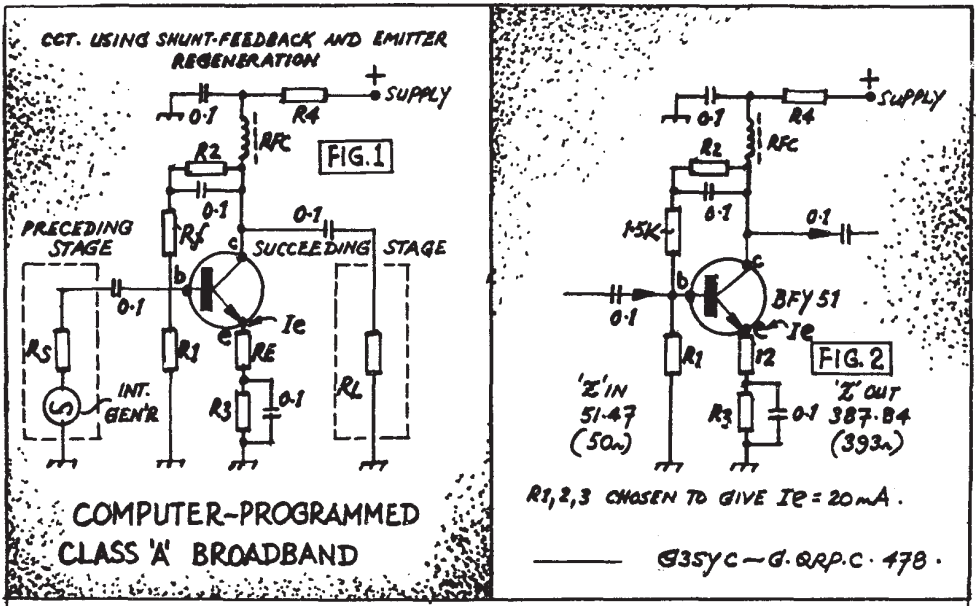
The receiver input circuit is very straightforward. A feature for so few components is the peaky tuning which entails slight retuning when changing crystals from say 7010 to 7050. However this sharp tuning proves very useful in rejecting those strong broadcast stations which play havoc to evening activity on this band.

Size should not prove a problem, the complete prototype was built on veroboard, 1¼ x 1½ inches. The fixed tuning of the transmitter also makes operation easy. Straight working into a 40 metre dipole is fine, however an ATU is required for the random wire type antenna.

Using an inverted vee dipole at 25 feet many European countries have been worked and a 569 report received during a half hour QSO with W1LVH, my first Stateside QRP QSO on this band.



L1= 18 turns 24 swg on T50-2, L1A= 2 turns 24 swg on L1
L2= 8 turns 24 swg on T50-2 tapped half way for RX pickup
L3= 22 turns 24 s.w.g on T50-2, L3 a&b= 2 turns 24 swg on L3
S1a/b is the transmit/receive switch.
Use generous heatsink on the PA as TX is capable of 2w out at 12 volts and 3.5w out at 18volts.



The above amplifier seems to find increasing use in amateur radio (see Solid State Design for The Radio Amateur - A.R.R.L.). The programme given calculates Z in, Z out and power gain of the stage (dB). It requires the following to be imputed into the programme as it runs: fT, fOP for the transistor used (hence B), Rs, Rl, Rc, Rf and Ic (see worked example). R1, R2 and R3 have then to be selected so that the value of Ic used in the programme is achieved. R4 is a low value decoupling resistor (38 ohms).

Example

Broadband amplifier using BFY51. To be fed from 50 ohm source (balanced ring mixer) and to feed crystal filter of input impedance 393 ohms.

Ft - 60MHz and Fop is 3.395MHz. Ft/Fop is B is 17.67. Rs is 50, Rl is 393, Rl is 12 and Rf is 1500 (the last on a trial and error basis to give the required impedance in and out) and Ic is 20.
Results:- Impedance input is 51.47 and Impedance output is 387.84 and the power gain is 18.11dBs.

WANTED: Any clandestine or spy radio sets also compact and miniature ex-gov. sets such as HF156,122,123,BP5 etc. Not a dealer just a collector. Write to John Baker,94 Shoot-up-Hill, London NW2.

SPRAT 35 CORRECTIONS:
1) Picture on Front was captioned G3EFJ, should be G4EFJ.
2) 10MHz Transverter (p.7) Point "B" goes to the 2n3053 input at 0.01uF.
3) Altern RX circuit (p.8) Top coupling (say about 10pF) required between the two sections of the input tuned circuits (across top of the two 22pF capacitors)

OXO Transmitter: Gus, G8PG, has found that a coil of some 45uH gives very good VXO swings when added in series with the VXO capacitor.

```
 10 CLS
 20 PRINT
 30 PRINT
 40 PRINT "BROADBAND AMPLIFIER CALCULATION"
 50 PRINT "******************************"
 60 PRINT
 65 PRINT "(f in mhz , R & Z in ohms , I in MA)"
 67 PRINT
 70 INPUT "fT (FOR TRANSISTOR) = "fT
 80 INPUT "fOP = " fOP
 85 LET @%=131594
 87 PRINT
 90 PRINT "fT/fOP = Beta = ";fT/fOP
100 LET @%=10
105 PRINT
110 INPUT "Rs = "A
115 PRINT
120 INPUT "Rl = "B
125 PRINT
130 INPUT "Re = "C
140 PRINT
150 INPUT "Rf = "D
160 PRINT
170 LET E = fT/fOP
180 INPUT "Ie = "F
190 G=26*E/F
200 H=G+(E+1)*C
210 I=(B+D)/(1+((E+1)*B+D)/H)
220 J=I/(I+A)
230 K=J*J/I
240 L=((E+1)*A+E*D)/(H+(E+1)*A)
250 M=B*(1-L)/(B+A+D-L*A)
260 N=A+D-L*A
270 O=M*M/N
280 P=10*LOG(O/K)
285 LET @%=&20109
290 PRINT
300 PRINT TAB(2);"RESULTS :";TAB(20);"Zin = ";I
310 PRINT TAB(2);"*******"
320 PRINT TAB(20);"Zout = ";N
330 PRINT
340 PRINT TAB(20);"Pwr. Gain = ";P;" DB"
350 PRINT : PRINT "RUN ENDED"
360 END
```

I.R.Cs FOR SALE.
The club now has a good stock of IRCs which I am willing to sell at FOUR FOR £1.00. Please send money and a SAE to G3RJV.

I was saddened to hear of the death of George McDonald, G3IEB, member 489. Members may remember George's circuitry which was added to the G3DOP JU6 transceiver in the JU6 PLUS which now features in The G-QRP-Club Circuit Handbook. George regained his interest in amateur radio in the latter years through QRP and home construction. (G3RJV)

We regret to announce the premature death of Daniel Lewis, N6HY, at the age of 31. Dan was killed in a car crash in June. Some members who have seen the Club slide presentation will recall Dan as the member on a slide which shows him with his /P HW8 rig, alongside his banjo, propped up against his Model T Ford. I exchanged several letters with Dan, he was an interesting and lively man. (G3RJV)

A PPL CIRCUIT FOR "SX1" UPPER QRP CHANNELS

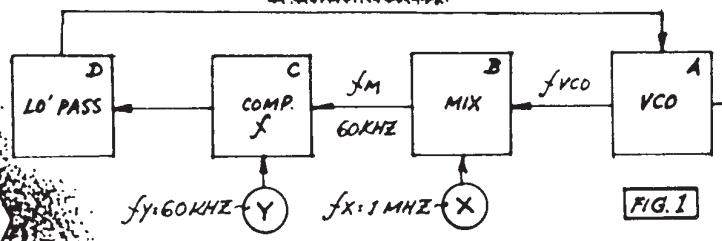


FIG. 1

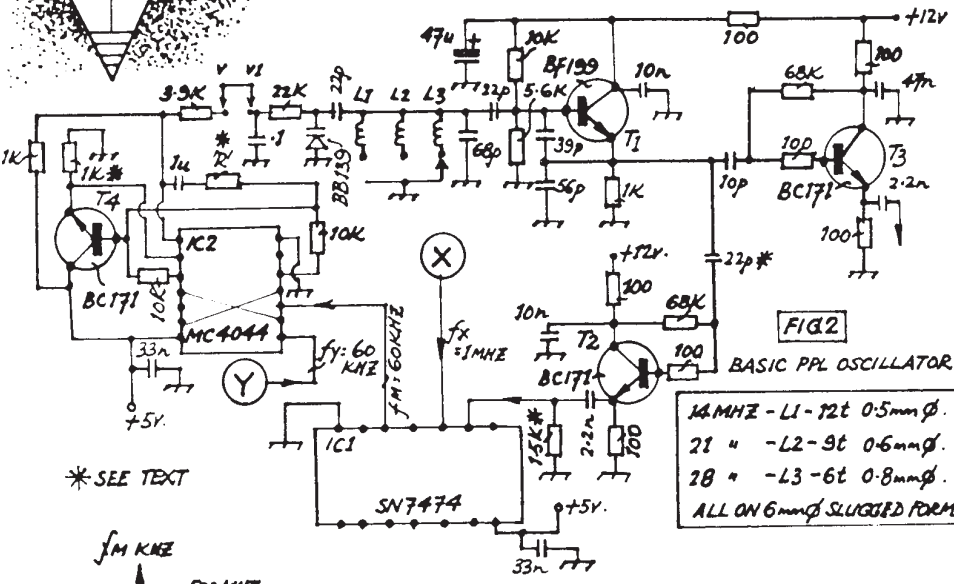


FIG 2

BASIC PPL OSCILLATOR

14 MHZ - L1 - 12t 0·5mm ø.
21 " - L2 - 9t 0·6mm ø.
28 " - L3 - 6t 0·8mm ø.
ALL ON 6mm ø SLUGGED FORMS.

* SEE TEXT

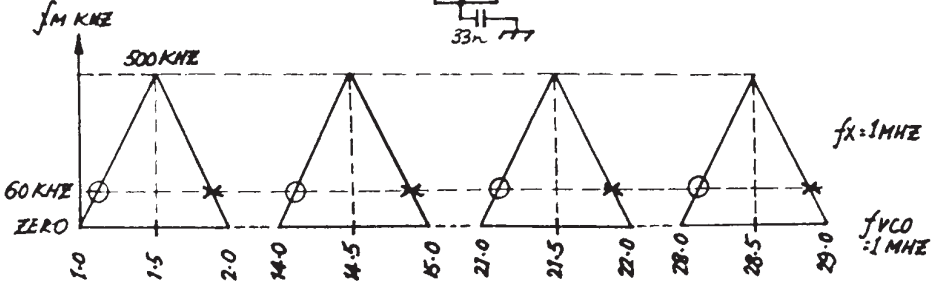


FIG. 3

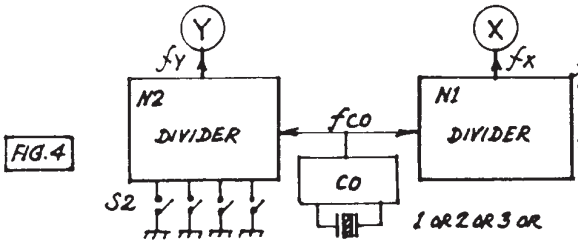
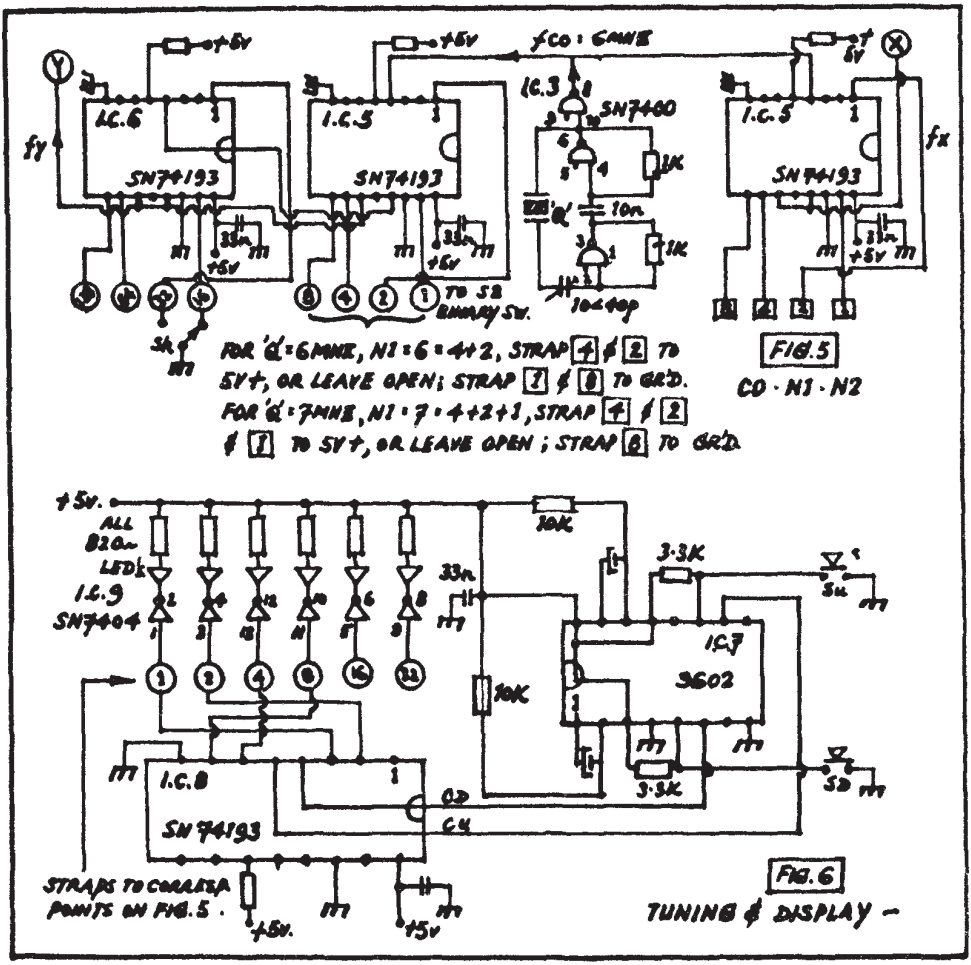


FIG. 4

GIG DRAGULESCU
• YO6HQ •



HELP REQUIRED,
G4GBL has been licensed for 7 years but not been on the air. He is disabled and unable to build equipment and on a low income. Jim is seeking to buy a simple transceiver, or RX and TX, to get him on the bands. He has some £40-50 to spend and is willing to use homebuilt equipment. Can anyone help? Contect Jim Armstrong, G4GBL, 9 Burns Cl. Grantham. Lincs. NG31 9NJ.

WANTED: Loan of handbook for HRO 5T, and required to buy bandspread coils and genuine HRO meter. Ian Wilks Ty Celyn, Axton Holywell, Clwyd. CH8 9DH or telephone 0745 570538.

INFORMATION REQUIRED: LA6NDA has an original National HF Receiver circa 1946 type N.C.-2-40 D and would like information or loan of a manual. Write to: Erling Seatravik, 6420 AUKRA. Norway.

BRANDNEW HW8 for sale, built but not used. £110. Tim G5DEH Newmarket 664757.

SX-1 and PLL CIRCUIT FOR UPPER QRP CHANNELS By Gig Dragulescu, YO6HQ

Since I first read that 1983 is a year of technical developement, I was busy with the idea of an oscillator to cover upper QRP channels, say 14060, 21060 and 28060 plus or minus 10KHz using only one Q crystal.

The result was the following circuit and I hope everyone who has difficulties in obtaining suitable crystals for these frequencies will be interested. In this circuit can be used any crystal with frequency integer multiple of 1MHz (that is 1, 2, 3....or even 16MHz). Do you know any crystal of this kind? What about your crystal marker?

From the block diagram in Fig. 1 you can see how this circuit works. The signals switchable to 14060, 21060 or 28060 from VCO (variable controlled oscillator) at A are going to the next stage at B where they are mixed with the incoming 1MHz signal (TTL level and rectangular form from a crustal oscillator at X). For mixing purposes is used a D flip-flop, the output of which is sent to the phase comparator stage at C. These nice signals always have a frequency of 60KHz being compared in phase with signals of the same frequency easy to obtain at Y from a conventional oscillator with a high degree of stability.

The output from the phase comparator passed through a LP filter at D results in a voltage proportional to the phase difference of the two 60KHz signals. This voltage is further used to control the frequency of VCO. If for any reason the VCO frequency changes, this control voltage will act on it moving its frequency back to the original value, so it is phase locked.

Now, if we shift the frequency of 60KHz oscillator, say within plus or minus 10KHz, the VCO in turn will shift 14060, 21060 or 28060 within the same range plus or minus 10KHz. The VCO stability depends on the 1MHz CO and the 60KHz oscillator stabilities. The complete diagram of the above circuit is shown in Fig. 2. Here T1 is used for VCO, IC1 (SN7474) for the mixer and IC2 (MC4044 from Motorola) plus T4 for phase comparator and LP filter. IC1 which is a D flip-flop works well up to 30MHz.

In Fig. 3 it can be seen this output Fm versus VCO input F VCO. Note that Fm varies only between 0 to 500KHz with VCO varying from 1 to say 30MHz. This output remains always constant at about 4Vpp. For PLL purposes the points marked O and X may be used as locking points. For the Fig. 2 circuit the points marked O are the stable ones, and those marked with X are unstable. If you need X points as stable locking points you may either change the direction of phase comparison or to reverse the polarity of the varicap diode so that its cathode to be connected to fixed positive voltage (5v) instead of ground. Note that you can use the above circuit for other than mentioned frequency, say for 10MHz, 18MHz or 24MHz. The only changes needed are for L or C values.

In the early stage of developing this circuit I used for fx the signals from my 1MHz based crystal marker (hi!) and for fy the signals of a LF generator, then of a 60KHz RC oscillator.

Now let us take a further step and see how there is no need for a separate 60KHz oscillator and how to use crystals other than 1MHz. If we drive 1MHz signals into a proper divider stage N2 (Fig. 4) say a SN7493 or a SN74193 IC, now fy is equal to fco/N2. For fCO is equal to 1MHz and N2 is equal to 16 give fy equal to 1MHz/16 which is equal to 62.5KHz (very near 60KHz). If we have a 5 or 6 MHz crystal then we can use a N1 divider wired to divide by 5 respectively 6 to obtain fx equal to 1MHz (SN74193 will be suited for N1 equal to 1 to 16). But now we must change N2 to 100 so fy is equal to 6MHz/100 which is equal to 60KHz. On the other hand now we can step N2 from 86 to 111 so fy is equal to 6MHz/186....111 or 54....70KHz in steps of about 400...600Hz. So the VCO in Fig. 2 will step, for example, from 14057 to 14070KHz in steps of about 400/600Hz. Fig. 5 shows the circuitry for CO and N1, N2 dividers. N1 uses a 74193 IC wired to divide by values from 1 to 16. Depending on the crystal used you need to strap the data input of IC4 as indicated in Fig. 5. N2 uses two 74193 ICs wired to divide by values from 96 to 111 or from 80 to 95. If you leave point 128 open you can divide by values up to 255. All you have to do is to change

the binary content to all data inputs of the 74193 IC5 and IC6, leaving them open or closing them to ground as necessary. Here the S2 binary switch can be positioned in 16 different ways, closing or opening its 4 independant contacts so we can step with N2 either from 96 to 111 or from 80 to 95. The Sh switch can be used to shift VCO frequency during reception (if you use a separate receiver) and/or to enlarge the range with other different steps. As you see S2 binary switch is now both for timing and for frequency indication (indirectly of course).

For other than the provided range you can easily change the value of N2. For other than 14, 21 or 28MHz VCO frequency all you have to do is to add new LC components via a switch in the VCO circuit. Instead of S2 binary switch I use the circuit of Fig. 6 to step up and down through the QRP channels with two push button switches. Every time you push Su switch, IC8 (SN74193) will count up. The binary data of its output will change to 1 (counts from 0 to 15 in binary). Wiring IC8 data outputs to data inputs of IC5 we step up N2. If we push Sd switch, IC8 will count down (counts from 15 to 0), so N2 will step down.

The LEDs are used for binary indication of this scan and so they give an indirect indication of VCO frequency. In order to eliminate the glitches resulted from the two tuning switches it was necessary to use the dual one shot IC7 (9602), equivalent type is the SN74123 but with different pin connections.

Practical Aspects :- The described circuits were built on three PCBs, note that good decoupling and proper shielding, especially for VCO, are essential. The tuning and display PCB is mounted vertically behind the front panel. The LEDs are marked 1, 2, 4, 8, 16, and 32. The S1 switch is located in the middle, just under the LEDs. On the left and right sides I drew two conversion tables between the LEDs indication and resulting frequency in KHz. The LEDs 4 and 32 on the Fig. 7 are lighted on, just add 4 to 32, it gives 36, so it means 60KHz.

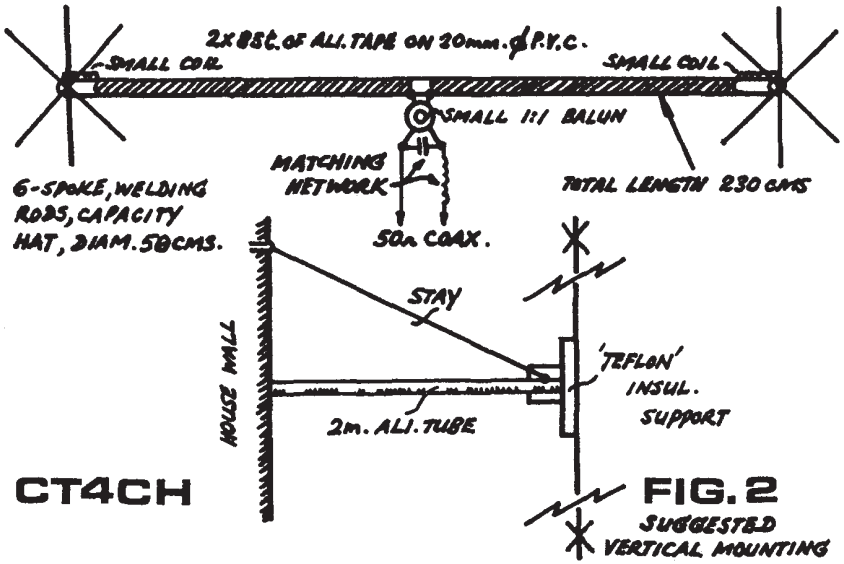
The adjusting procedures are as follows:- Connect tuning and display PCB to plus five volts, and the LEDs 1, 2, 4 and 8 will indicate the content of binary counter IC8. To find the decimal value just add the figures you marked near these on the lighted LEDs. Pushing on Su check if indication will increase by one every time you push this switch. Check also for Sd, but this time a decrease of one will occur. If results of more than 1 are increasing (or decreasing) it means some glitches occur. If so, increase the value of 10K resistor at IC4. Connect now the inputs of 7404 inverter to the corresponding points, data inputs of IC5 and IC6. Do not forget the Sh switch. Connect now to plus five volts to the CO, N1 and N2 PCB, a frequency meter to pin 8 of IC3 and adjust the 40pF trimmer to obtain Fco equal to 6MHz. Make the straps to data inputs of IC4 and move the frequency meter to pin 11 of IC4 (point X). Check for Fx equal to 1MHz, if not recheck the straps. Connect the frequency meter to point Y and check to see if Fy is equal to FCO/N2 which is equal to FCO/(64 plus (decimal indicated)), pushing Su (Sd) and moving Sh switch, now disconnect the bridge v - v', connect plus five volts and plus 12 volts and about plus 25 volts to V1. Adjust the slug in L1 until the frequency at pin 2 of IC1 is 14060KHz. Proceed the same way with L2 and L3. Check the voltage at pin 2 of IC1 to about 2-3Vpp. If not so, change the value of the 22pF capacitor to the base of T2. Push the Su (or Sd) switch until N2 is equal to 100 and wire X from IC4 to pin 3 of IC1. Connect the frequency meter to pin 5 of IC1 and check for Fm equal to 60KHz. Adjust the 1K resistor (emitter of T4) until at pin 8 of IC2 you have plus 2.5 volts. Connect Y from IC6 to pin 1 of IC2 and V to V1. Check again the voltage at pin ' of IC2 to be plus 2.5 volts, if not so readjust the slug in L1 (L2, L3), how the VCO will follow the necessary tuning as you push Sd and Su up and down the 14060, (21060, 28060)KHz. The adjustments are now finished.

As far as I know there are also a lot of alternatives for the IC2 (MC4044) or for VCO, and I am sure you may find them in the amateur radio literature. I will be glad to exchange complimentary opinions of the circuit described above or on any similar one with any Club members.

Some Helical Antenna Experiments

Ben Johansson CT4CH

FIG.1 15M HELICAL



I have recently developed a prototype helical antenna for 10 and 15 metres. The design incorporates helical windings made from 8mm wide aluminium tape, which provides low losses and light weight, and large capacity hats to increase the radiation resistance. The system is thus more efficient than shortened dipoles with large loading coils. Although very light, normal precautions should be taken to ensure that these antennas do not fall down and injur passers by. Although only tested at low power levels, the models described should be suitable for use at powers up to 100 watts output. The PVC is suspect at higher powers.

When used outdoors the radiation resistance will be between 20 and 30 ohms. If erected indoors the radiation resistance is not predictable owing to the dielectric loading provided by walls, house wiring, etc. Matching, particularly if the system is used indoors, is best achieved by means of an L network inserted between the feeder cable and a 1:1 balun, the balanced side of the latter being connected to the antenna. To allow fine tuning to resonate the antenna, small coils with tuning slugs are inserted between the ends of the antenna and the capacity hats. They are adjusted with the aid of a GDO.

As can be seen in the diagram, the 15m version provides a length reduction of 35% compared to a full size dipole, and the 10m version 40%

Connections to aluminium are always a problem; in the prototype pressure joints were used, each of them being carefully varnished to provide weatherproofing. Copper tape would obviously provide a better solution, although at an increase in both cost and weight. Which ever material is used the whole of the helix windings must be carefully covered with weatherproof tape before the antenna is erected.

The antennas have been developed from an amalgum of ideas published in various radio magazines and origininality is not claimed. It has provided some remarkable results from a difficult second floor location in central Lisbon, however, if it is carefully constructed it should give results close to those expected with a full size dipole.

There has not been time to investigate further uses such as multi-band operation with open wire feeders, but it is hoped that other members will examine these aspects and report their results.

Some 10MHz Modifications LX1BK

CONVERTING THE HW7 FOR 10MHz By George Scholter, LX1BK

In the original circuit the VFO works on 3.5MHz and doubles to 7MHz. For 10MHz work the VFO coil L12 is retuned to 10.1/3 = 3.366 (it is the upper core in the coil can). Q4 is going to triple to 10.1. To be able to do this C29 is changed to 68pF and C35 to 82pF. These values are the ones I used, but there is ample margin. Finally L6 and L7 are tuned to the new band. In my HW7 they now have 11 turns, but this may change for the original transistor in the PA which I have unfortunately burned out a long time ago, (2N2218 or 2N3866 work very nicely).

One more tip for people who want to add an HF amplifier and do not have a two gang capacitor: with the now reduced tuning range of the receiver preselector half of the original capacity will do: with a fine saw and reasonable care the stator can be divided in two.

ADDING 10MHz TO THE ARGONAUT By George Scholter, LX1BK

On the 28MHz position of the bandswitch the injection frequency of the 505 varies between 19 and 21MHz. With the IF of 9MHz subtracted, this covers the 10MHz band (with room to spare). To get the Argonaut working on this band we must be able to switch all the tuned circuits between the transmitter/receiver mixer module and the antenna to 10MHz. Thanks to the low power levels this can be done with miniature relays (such as the 275-213 from Radio Shack, or similar) except for the output filter where I used a slightly larger model. The lightweight relays are supported by the wiring. Except for the filter switching the relays need only make contacts.

Here is a list of the different relays and what they do :-

1. Switches a 82pF capacitor parallel to the 7 - 40pF 10 metre trimmer on the transmit/receiver mixer board, (C14).
2. Switches a 250pF compression trimmer parallel to C20 (driver output, see Fig.1 of the instruction manuel).

3/4 Same thing for the transmitter buffer, C26 and receiver input, C5. Here I used a two pole relay to save space.

5. Same thing as for the receiver output.

6/7 For normal operation these contacts switch in the L6 C36 C37 10 and 15 metre filter, when energised they switch in a filter for 10MHz.

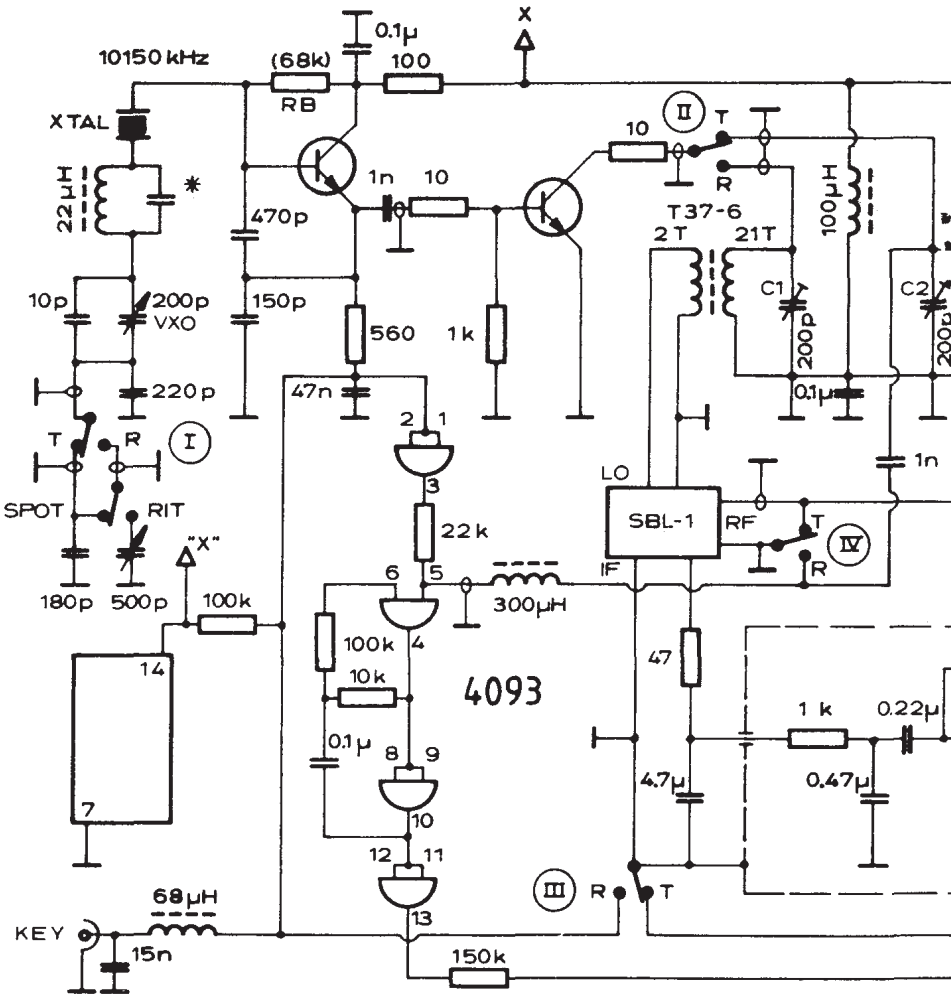
For convenience I used a four pole PCB mounting relay for 5, 6 and 7. This relay is glued with epoxy cement to a small angle screwed to the back of the chassis.

The 10MHz filter consists of two 1000pF capacitors and a 7 turn coil on a 6mm slug tuned coil former. In my Argonaut there was enough space left near the 10 metre trimmers to mount the new compression trimmers.

The alignment procedure is to retune the five 10 metre trimmers. Oscillator to 19.1MHz and then rotate the "Resonate" control to a position in the middle between the 20 and 40 metre position. Energise the relays and tune first the three transmit trimmers (mode switch on "lock") and then the two receive trimmers (mode switch on CW) with the aid of a (weak) external signal. Then tune the filter for maximum output.

The double front plate of the Argonaut makes a mounting of a normal toggle switch difficult, so I used the switch of a miniature potentiometer. I connected the output of the local oscillator via a 10pF capacitor to a Cynch outlet on the back apron and used a miniature Monacer frequency counter for monitoring. Given the tuning range of the 10 metre band this is practically a must for 10MHz operation. Since all the bands tune the right way, it is very convenient for them too.

BC 108 2N3866, 2N2218



* see text
FB ferrite bead

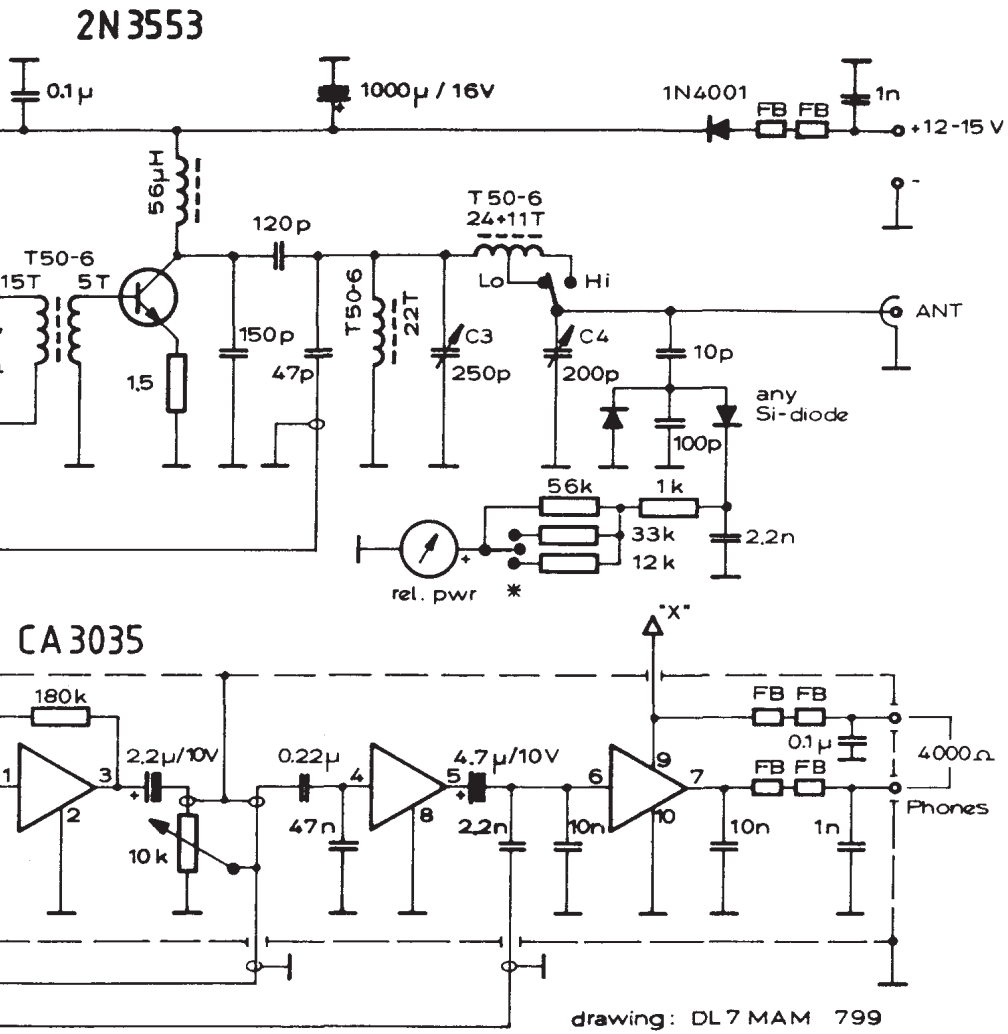
10 MHz - Tran

STOP PRESS NEWS – G-QRP CLUB

Sweat Shirts & Tee Shirts now available with Club logo. All sizes. Further details to be announced. For advanced orders ring Ken Stockley, Wesbech Amateur Radio Tel: (0945) 581099.

PRICES:	Sweat Shirts	Adult	£6.75	Tee Shirts	Adult	£3.00
	" "	Child	£5.50	" "	Child	£2.65

All inc. P & P and V.A.T.


2N3553
0.1µ
1000µ / 16V
1N4001
FB FB
1n
+12-15 V
56µH
T50-6
15T 5T
120p
T50-6
24+11T
Lo
Hi
ANT
150p
47p
T50-6
22T
C3
250p
C4
200p
10p
any
Si-diode
100p
1.5
56k
1k
33k
12k
2.2n
rel. pwr
*

CA3035
"X"
180k
2.2µ/10V
0.22µ
4.7µ/10V
FB FB
0.1µ
4000Ω
FB FB
Phones
10k
47n
2.2n
10n
10n
1n
drawing: DL7MAM 799

sceiver

The LAIM Transceiver

Ha Jo Brandt DJ1ZB

This a 10MHz VXO-DR-PA, two watts output, with direct conversion receiver. After designing the "Twinnyset" for the G3RJV Twenty Trophy, the author would not keep it merely as a curiosity. He wanted to convert it to a 10MHz rig to increase QRP activity on this new band, and to add some features which could not have been realised with the 40 components: larger VXO range, RIT, aerial tuner with relative power indication, and CW monitor. This work resulted in The Laim Transceiver, which now is operated by DK5RY, first from HBØ during the Activity Week-end of 11/12 September 1982. Laim, to be produced like Harry Lime in the well known Orson Wells motion picture, is the quarter of Munich in which DL7MAM and DJ1ZB are living.

Receiver Section - No changes were made on the basic receiver circuit (SBL-1 diode ring mixer and CA3035 AF amplifier), because sensitivity and freedom from AM feed through were sufficient even for working other QRP stations. Just the output capacitor of the RC audio low pass filter was increased to a 0.47µF to improve CW selectivity.

As mentioned in The Twinnyset article, the main problem of this receiver was to shield the high gain AF against the RF generated in the VXO on the same PCB. One metal shield had to be added around the CA3035 (see photograph), another below the PCB. Because of these reasons the details of the original PCB are not given here. For future designs it is recommended to use a separate PCB for the AF amplifier (preferably begining with the second section of the RC low-pass filter), enclosed in an extra metal box. This PCB may include the 4093 CW monitor.

Fighting Receiver Hum - On this occasion, some remarks on the hum problem in DC receivers will be necessary. When the receiver oscillator is not operating, hum in the receiver is caused by either a poorly regulated supply or by AC currents or fields coupled directly into the AF amplifier. These problems should be cured first. It should be possible to turn the volume control to maximum sensitivity without any sign of amplifier instability. When oscillator and mixer are operating, hum is caused by oscillator radiation. The radiated oscillator power will be received by the electrical installation of the house and will be AC modulated in the rectifier diodes of other electronic equipment. This modulated RF is radiated back to the receiver and causes an annoying hum, which makes weak signal reception impossible (and a high gain AF amplifier in the receiver impracticable).

There are three ways to cure this hum problem:-

1. Operate the receiver in the field only, far from AC power lines, on a batter supply.
2. Bypass all rectifier diodes in your house with 4.7nF ceramic disc capacitors of sufficient voltage rating (can you reach them all?).
3. Reduce oscillator radiation as far as possible!

To realise No. 3, especially when employing a diode ring mixer with a high oscillator power, a DC receiver should be housed in a metal case. When experimenting on such a receiver, with the case open, in most cases some hum will be present. Oscillator leakage via the aerial input is sufficiently low, due to the symmetrical design of the diode ring mixer. But other leads leaving the metal case such as supply voltage, headphone cord and the cable to the key, may radiate much better! In the case of the Laim transceiver, an LC filter was necessary directly at the key jack, and a 0.1µF ceramic disc capacitor had to be placed from the positive headphone terminal to ground. Wiring all internal AF and DC leads with sheilded cable will reduce oscillator radiation and residual hum during receive even further.

Transmitter Section -After some rewiring on the original Twinnyset PCB, the oscillator transistor was replaced by the driver transistor, a PNP type (2N5160) in this case, because both collector resonant circuits were at ground potential. In new designs, however, a popular NPN transistor should be employed. The DAU foil trimmers used for C1 and C2 are now available from Ambit (up to 500pF). VXO and PA are similar to those shown in the author's 10MHz transmitter (SPRAT, Summer 1982). The VXO is covering the whole band, with the exception of the

last 5KHz, which had to be sacrificed for the RIT. The PA tank can be switched to match coax fed aerials (LO) and high impedance longwires (HI). The relative power indication has three fixed sensitivity steps using a miniature toggle switch with a zero position. By sensing the DC potential at the key jack, the CW monitoring tone is generated in a 4093 CMOS oscillator and fed into the AF amplifier of the receiver.

VXO and RIT - This is the first VXO on which the author has tried a RIT. Because the RF voltages on the crystal are rather high, capacitance diodes cannot be used for this purpose. Therefore a variable capacitor and switches operating in the RF circuit are necessary. But as the RIT circuit is shunted by the 220pF capacitor, the switches and the RIT capacitor may be mounted at convenient locations on the front panel. Connections are made by coaxial cables, the capacity of which merely adds to the 220pF capacitor. The SPOT capacitor of 180pF, representing the centre position of the RIT is about one third of the maximum RIT capacity due to the non linear relationship between capacity and VXO frequency. Also, the frequency pull of the RIT is dependant on the setting of the VXO capacitor, being just sufficient at the upper band edge (10145KHz) but more than necessary at the lower end (10100KHz).

Transmit - Receive - Switch - A four section miniature toggle switch has been used to change from transmit to receive. Section 1 allows the RIT to be active in the receive position only. Section 2 connects the driver output to the PA in transmit and to the mixer in receive. Section 3 is to shortcircuit the receiver AF during transmit (to produce a clean CW monitor tone) and operates the VXO continously in the receive position. Finally, Section 4 closes the mixer input in the transmit mode and has two functions during receive. It directly detunes the PA input circuit (to bypass aerial energy which may leak into the oscillator path of the mixer), and via the 330µH choke it prevents the CMOS circuit from generating a continuous tone.

Tuning the Laim - First, the VXO pulling range is optimised by trimming the small capacitor across the 22µH coil (consisting of two twisted insulated wires maximum 1-2pF). Then the transmitter is tuned for maximum power output (C2, C3 and C4) to a dummy load and the VXO bias resistor RB varied for almost equal power output (ca 2 watts) within the tuning range of the VXO.

For tuning the mixer input resonant circuit (C1) the transmitter is operated near the lower band edge (10100KHz) and the frequency checked in a separate receiver (zero beat). Then the Laim is switched to receive, in the SPOT mode, and the oscillator signal will be heard in the receiver with a differing beat note, due to different loading of the driver output. By tuning C1 the beat note can be readjusted to zero beat. Switching to transmit again will show that there is no difference between transmit and receive frequency. In practical operation a received station is spotted by tuning the VXO to zero beat. After this, the RIT is used to produce a beat note again on either side of zero beat, depending on the QRM situation.

Thank You

May I thank everybody from the club who greeted me with cards and gifts on my 40th birthday in July. Thanks for some secretive work by G3VTT and G4BUE half the world seemed to know that I had reached middle-age.

Many thanks to those who attended the celebrations during my trip to the south of England, especially Rich, G5CSU, for coming from Norfolk and Brian, G3SYC, for coming from Pontefract. Especial thanks to the lovely Brenda and Pam, Colin and Chris, ROO and Dave. QRPers are a great people, I will remeber it for years! By the way, I'm forty-one on the same day next year.....G3RJV

FOR SALE: TEN TEC 405 LINEAR AMP (for 409) 2w in for 50-60w out. Would trade for IC202S or £100. Rich, G5CSU, Newmarket (0638) 667055.

AMERICAN BASEBALL TYPE CALLSIGN HATS. Your call on front of hat, range of colours. £5.00, with name extra 50p. Pat Arland 0638 667055.

Miniature 2M FM Transmitter G8CKT

(This article originally appeared in the February/March issue of the UK FM Group (London) News Letter and is published under our swap arrangements. Ed.)

The transmitter described was designed for mountain top applications where small weight and compact construction are paramount features. For this reason it was decided to limit the power output to 250 milliwatts at a supply voltage of 12, and to keep the transistor line-up to a bare minimum by using an oscillator at 48 MHz. The design uses three transistors only and these function as oscillator, multiplier and output stage. The entire circuit may be wired on to a copper laminate board 100 x 70 mm.

Construction should follow the layout of figure 1 and wiring should be as short and direct as possible. Decoupling of the supply to each stage is most important and this is provided by soldered-in 1nF capacitors which pass through the double sided copper laminate between oscillator and amplifier stages. The purity of the output signal is improved by incorporating a series tuned circuit at 145 MHz between the multiplier stage and output stage. The inductor used - L6 - also helps to improve the match into the base of Tr3. The 1k resistor wired across L7 is used to reduce the 'Q' of this component and this ensures that Tr3 is unconditionally stable. If desired, the output may be further amplified by the addition of an extra stage.

On the author's prototype, three crystal channels were included. These are switched by a low-loss wafer switch. The crystals are trimmed on to channel by series inductors - L1, L2 and L3. FM is produced by use of a variable capacitance diode. Various types are suitable for this purpose and the device used in the prototype exhibited a capacitance of 50pF at a reverse voltage of 3. The audio voltage required to produce 3 kHz peak deviation is approximately 2v. peak-to-peak. This can be derived from a simple microphone amplifier with suitable frequency compensation. The actual deviation produced will depend upon the setting of the crystal series inductor - L1, L2 or L3. The inductors give a typical trimming range of 20 kHz from the nominal crystal frequency. The circuit diagram is shown in Figure 2, opposite.

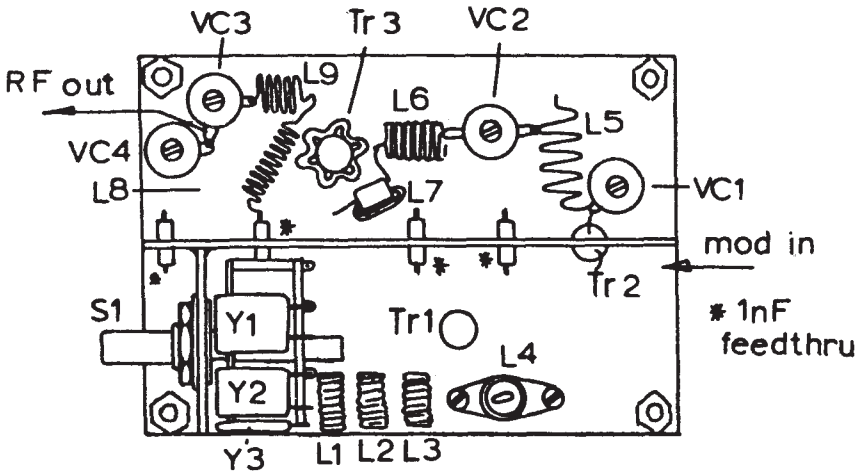


Figure 1 Miniature 2m FM Transmitter; Component Layout

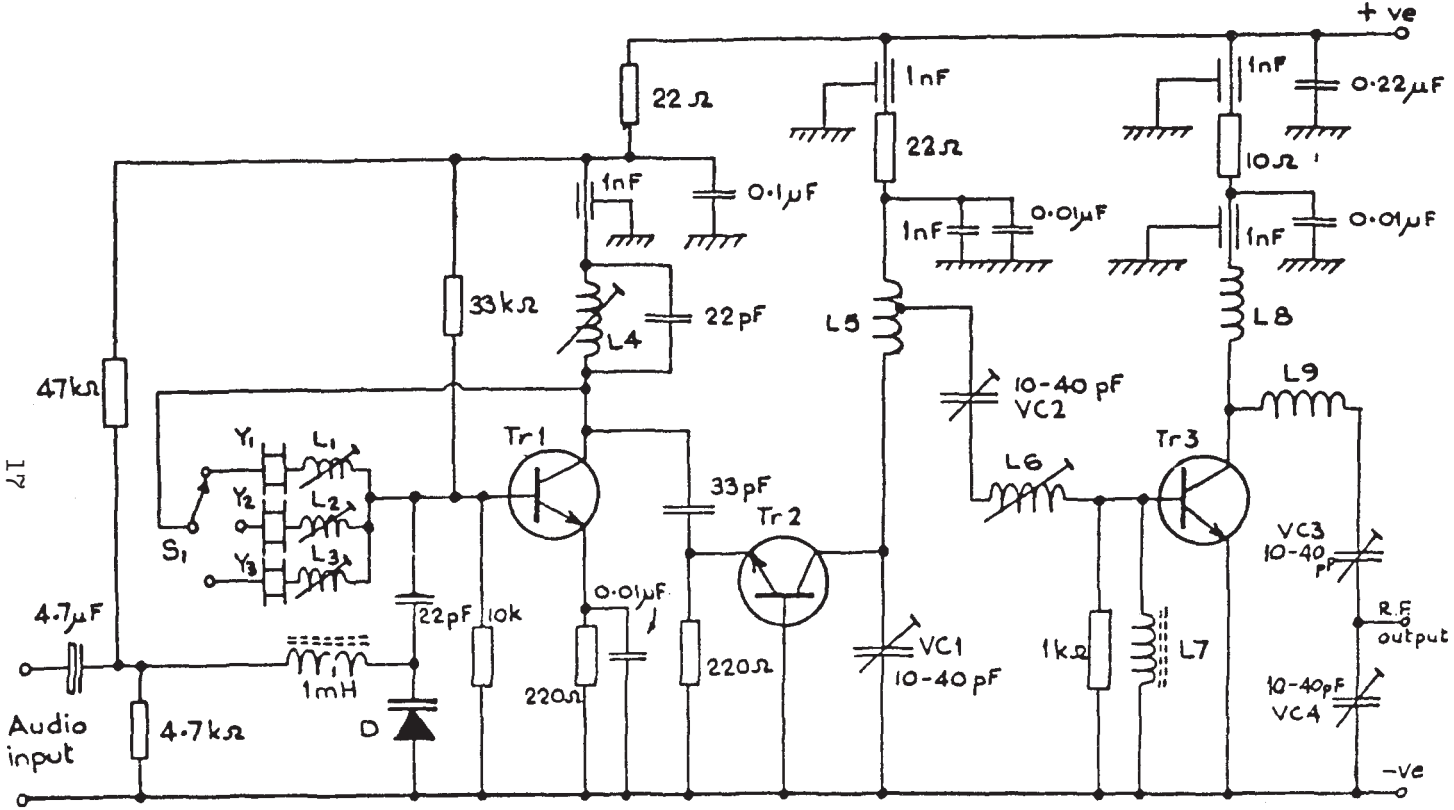


Figure 2 Miniature 2m FM Transmitter; Circuit Diagram

COIL WINDING DATA

L1, L2, L3	14 turns, closewound on 5 mm former with dust core
L4	8 turns, 22 s.w.g. enamelled copper wire on 7.5 mm diam. former with dust core
L5	4 turns, 18 s.w.g. tinned copper wire, air spaced and wound to occupy 10 mm. 7.5 mm. diam. tapped 1 t from cold end
L6	3 turns, 26 s.w.g. enamelled copper wire on 5 mm. diam. former with dust core
L7	2 turns, 26 s.w.g. enamelled copper wire on ferrite bead
L8	6 turns, 22 s.w.g. enamelled copper wire spaced to occupy a length of 15 mm. diam. 7.5 mm.
L9	4 turns, 22 s.w.g. enamelled copper wire spaced to occupy a length of 10 mm. diam. 7.5 mm.

TRANSISTOR COMPLEMENT

Tr1, TR2	BSX19, BSX20, 2N2369 or similar
Tr3	40290, 2N4427, 2N3866 or similar
D	Variable capacitance diode - see text

CRYSTALS

Y1, Y2, Y3	Miniature HC18/U or HC25/U 48 MHz range. E.g. 48.5 MHz for S20 (145.50 MHz).

ALIGNMENT PROCEDURE

The following equipment is essential before attempting alignment;-

1) A grid dip oscillator or a sensitive absorbtion wavemeter covering the range 48 - 288 MHz.

2) An output indicator connected to a non-reactive 50 ohms load; e.g. an RF wattmeter, or a diode detector and 50 ohms, 1 watt resistor connected by a short length of coaxial cable.

Connect the supply and note the current drawn by the transmitter which should be in the 10 - 100 mA range. If a receiver is available, tune this to the desired 2m. frequency. Adjust L4 for resonance at 48 MHz. If using a GDO, this may be done with the supply switched off. Transfer the wavemeter/GDO to L5 and tune this for maximum output at 145 MHz. After optimising the setting of the 10-40 pF capacitor VC1, check that there is no other frequency present at this stage - e.g. 96 or 192 MHz - noting that, on a very sensitive wavemeter, these may just be detectable but should be at a MUCH lower level than the desired signal.

Peak L6 for maximum RF output by adjusting its series capacitor, VC2. This circuit should now be resonant at 145 MHz: check this with the wavemeter/GDO. It will be necessary to re-adjust VC1 at this stage. The two output capacitors, VC3 and VC4, should now be peaked for maximum output, the frequency being checked with the wavemeter/GDO. The output power should be approximately 200-250 mW.

With careful alignment, the transmitter should provide a clean signal which should give many hours of pleasure on 2 metres from a good site, or via your local repeater.

Mike Tooley

SSB NEWS Ian Keyser G3ROO

Ian Keyser, Rosemount, Church Whitfield, Dover. Kent.

Why is it that I get letters the morning after I have typed this news page out? I had received only one letter and that was from our VHF manager John, G8SEQ and having moaned in the text only to find two letters on the carpet in the morning!

Firstly, there is nothing to report on the SSB calling frequency in the States so it is wise for the time being to use both 21285 and 21385. I hope that we will have some news in the next issue.

The few times that I have managed to get on the air, with the exception of the holidays, things have proved very quiet indeed. Not a single SSB QRP station and only a handful of CW QRPers on the LF bands. For the hols. I managed to get a French callsign at the very last minute and a quick call on the land-line to George to spread the news still resulted in NIL QRP QSO's. I have heard that Fred, G4HDM heard and called me but without luck.

The letter from John, G8SEQ reminds me of the fact that it is possible to use FM filters to generate SSB. I did cover this aspect in SPRAT a few years ago and the circuit is on page 83 of the Handbook. I think that I must cover this again and will submit a design to George in the near future unless one of you would like to do it?

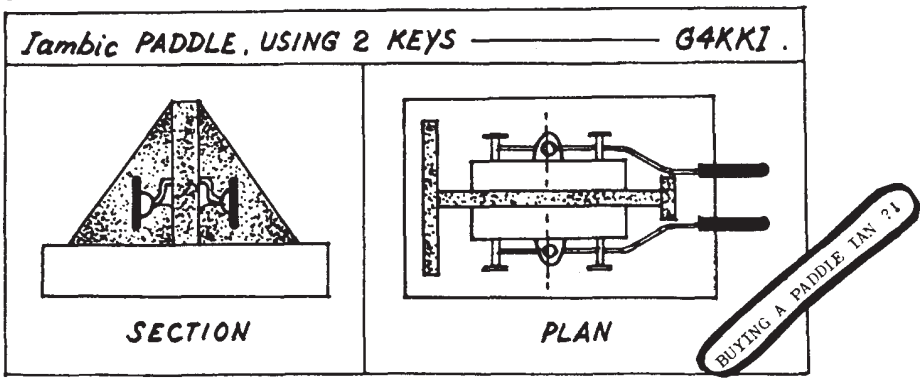
The next letter is from Frans. PAØGG. Several intersting points here, firstly the Benelux QRP Club net on Saturdays on 3690 KHz. In the summertime it is on at 0830 to 0930 and winter time 0930 to 0030 GMT, Frans suggests that after the net is over it would be a good idea for G QRP Club stations to call in. He also comments on Dave's (GM3ELV) 5 band WAC and that it would be a story worth hearing, how about it Dave?

The final letter is from Bob, G3IQF, to say that he will be on on the 26th for the short contest also that he wants an SSB activity weekend on 7 MHz as that is where he puts out his best signal! I have not had any time to think about that one yet, will set one up for the next edition. Also he had not realised that the SSB power output is now 10 watts PEP and this is the level for the G QRP Club awards. This has made Bob's countries score jump by 25 to 98.

Sitting here the contest is only 12 days away I will be away in France and will be on 20 M signing FØHZS... hope that is a success. Well, that is all for now, please remeber that I need feedback from you to do the job of SSB manager and to keep this page going. It is very easy for a minority group to be neglected and even our leader didn't even give us a mention in our first page in Rad. Comm.!!! Shame on you George.

73's Ian.

P.S. Any report elsewhere in this edition that I am purchasing another paddle I am ashamed to admit is true!



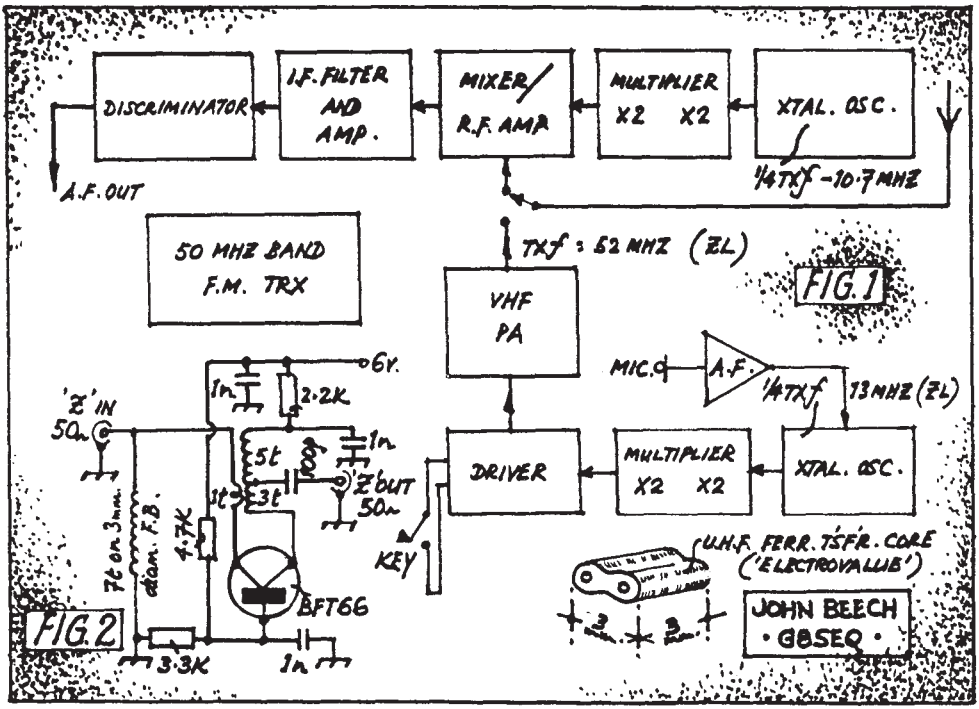
Two cheap Tandy keys, wooden supports on base board and there you have it!

VHF NEWS — John Beech G8SEQ

(John Beech, 14 Hollow Crescent, Radford, Coventry. CV6 1NT)

There is a rumour that T1REF has been appointed official Adjudicator for all QRP Contests. On a more serious note, Michael, ZL1ABS, has sent me details of the 50MHz TRX that is used by the Wellington Club. A block diagram is shown in Fig.1. It is in fact a separate TX and RX which fit into one case. I suggest anyone wishing to know more should contact me as the detailed construction notes would fill SPRAT nearly twice over.

Also this issue I include a circuit of uncertain origins for a low noise UHF amp which could be used without modifications at a lower frequency. The gain is controlled by the feedback transformer and is independant of the transistor gain provided that this is high enough for the chosen frequency. The circuit is in Fig.2. All capacitors are leadless ceramic (Ambit). The BFT66 (Electrovalue) could be a BFR66 and the amp could be preceeded by a suitable stripline or helical filter.



MASTER COPIES OF SPRAT....
Could the local member who has some of my master copies please contact me: G3RJV.

A USEFUL SHOP.
I was very pleased to meet Chick Tutt on my last visit to see G4BUE. Chick runs a lovely little component shop in a converted Brighton donkey stable and has some of 'our type' of bits and pieces in stock, so if you live nearby try him. Tutts Radio, 17 Hollingdean Rd. Brighton. Chick is only there at certain times so try a check first to see when he is open. Chick is a club member.

NEWS...

IMPORTANT CW POWER LIMITS FOR G-QRP-CLUB AWARDS IMPORTANT

Members will be aware that the U.K. Government has recently changed over to power output instead of power input for measuring the legal limits for U.K. amateur transmitters. Amongst other things this means that all those currently studying for the R.A.E., and all future candidates, will be trained to work in power output. To bring our Award schemes into line with current U.K. regulations it is necessary to change over from power input to power output. We propose doing this in two stages. Until 31st December 1985, members applying for Awards may certify that their power did not exceed either (a) 5w DC input; (b) 3w RF output; (c) 5w DC input or 3w RF output (this allows for those who change from input measurement to output measurement while working for an Award). From 1st January 1986 the power input provision will be dropped, and only power output will be used. This change only applies to CW and the SSB limit remains at 10W PEP.

AWARD NEWS

CW Novice Award We cannot list all holders, but for the record the first Class A (QRP) Award went to G4OTW, and the first Class B to P29BR, so we got into the real DX quickly! Mention must also be made of our member GI4ONL, who not only chalked up the first Award to go to GI, but also the first endorsed for 160m only and 2m only. Many applicants comment on how the Award gave them the incentive to try CW, and how much they now enjoy that mode.

QRP Countries 175 GM3OXX; 125 OE1SBA; 75 PY5TU, G4EBO, F6FZL; 50 AJ1Q (all on 7MHz), G3IQF, G5CSU; 25 EA2SN.

Worked G-QRP-Club 220 GM3OXX; 120 G4EBO; 100 I7CCF, G4JFN; 80 GM3RKO; 60 G3IQF, GM4ELV; 40 G4MIJ, F6FZL; 20 G4GDR, G4IKR, G4KLQ, GI4MBO, GW3SB.

Two-Way QRP Award 30 G4EBO; 20 F6FZL, DL9CE, YO6HQ; 10 G4IKR, G4KLQ, G4MIJ, G3JKB.

QRP W.A.C. FIRST EVER FIVE BAND QRP W.A.C. to GM4ELV - CONGRATULATIONS! Endorsed 7MHz only to AJ1Q - well done! G5CSU, PY2TU, F6FZL, YO6HQ, G3IQF.

New QRP Masters Congratulations to GM4ELV and G4EBO on becoming Masters.

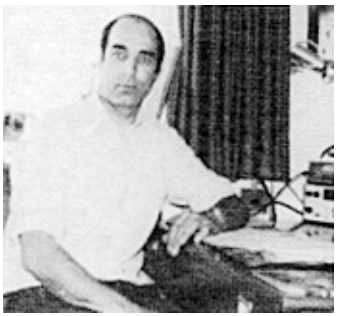
We cannot close without again congratulating GM4ELV on making QRP W.A.C. on the five bands 3.5, 7, 14, 21 and 28MHz - a great effort.

AGCW HAND KEY PARTY CONTEST.
On EACH FIRST SATURDAY IN OCTOBER, 1300 to 1600 UTC. CW ONLY with all hand keys (no bugs or el bugs) 3530 - 3560 KHz.
Exchange RST/QSO Number/Name. Score one point per QSO - only one per other op. Each op who has completed 20 or more QSOs may nominate another operator as "a good CW Operator" and he will then gain 10 points.
Logs: with signed statement that rules have been followed and only a hand key used sent within a fortnight of contest to Karl-Heinz Pape, DJ5ZP, Eichenstrasse 40, D-2733 Westertimke. If results required inc. a SASE.

Stop Press News

GM4ELV WINS THE G2NJ TROPHY FOR 1983/4.
The G2NJ Trophy, the club award that runs in a three year cycle is given this year for merit in QRP operating.
The trophy is to Go to Dr. Dave Dhuglas, GM4ELV, for the first ever 5 Band WAC on QRP (under 5 watts DC Input) Well done Dave!

Members News



Chris Page G4BUE

Alamosa, The Paddocks, Upper Beeding, Steyning, West Sussex.

The social side of The Club has been in full swing this summer which with the really hot weather has made the last couple of months just great. George (RJV), Jo and family stayed here for a few days at the end of July, and as you can imagine QRP was discussed well into the small hours. George celebrated his 40th birthday while he was down south and a surprise birthday party was laid on for him. Colin G3VTT, Ian G3ROO, Rich G5CSU, Brian G3SYC and families, together with other members from the south helped give George a day to remember. I would like to say a big "Thank you" to all those members who sent George cards and presents which helped the whole thing go in QRO style.

While George was here we popped into Brighton and met Club member Chick Tutt, G8TOZ. Chick runs Tutts Radio in Hollingdean Road, Brighton and stocks all the bits and pieces needed by home-brewers. If you are in Brighton pop in and see him, being a member he knows the components you will need to build those projects in Sprat.

The social side continued onto The Brighton Mobile Rally where it was nice to meet members and have a natter. During the last couple of months I have been talking about QRP to some of the local radio clubs. Hastings, Worthing and Crawley have been visited and by the time you read this Reigate and Mid-Sussex also. Meeting other amateurs and seeing the response to QRP and homebrewing has made me realise that there are still many amateurs, like us, who believe in the true spirit of amateur radio and are not just 'black-box' operators.

The social side is set to continue even further as I have decided to keep the two Georges (RJV and OXX) company at The A.R.R.L. Convention in Houston, Texas at the begining of October. There is no truth in the rumour that I am only going at the request of George Burt's (OXX) xyl's request to keep an eye on him! One week-end about a month ago I decided to go on the spur of the moment, and by the Wednesday I had paid my money and was booked. No time to change my mind! In addition to a first trip to The U.S.A. I am really looking forward to meeting some of the members and QRPers from that side of the water. By the time you read this the trip will almost be over, as I am only able to stay in The U.S.A. for ten days.

Now for a bit of gossip! Ian, G3ROO our SSB Representative on hearing that I was going to The U.S.A. has asked me to bring him back a Vibroplex keyer. What is more he intends using it himself!! What more can I say?

Two new Milliwatt DXCC holders in The Club. Congratulations to Aga, EA8EY for qualifying for Trophy Number 6 and to Dave, GM4ELV for qualifying for Trophy Number 8. Dave was also the outright winner of The G. Marconi QRP SSB Contest earlier this year, beating the Italians in their own contest. Fine going Dave. Still on the contest scene W6SKQ again took to the hills with some friends for The A.R.R.L. Field Day. With their Argonauts, Bob and his friends made 275 QSOs. On a personal note, Bob reports QRP QSOs with BV2B and IZ9A (Burma) for two new ones taking him to 117/102, another QRPp DXCC Trophy coming up to a Club member. Bob also intends visiting Houston so an eyeball QSO is in the offing for us.

Maurice, G4LV has been doing some milliwatt experimenting with his 515 Argonaut. It has been very interesting comparing his results with those of Brice, W9PNE and his Argonaut and with mine on the 509 Argonaut. Maurice has been working on the lines of changing the PA from Class B to Class C to make it more efficient, not being too interested in SSB.

Did any of you see G3CCB's article in the August edition of Wireless World? Alan's article is called "Did Morse get it Right?" and is well worth reading. A nice letter from Bob, G3IQF tells me he is visiting Sussex for his holidays this Summer. You had terrific weather Bob, and you should have dropped in here for a natter. Bob's DXCC total suddenly jumped up to 98 when he discovered that he had misunderstood the power limit for SSB. On the question of the Summer AGCW QRP Contest he says it was "hard going". Aga, EA8EY description was on similar lines, "horrible". These two comments probably explain why no other members made mention of the Contest. Going back to Bob he seems to have caught the DXing bug, as he worked the recent OHØ DXpedition three times!

George, GM3OXX took time off from QRP to visit the north of Scotland on holiday, and is now practising for The Edinburgh Marathon, trying to better last years time. He worked OY1R on 10MHz with his FOXX transceiver featured in the last Sprat. He has also taken his DXCC total to 190 worked with IR, TI and CX being the new ones. KC5EV suffered some storm damage to his tower and antennas recently. Leo has taken the opportunity to take the whole lot down and start again with something bigger and better. Looking forward to seeing the new set-up in October Leo.

Fred, G4HOM took the opportunity to work /P while he was on holiday in North Wales and found he was getting out much better than what he was at home! Fred was only using a 40 feet end fed at 6 feet, and worked 11 countries on 7MHz with it. Must be something to do with that Welsh ground Fred!! A letter from Norman, G4LQF tells me he was one of the stations that worked Fred in Wales.

Another member is drawing near to QRPp DXCC. John, F6FZL is now at 96/79 and says he is very active on 14060 which is by far the best band for him to work members in Western Europe. John recently had an interesting two-way QRP QSO with a maritime mobile station who was off the coast of Oporto in Portugal and running one watt.

By the way an apology to those members whose stamps were stuck onto their envelopes a little skewiff with their Summer Sprats! One of my ten year old twin boys, Gary was helping me to put the stamps onto the envelopes - no I hadn't been hitting the bottle!!

A note from SM4MNT to remind members that SM amateurs do not have the whole of the 160 metre band. Ingvar says they cannot use 1850 and suggest 1840 as an alternativ for QRP QSOs. David, G4IKR has been active on 14MHz working new countries with his new rig and Allan, G4NNJ recently had his day made when he worked JX5DW through a moderate pile-up on 14MHz with his HW7. 14MHz seems to have been holding up very well for DX throughout the Summer considering we are well down from the peak of the sun-spot cycle. Many evenings the band has stayed open all night.

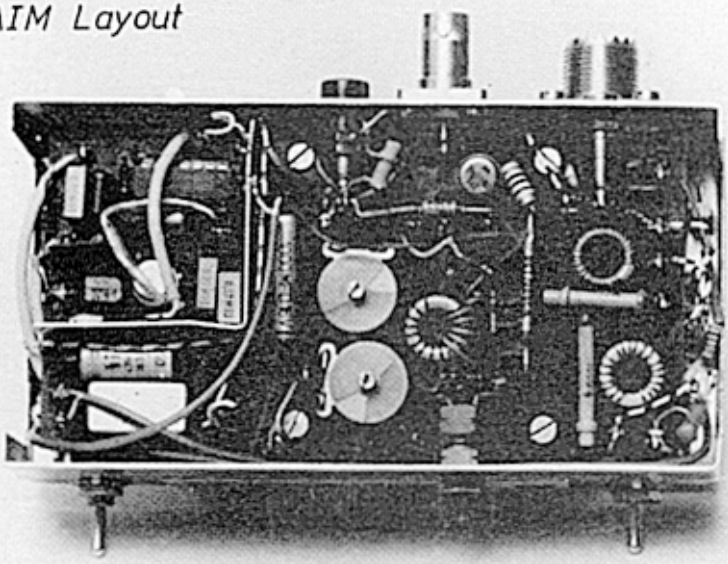
GM4JMU is another member with a complete home-brew station. After trying many different antennas on his small plot Ken has finally settled on a dipole with a 60 feet top and tuned open wire feeder and tuned balun ATU. He is only QRV on 3.5/7/10MHz and finds it works very well on all those bands. Ken has never worked SSB on 10MHz in case anyone misunderstood the remarks in the last SSB News about him being active on 10MHz. Ken is building a new rig which will take him onto 3.5MHz SSB.

Before jetting off to VE land, Gus worked two VK3s, one after the other, on 14MHz, just to show that G8PG still has the magic touch. G5CSU decided to have a day out working /P and found he had picked The N.F.D. week-end, at least that is Rich's story! Using a Hustler Whip on top of his Caravanette Rich worked some stations on 7MHz, including members GM4HBG, PAØGG and EI9EZ for the first three QSOs. He thoroughly recommends the Hustler for anyone wanting a mobile whip.

EIØCF has built a two transistor transceiver which gives two watts out. He made a three transistor version first and managed a swing of 30KHz on 7MHz with the VXO. Finbar worked a W1 with it, but then made up the two transistor version. Sounds fascinating, no doubt the details will eventually appear in Sprat to enable other members to try it. Adrian has been QRV on 10 metres FM and has worked the U.S.A. and all around Europe. Adrian (G4GDR) wants a transvertor for 4 metres to go with his Argonaut if anyone can assist him (Swindon 762970). Adrian would also welcome skeds on 144MHz CW. Just room to say thanks for all your letter and let me know how your Autumn goes, by the 15 November please.

73,, Chris Page - G4BUE

LAIM Layout



COMPUTERISED RECORDS

Members will have noticed that the address label on this issue is a computer printout. All the club membership data is now stored on floppy disc through the kindness and no small efforts of G6GZD. PLEASE CHECK THAT YOUR DETAILS ON THE LABEL ARE CORRECT, ESPECIALLY CALLSIGNS AND POSTCODES.

We would like to have postcodes for all our UK members, if yours is not on the label and you know it, please let us know. All membership changes and extra details should be addressed to the Membership Secretary, G4HDM. Fred Garrett, 47 Tilshead Close, Druids Heath, Birmingham. B14 5LT.

CALLSIGN GUIDE

The computerisation of club records will enable us to offer several types of printout of membership details. To begin this service, we can now offer:

A READOUT OF MEMBERS CALLSIGNS AGAINST NUMBERS (IN CALLSIGN ORDER)
An excellent guide for working club members. We have to charge to cover costs of duplication. This readout will be available for 75p from G3RJV. Please enclose a SASE capable of holding about 8 A4 sheets of paper.

Arthur, G4EFJ.

I regret to announce the death of Arthur G4EFJ, whose shack appeared on the front page of the last issue of SPRAT. I had met Arthur several times and was impressed by his interest in QRP - his only rig was an HW8. Our best wishes go to his wife and family.