SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED·TO·LOW·POWER·COMMUNICATION

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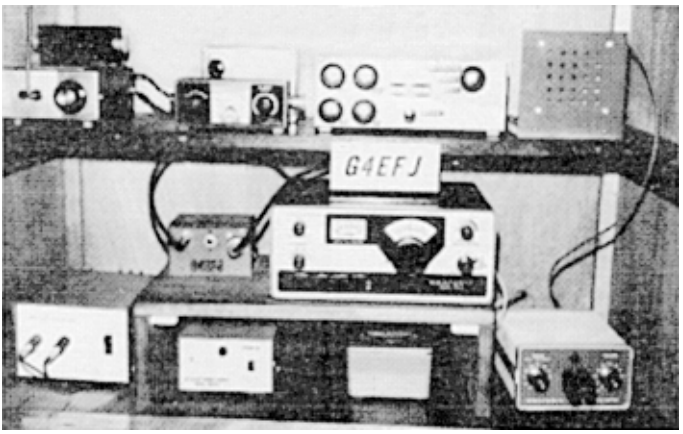

G3EFJ Station in a Cupboard. nr.255

3 Band Receiver W1FB on Harmonic Filtering
10MHz Transverter WARC Converter STX FOXX
Club PCBs Hybrid TX FT7 Mods 80-2m. Converter
Club and QRP News

SPRAT The Journal of the G QRP CLUB

Rev. George Dobbs
G3RJV
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Birmingham.
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Dear Members,

What a year this has been - and its only half way through. We began with a membership explosion, nearly 600 new ones since the start of the year. The RSGB Exhibition at the NEC where the club stand was solid with visitors for most of the two days. The RSGB Convention on the same two days produced bigger audiences for my two QRP talks than any other subject. Look out for the "QRP" column to begin in Rad Com from the August issue, every other month. In March the RSGB Council agreed that the society would re-print the G QRP Club Circuit Handbook and handle the distribution and sales. So if you missed the first print it should be ready for the autumn.

Sometimes I think I begat a monster.....what only one? says my xyl as she clears up after our two boys each night! The growth in interest in our branch of the hobby has been very gratifying but has had its problems. In the last six months I have been pushed to my limit in time and resources. It has also been a very busy time in the church with staff changes...yes, I do have to work in a busy parish! After considerable discussion, several changes are been made in the way the club is run. Some of these changes are announced on the back page and I urge members to read them and to please be patient until everything is working smoothly. I may now even have time to go on the air.....whats da da di da?

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

Overdue 91-120, 201-222, 272-292, 393-418, 522-572, 772-833, 1082-1157, 1315-1375.

We'll let you know....

One of the horrors of a holiday for me is returning to a mountain of mail. So can I remind members that I will be away, attending the ARRL National Convention in Houston, for the whole of October. It would help if I could get in my front door when I return!
On the same subject, Gus, G8PG, will be away in Canada from July 22 to Aug 26.

HAVE WE GOT AN EXPERT ON COMPANY LAW? The club committee would like to seek your advice. Contact G3RJV.

3-BAND DIRECT-CONVERSION RECEIVER ~ MARTYN LINDARS -

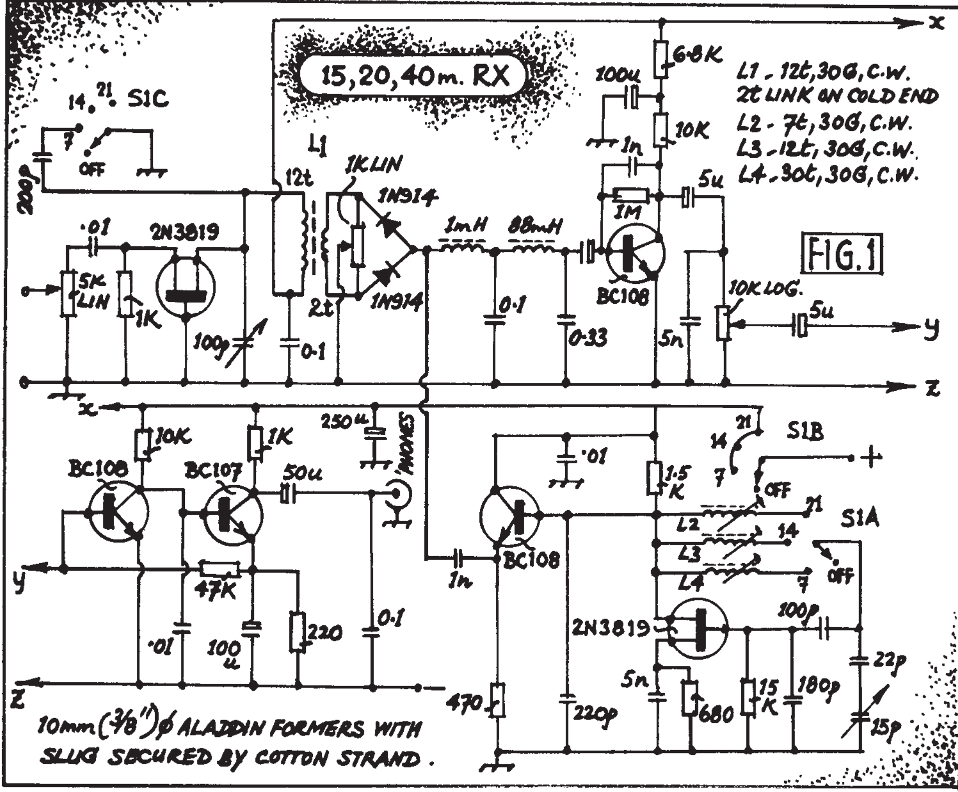


FIG.1

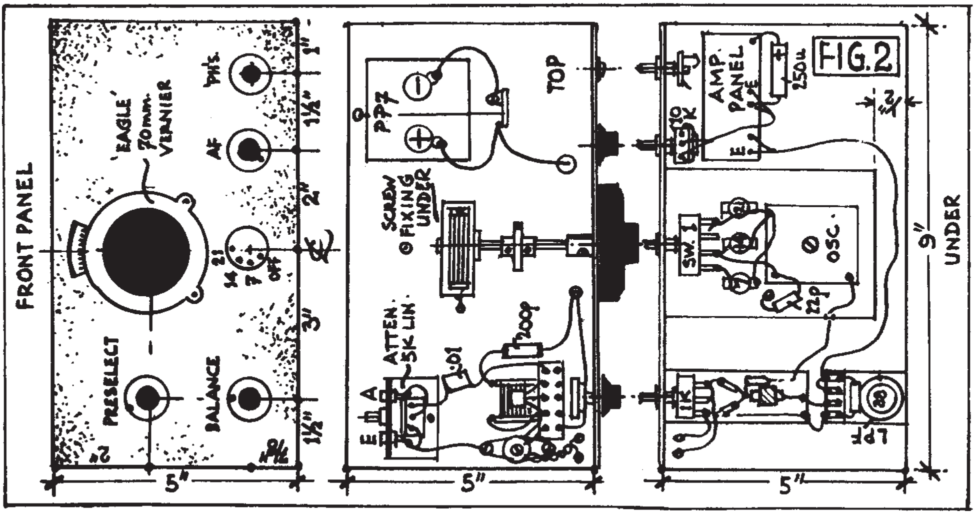


FIG.2

DC RECEIVER FOR 15, 20 AND 40 METRES By Martyn Lindars

This receiver is based on J. Young's "Cadet" and "80 metres DC receiver for the Novice" as described in the October 1973 and February 1975 issues of the Radio Communication magazine of The R.S.G.B., and I am indebted to Mr. J. Young and Mr. A.W. Hutchinson, the Editor of Radio Communication, for permission to reproduce these details.

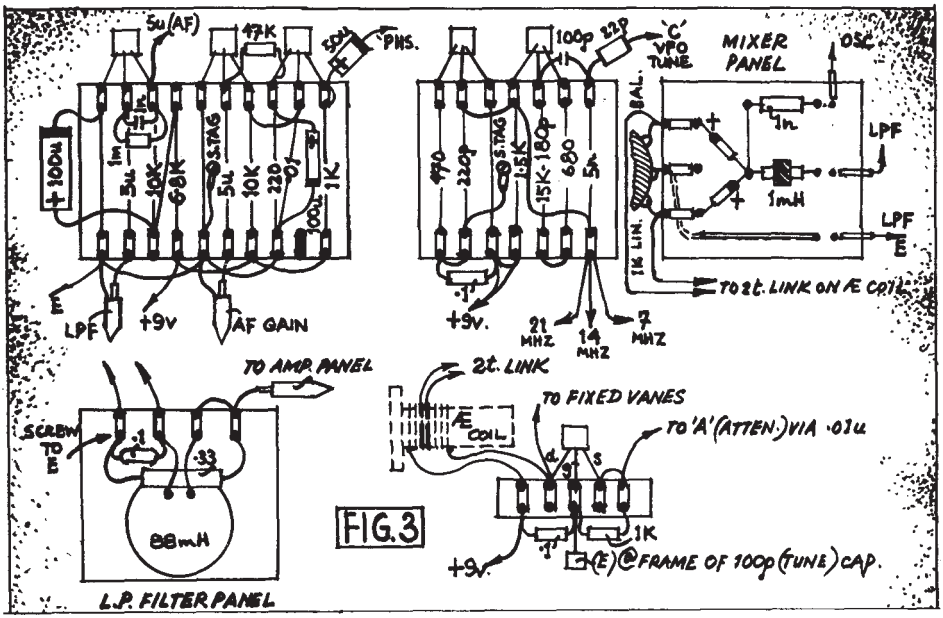
The chassis is 9 x 5 x 2 inches and the front panel is 9 x 5 inches. An Eagle vernier S.M. dial (70mm) gives about 7:1 reduction, which is a little too fast for comfort but is nevertheless no worse than some commercial sets. If available the old Muirhead 50:1 slow motion dial is ideal. Some components are left out in the chassis views for the sake of clarity. A 'U' shaped screed (2 inch strip) surrounds the oscillator components leaving a channel at the back for the screened lead from the low pass filter to the AF amplifier.

The preselector coil covers the 14 and 21MHz bands with the sweep of a 100pF variable capacitor and has an additional 200pF capacitor placed in parallel in order to cover the 7MHz band.

Three separate coils are used in the VFO which is of the Vackar type and has good stability. There is slight pulling of the oscillator when tuning the preselector on 14 and 21MHz, but none on the 7MHz band. This does not present a problem, but it does illustrate the desirability of better isolation between the parts of the mixer and this is where the diode rine scores. An SBL-1 diode ring has been tried in this receiver with no changes to the circuit and there is then no pulling of the oscillator and, as a bonus, no microphoning. No doubt the rich will opt for the diode ring.

The receiver is very sensitive and will bring in a large number of signals with only a very short antenna. The preselector coil may be wound in bifilar fashion with slight modification to the balance pot. circuitry, but I doubt whether it is worth it with only two turns. I have not found any occasion to criticise the circuit as it stands with which it is easy to balance out any AM signals.

The balance control is brought to the front panel because the exact point for nulling out AM is not exactly the same for the different bands due, no doubt, to the effect of differing stray capacitance in the coil. If the receiver is intended for a favourite band, then the balance control could be a preset pot. and the vacant position on the front panel used for a simple antenna attenuator.



Doug DeMaw[W1FB]on QRP Transmitters and Harmonic Output

In reading the QRP literature for many years it became obvious that some designers of homemade equipment not only ignore the matter of harmonic output from their transmitters, but they apply poor design techniques to the PA tank circuits. The added cost and labour of including a correct tank-circuit design is so minor that it should become a matter of course when developing a new circuit. A correctly designed output network will help to ensure maximum energy transfer to the load (antenna), and will, therefore, increase the overall efficiency of the low power rig.

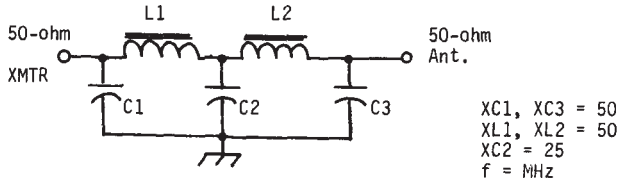
Harmonics - We might wonder how harmonic radiation can be considered a serious matter when we are delaing only with a few watts of power output. But, consider for eaxample, a five watt carrier from a transmitter that has a second harmonic which is only 13dB below the peak output at the fundamental frequency. This is not an uncommon situation with solid state Class C amplifiers, assuming the tank circuit is poorly designed or too simple in format. The power level of the second harmonic would be 0.25 W or 250mW, still QRPp! Suppose also that the fundamental operating frequency was 7010. The second harmonic would appear at 14020, and could be rather ferocious to a nearby 20 meter CW operator. Depending upon the selectivity of the 40 meter antenna, that same unwanted signal could be heard world wide on 20 meters! Having strong harmonics is not only poor operating practice, it is unfair to those who share our bands with us. Furthermore, depending upon the chosen band and operating frequency, we could easily interfere with commercial services and our neighbough's FM and TV sets.

Ensuring that all stages of the transmitter (oscillator excepted) do not self-oscillate under all load conditions will further aid in the reduction of spurious output from the transmitter. Stability is not hard to achieve if ordinary measures are taken.

Typically, the collector circuits of a solid state Class C amplifier has a second and third harmonic current level that is only 10-13dB below the fundamental frequency. This results from conventional envelope distortion (common to tube type amplifiers) plus the varactor action of a transistor junction during the sine wave cycle. For this reason the semi-conductor amplifier generates substantially more harmonic current than is the case with tubes or valves. The output network must therefore be somewhat more elogant than that of a tube style of amplifier.

Matching to the Load - We see some rather bad examples of tank circuit design in the amateur literature. A number of experimenters try to apply vacuum tube network techniques to transistors, and generally that does not work well. The consequenc of such misapplication can be seen as degraded power output, circuit instability and poor harmonic attenuation. Because we are dealing with simple circuits does not mean that the output network of the transmitter must also be simple. Examination of the output spectrum of some homemade transistorised QRP transmitters will often yield a spectrograph that resembles the skyline of NYC at night!!, owing to the myriad unwanted spurious responses! Part of the problem is caused by improper matching and resultant amplifier instability.

How to Resolve these Problems - When in doubt, add a 50ohm harmonic filter.. assuming the PA collector has already been matched correctly to the load (or vice versa if you please). Generally, a half wave filter will provide at least 30dB of harmonic attenuation. The filter QL (loaded Q) is 1, and the reactance of the two inductors and end capacitors is 50 ohms. The reactance of the centre capacitor is 25 ohms. From this information we can develope a filter for the frequency of our choice. For example, let us say we want to build a harmonic filter for use on 40 metres. Since the half wave filter is a low-pass device, the cut off frequency should be somewhat above the operating frequency to prevent unwanted attenuation of the desired RF energy. I usually design the filter for a cut off frequency of 1.13 x the highest operating frequency. Thus, for an upper frequency of 7.1MHz the filter f_{co} would be about 8MHz (8.023MHz). Fig. 1 shows the design progression.



HALF-WAVE FILTER

L1, L2 (μH) = $X_L/2\pi f$ = 50/6.28 x 8 = 0.99 μH

C1, C3 (μF) = $1/X_C 2\pi f$ = 1/(50 x 6.28 x 8) = 0.000398 μF or 398 pF

C2 (μF) = $1/X_C 2\pi f$ = 1/(25 x 6.28 x 8) = 0.000796 μF or 796 pF

Fig. 1

L1, L2 (μH) = $X_L/2\pi f$ = 50/6.28 x 8 = 0.99μH

C1, C3 (μF) = $1/X_C 2\pi f$ = 3/(50 x 6.28 x 8) = 0.000398μF or 398pF

C2 (μF) = $1/X_C 2\pi f$ = 1/(25 x 6.28 x 8) = 0.000796μF or 796pF

We will fare satisfactorily by using the next standard value of capacitor at C1, C2 and C3. Hence C1 and C3 can be 390pF and C2 can be 820pF with little impairment of the filter operation. If we wish to be more precise we can use parallel combinations of capacitors to approach the exact computed values. Silver-mica or polystyrene capacitors are recommended for use in the HF range.

For most QRP applications we can use a 0.5 inch OD powdered iron toroids for L1 and L2. The Amidon T50-6 cores are suitable (μi = 8) which have an A_L factor of 40. The T50-2 cores should be entirely suitable from 1.8 to 14MHz (μi = 10 and A_L = 49).

More elaborate filters can be designed from the normalised filter tables in The A.R.R.L. Radio Amateur's Handbook, transmitting chapter. Data are provided also for impedance matching networks and broadband transformer design. These subjects are treated in considerable detail by Hayward and DeMaw in Solid State Design for The Radio Amateur (A.R.R.L.).

In Summary - I was prompted to write this piece after having found signals on 40 and 20 meters that did not really belong there! They were harmonics of QRP rigs that were supposed to be within the 80 and 40 meter bands! After answering the "phantom"CQs a few times, to no avail, I checked the next band lower, and sure enough...there the culprit was! This condition can be complicated tremendously when a harmonic antenna or trap style of radiator is used, since there is virtually no rejection of harmonic energy by the antenna system.

WANTED: to borrow and copy users manual for AVO Mk3 Valve Characterist Meter
Alan Lake, G4DVW, QTH as per subs note on inside cover.

10MHZ TRANSVERTER

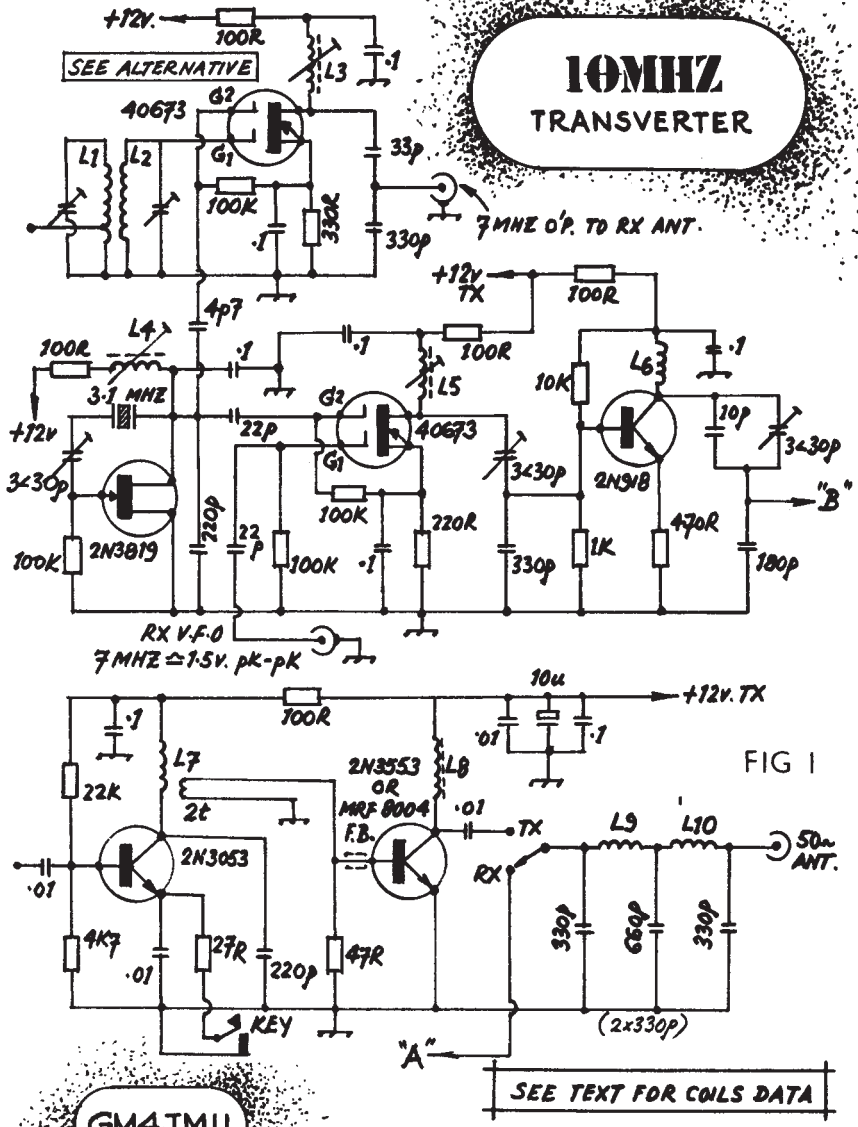


FIG 1

GM4JMU

10MHZ TRANSVERTER By Ken Maxted, GM4JMU

This 10MHz transverter design may be of interest to constructors having a 7MHz direct conversion receiver with a VFO operating at signal frequency. It is based on the GM3OXX design, Sprat Winter 1981/82. The transverter gives an output of 1.2 watts into 50 ohm for under 1.8 watts of input power. Harmonics and spurious are more than 40dB down, potentially the most troublesome being that at 3 X crystal frequency - 9.3MHz. If a suitable crystal is available it would be better to operate this stage at 17.1MHz with appropriate changes to the oscillator tank circuit.

The receive section input tuned circuit consists of two loosly coupled parallel tuned circuits, the coil centres spaced 25mm. The mixers are straightforward, the outputs being taken at low impedance. After the transmit converter, two stages of amplification are used before the PA. Care should be taken to tune to the mixer product and not to an oscillator harmonic. The driver stage is emitter keyed, and no key clicks are produced. The Class C amplifier in the original PA uses a Motorola MRF8004 transistor, but most 3.5 - 5 watt RF transistors such as a 2N3553 or CB type PA devices would be suitable. The original is very tolerant of mismatch. Link coupling to the base circuit was found to be easier than capacitative dividers and a ferrite bead is threaded on the base lead to stop parasitics. The collector choke consists of four turns of 28 enamel wire through a ferrite decoupling bead, such as FX1115. The output filter is fo the 'harmoniker' type.

The 12 volt transmitter line can be used to switch RIT in the receiver via a relay or a transistor circuit.

The prototype was built in a 230 x 135 x 60 mini box with the local oscillator and receive converter in a separate screened compartment from the transmit converter, driver and PA stages. If true transverter operation is required with eg a transceiver, the 7MHz transmitter output must be given a dummy load and attenuated to give the 7MHz VFO 1.5 volt peak to peak via suitable relay switching.

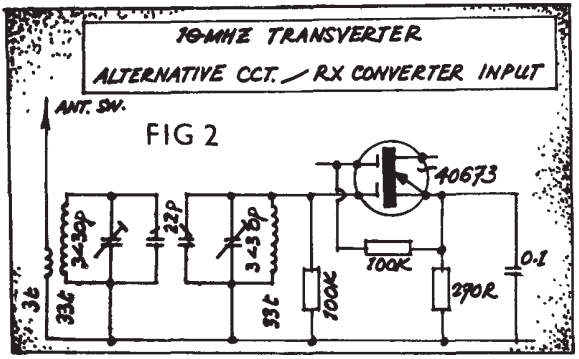
Coil Details - all Aladdin formers, close wound with 32SWG wire (82 turns per inch).

L1	33 turns (tap 4th turn)	Aladdin 7/16" former with no slug
L2	33 turns	

For coupling - coil centres separated by 25mm or alternate wound.

L3	33 turns	Aladdin former with slug
L4	41½ turns	Aladdin former with slug
L5	33 turns	Aladdin former with slug (part in)
L6	33 turns	Aladdin former with no slug
L7	14 turns (link 2 turns at ground end)	Amidon T50-2
L8	4 turns (28SWG enammel)	FX1115 ferrite bead
L9) L10)	12 turns (18SWG enammel)	Amidon T68-2

Output can be put directly across 2000 ohm phones in parallel with receiver output, or attenuated and introduced into the receiver AF amplifier. Current drawn when tone transmitting is 12.7mA and quiescent is less than 1uA.



WARC Converter *Ha-Jo Brandt DJ1ZB*

For those who still own a proven five band receiver or transceiver, this is the easiest approach to listen to the new WARC bands. A single 4MHz crystal oscillator and a dual gate FET are combined to mix 10.1MHz and 18.1MHz to 14.1MHz and 24.9MHz to 28.9MHz. Band switching is accomplished by two independant push button switches. Unused input filters are short circuited. Some of these short circuit bridges are on the PCB, others must be wired by hand on top of the push button switches. The terminating resistor on the 24.9MHz input filter (R11, 8.2K) was also placed there.

In the crystal oscillator a bipolar transistor was used first, but created harmonics which caused spurious reception of broadcast stations from the 16 and 31 metre bands, lying on the slope of the corresponding input filters. The FET oscillator produces a much cleaner waveform and almost eliminates this problem. However, referring to an old RCA recommendation, oscillator voltage at the test point should not exceed 0.5 volts RMS to keep spurious mixer products down.

There are two alternatives to set the operating point of the FET. The first is to omit R3 and to use diode D1 which produces a positive voltage between gate and ground and a corresponding increase in source current after oscillations have started. The other way is to use a gate divider (R3 = 3.3 to 3.9Mohms) to produce a positive voltage at the gate without diode D1. In this case the source current will decrease somewhat after oscillations have started. The reason behind both alternatives is to eliminate a souce choke and to use a relatively high source resistance in order to keep the loading effect on the capacitive divider small. With other FET types it may be necessary to alter the source resistance for best performance.

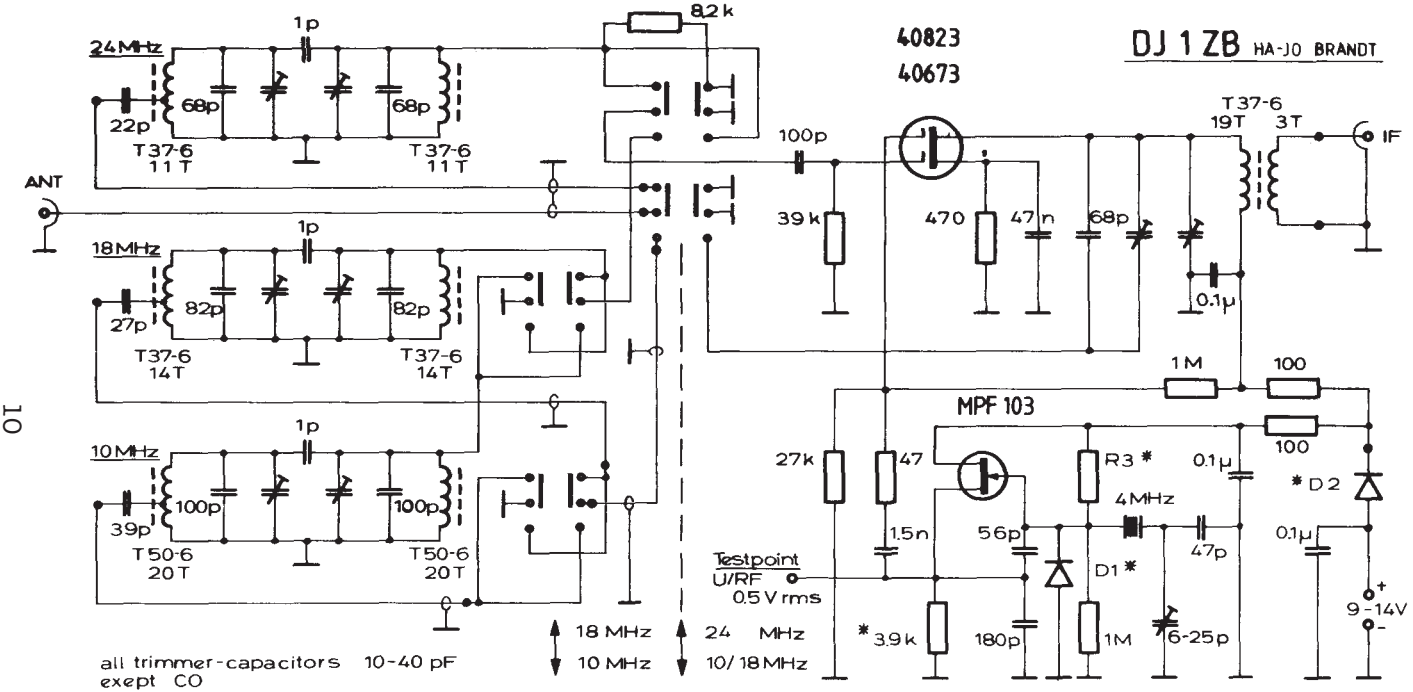
As sensitivity of the converter is more than adequate on 10 and 18MHz and these bands are very close to the 31 and 16 metre bands, performance of the converter may be improved by adding a third (or even a fourth) resonant circuit to the 10 and 18MHz input filters, using the same L and C values. Good input selectivity (which does not consume any DC power) is of prime importance for this "low level" converter which is in extreme contrast to todays mixer philosophy favouring high level mixers with tens to hundreds of milliwatts of oscillator power, but neglecting input selectivity. This converter merely consumes 3mA at 12 volts (9 volts operation is also possible) and will perform well even on long and high antennas.

If anyone finds it desirable to add a bypass switch to the converter, to receive the other bands, care must be exercised not to introduce additional coupling between input and output (increasing IF feedthrough). For the same reason the positive supply jack is directly bypassed for RF, because supply cables may also act as antennas and couple 28MHz or 14MHz signals into the converter box. D2 may be any silicon diode and is recommended to protect the circuit against wrong supply polarity.

To tune the converter, first calibrate the associated receiver at 28MHz. Switch to the 24.9MHz band, tune in the 7th harmonic of the 4MHz crystal oscillator and adjust it to its exact frequency (C7). To align the input and output resonant circuits, an RF signal generator may be helpful, or the spot signal from a WARC band QRP transmitter. The 24.9MHz input (C3 and C6) and the 28.9MHz output (C8) circuits must be adjusted first (maximum S meter reading). Finally switch to the other bands to tune the 14.1MHz output (C9) and the 18.1MHz (C2 and C5) and the 10.1MHz (C1 and C4) input filters.

Converter Measurements

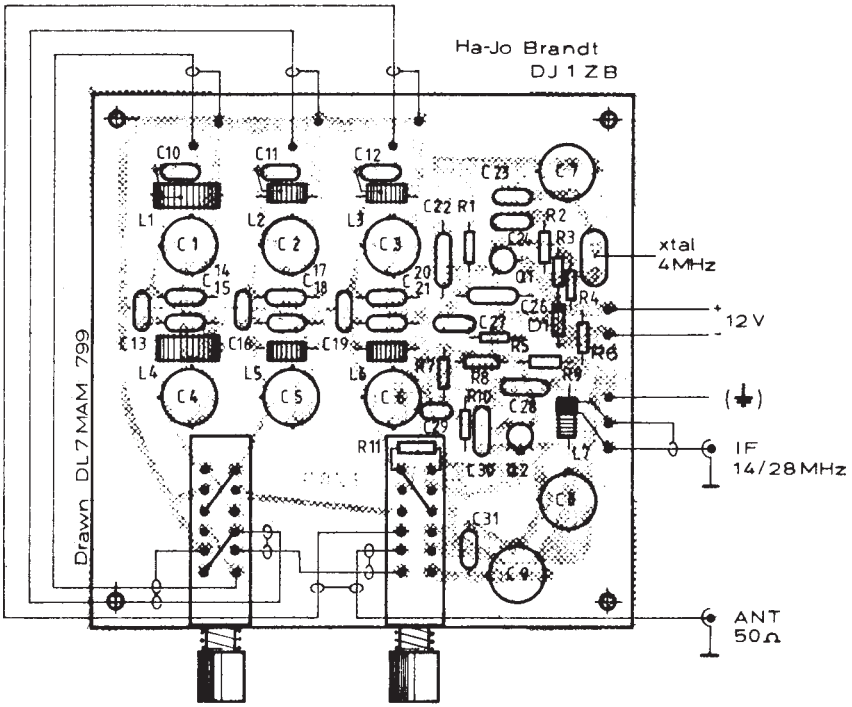
Band (MHz)	10		18		24	
Noise Figure	7.5dB	6 kTo	11dB	12kTo	11dB	12kTo
Gain	19dB		14dB		12.5dB	
Image Rejection	18.1/14.1	64dB	10.1/14.1	71dB	32.9/28.9	52dB
IF Feedthough Rejection	14.1	52dB	14.1	64dB	28.9	39dB



HA-JO's WARC CONVERTER

Input	Output
24.9 MHz	28.9 MHz
18.1	14.1
10.1	14.1

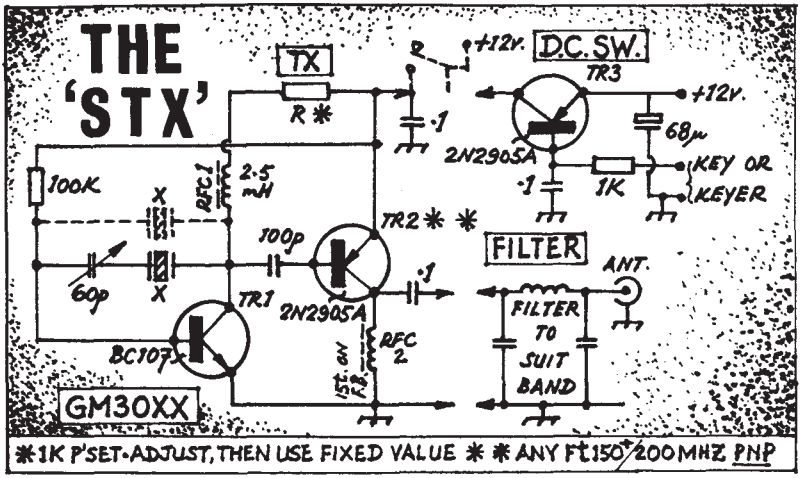
* see text



Placement-Guide for WARC-Converter PCBs available

Placement Guide, parts identification

C1 to C6	ceraminc trimmers, 10mm Ø, 10-40pF				
C7	" " 6-25pF				
C8, C9	" " 10-40pF				
C10	ceramic 39pF				
C11	" 27pF				
C12	" 22pF				
C13, C16, C19	" 1pF				
C14, C15	ceramic, mica, styroflex or polystyrene, 100pF				
C17, C18	" " " " 82pF				
C20, C21	" " " " 68pF				
C22	" " " " 180pF				
C23	ceramic, 47pF				
C24	" 0.1uF		C29	Ceramic, 100pF	
C26	" 56pF		C30	" 47nF	
C27	" 1.5nF		C31	" 68pF	
R1 3.9K	R4 100 ohm		R7 39K	R10 470 ohm	
R2 1M	R5 47 ohm		R8 27K	R11 8.2K	
R3 See text	R6 100 ohm		R9 1M		
L1, L4	10MHz coils (T50-6)	)			
L2, L5	18MHz coils (T37-6)	)	taps of the input coils are at one half		
L3, L6	24MHz coils (T37-6)	)	of the total turns		
L7	Output coil (T37-6)				
D1	BAW75, 1N914, 1N4148				



The STX [Simple TX] George Burt GM30XX

Parts: RFC 1 2.5mH
RFC 2 15 turns or as many as you can . 32SWG on ferrite bead
*1Kohm trim, adjust and fit a fixed value
T1 BC107
T2 2N2905A PNP, or any medium switching PNP with Ft 150-200MHz for 14MHz.

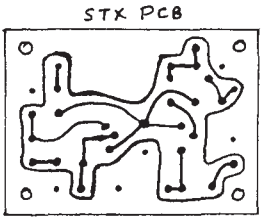
For all those people who have trouble building, here is a transmitter for you, hi. If you do not have a PNP transistor in the junk box, use a NPN transistor and put the RFC and collector to the 12 volt rail and the emitter to ground.

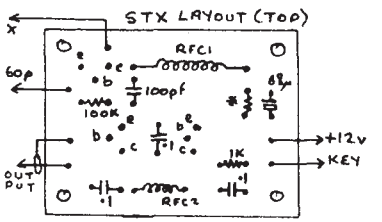
The rig was built in about 30 minutes on a tag strip. Adjust R* for two watts input with about 800mW out, you can make the PA draw lots of current, adjust R* for maximum RF out then stop, start with R* at its largest value, this prevents you from making the PA draw too much current. If you do not want to use a hand key it is easy to add transistor switching (TR3).

The crystal gives a few KHz shift with the 60pF capacitor. If the crystal capacitor is left out you get a frequency not available with the capacitor in, so fit two crystal holders, one with the capacitor and one without. It works fine with any fundamental crystal, but LC for PA must be changed to suit the frequency in use.

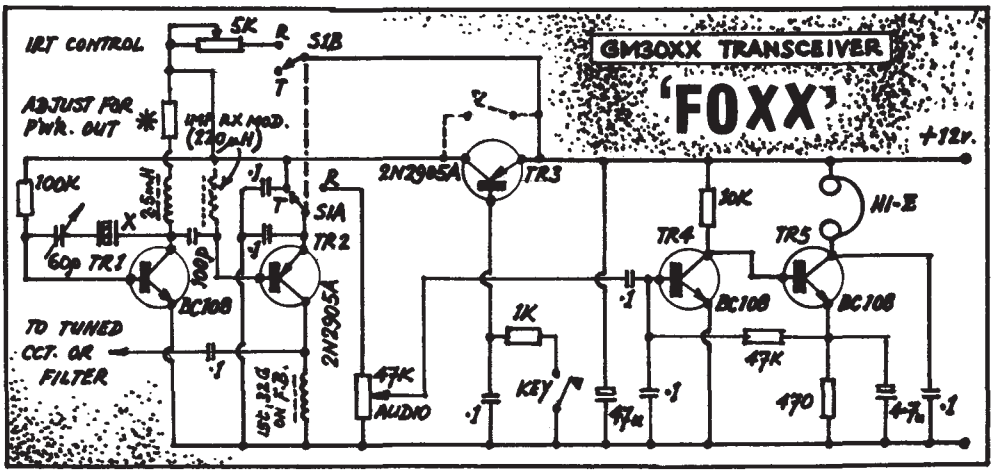
The first station called was a DJ on 40 metres, so we were O.K., 539 cannot be bad! If you are wondering why a PNP PA, it is because the transmitter was to be the basis of a simple transceiver, the "FOXX".

Sketch of PCB Layout (Half Size) Etched PCBs available - see note elsewhere.





SWAP - I have a good HW7 and would swap it for one or two JU6's in sturdy metal boxes suitable for /P when hiking. Bob Cutter, KIØG, 701 19th, Glenwood Springs, Colorado. 81601. U.S.A.



The FOXX minitransceiver George Burt GM30XX

[A TRANSCEIVER ON A 2"x2" PCB]

After chatting to people at the Club stand during The R.S.G.B. HF Convention at The N.E.C., it was obvious that what was needed was a simple transceiver with no expensive or hard to get bits, like MD108s. The first thing was to build a very simple transmitter, then try to convert it into a transceiver.

The STX was built and several separate receiver sections were tried without much luck. Then by sitting and looking at The STX circuit, the idea of using the PA as a detector came to mind. Why not, after all it is only two diodes. So the PCB was cut and a 47Kohm pot was connected to the emitter along with an audio amplifier Great, it worked, next step was to wire in a toggle switch. With it spread all over the bench and a quickly made mini Z match for the RF coil, on loading up it gave 2½ watts of RF out on 40 metres. Using R* the drive was reduced to one watt out. Try to leave some R* in circuit otherwise the BC108 will be working very hard

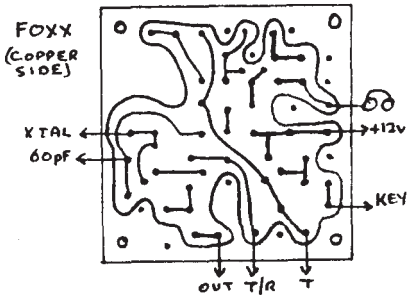
After a quick CQ call, back came a LA6, followed by Frank, ON5AG and G4GXI, Peter, both Club members. A trim pot of 5Kohm had been wired in the receiver side to try and adjust the oscillator injection for the PA/detector. It was found that it altered the drive until the oscillator stopped, but better still it altered the frequency. On 40 metres, with the series crystal capacitor at full value it pulled the crystal by 1.5KHz before it stopped, now we had IRT as well, on 20 metres it pulled the frequency by 3KHz. Alas on 80 metres, it pulled the frequency by only 400Hz, still you cannot win 'em all!

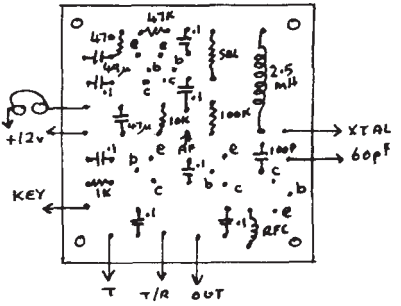
The other nice benefit that turned up was on transmit. When there is no detector thump and the audio left on, a smooth click side-tone is produced. It is even possible on receive to zero beat, depress the key and this shorts out the IRT control, and one can tune on the crystal capacitor.

Now what more could you want? A simple transceiver with crude IRT and side-tone with a PCB that measures 2 x 2 inches. So have a go, it is fun and easy. Both Nor, GM3RKO and Iain GM4HBG have built one and Iain has already improved the receiver by placing a small RF choke between the base of the PA and supply rail.

So have a go, there is no reason why the PA/Detector idea cannot be used with a VFO transmitter and a better audio side.

Sketch of PCB Layout For The FOXX Transceiver. Etched PCBs Available.





FOXX LAYOUT (TOP)

G QRP Club Printed Circuit Boards

The club is now able to offer a series of etched and drilled printed circuit boards for club projects. They are:

THE S.C.D. TRANSMITTER BOARD £1.00
A simple beginners transmitter by G3RJV from 'Short Wave Magazine' suuplied circuit and layout details.

G3ROO BROADBAND LINEAR AMPLIFIER £1.50 (undrilled)
A Linear RF Amp board ideal for SSB QRP PAs from SPRAT and Circuit Handbook usable 160-10M. Supplied with circuit and layout details.

THE STX £0.75
Simple transmitter featured in this issue

THE FOXX £0.85
Miniature transceiver featured in this issue

WARC CONVERTER £2.15
Receive converter by DL1ZB featured in this issue.

Cheques to "G QRP CLUB" Postage charge of 20p on all boards.
From:
Mick Hodges,G4OPE, 51 Carnford Road, Sheldon, Birmingham. B26 3AG.

Members Ad's

G3RJV is looking for a Manual (to borrow and copy) for a Trio 2200GX

FOR SALE: Argonaut 509 Stickers for QSL Cards, $1.00 per page of 36. WB8OWM, Skip Westrich,1309-24th St. Canton,Ohio 44709.USA.

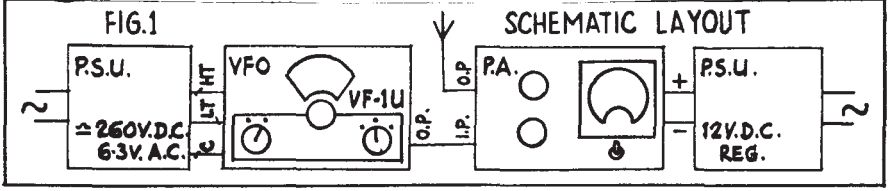
FOR SALE: ARGONAUT 509 (Excellent Condx) plus mike and cw filter 203 Unit. £225 ono - or exchange for Trio TS130V with cash adjustment. Vince Lewis, 19 Cowley Cres. Padiham, Lancs. Phone:0282 72131(day) 0282 72916(evenings).

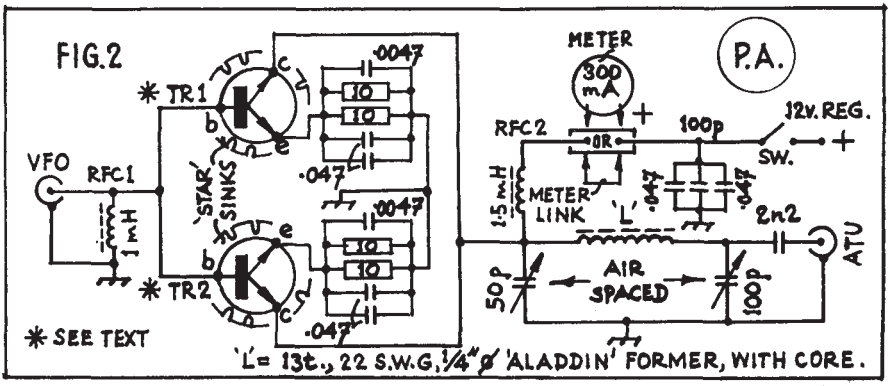
SWAP: Solid State Design for the Radio Amateur book for QRP HF Transceiver G4SQA, 24 Oakleigh Dr.Peterborough.PE2 0BD. Peterborough 232211.

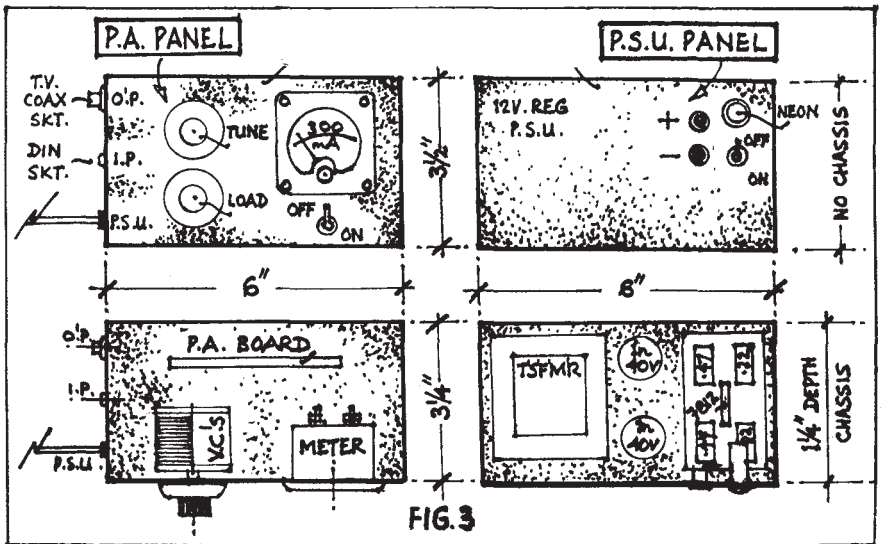
FOR SALE: SEM 2 metre Converter (2-4MHz output) unused £10 p.p. ono. DFM partly assembled,complete with all parts, SWM articles and prefabricated case. offers invited. G8BAF QTHR Phone 0376 514912 (Essex).

FOR SALE: TENTEC PM3A £50 or o.n.o. G8CK QTHR. Stourbridge.

'REVERSE HYBRID' 40M. QRP TRANSMITTER







G3FCK — G·QRP·C ~~020~~

"REVERSE-HYBRID" QRP TRANSMITTER By A.W.McNeill (Mac), G3FCK

Hands up all those members who cannot build a VFO! Go to the bottom of the class and join G3FCK!!

Seriously, VFO construction demands expertise in mechanics, as well as electronics, which is where many fall down, particularly yours truly, whose efforts generally look like (1) a "birds nest" which (2) will not go into the box, and (3) drive the station digital frequency counter meter haywire, trying to determine the intended range, showing every QRG between zero and 30MHz!

The alternative of remaining "rock bound" is not attractive, as the writer's collection of crystals testifies, viz a selection of several dozen all seem to occupy these niches in which are firmly entrenched (1)high power SSB (2) RTTY gone mad (3) B.C. breakthrough, or (4) two G4's swapping life stories, with maximum legal power at five words per minute, (apologies in advance to all those G4's with whom G3FCK has recently scrabbled to copy 35 w.p.m. of flawless CW!).

The alternative? Easy! Hook up a valve-type VFO (hence "Reverse-Hybrid" as recent Sprat hybrid designs have mainly featured a valve PA). In this case, a very stable keyed VFO is employed to drive a standard design, home brewed PA, which with a regulated 12 volts supply, will provide a 2 to 2½ watts input with an efficiency of approximately 60%. So all you owners of Heathkit transmitters which utilise the outboard "VF-1U" VFO, detach it from the QRO rig, connect up as shown, and let the "big rig" rust away on a shelf while you "bring 'em in" on 40 metres.

Needless to say this PA can be used to check out prototype XCO, VXO or VFO designs, before committing oneself further! The drive required is inly about 80 - 100mW.

The PA was constructed using cheap, easily obtainable components and /or junk box materials. The prototype used "ITT" switching transistors, obtained from a recent "Sprat Offer", but ex-equipment BFY50s have also been used successfully. It would seem therefore, that other alternatives would be BFY51/52, 2N3053 or 2N3866. The unit is tolerant of components variability, viz RFC1 can vary between 1 and 1.5mH, RFC2 can be extended to 2.5mH, two 0.047uF capacitors can be "telescoped" to 0.1uF and the emitter resistors altered from four 10n to two 2.7n, with the proviso that the wattage is not less than about three.

In general, with approximately 12 volts DC, the PA will draw between 180 and 250mA. The writer's unit used an ex RAF 100mA meter, shunted to 300mA, but to save expense and space, a meter link can be substituted, and the station multimeter inserted when required on the 250mA range.

To prove this units reliability, a minimum of 100 QSOs was undertaken, using a somewhat inefficient antenna system, comprising one half of a trap dipole erected at an average height of three metres above ground level.

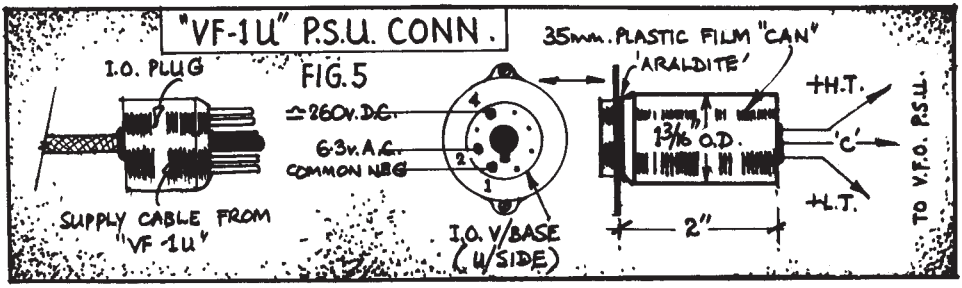
From the results achieved it would seem that DX is a distinct possibility, using a dipole at maximum height or another reliable antenna.

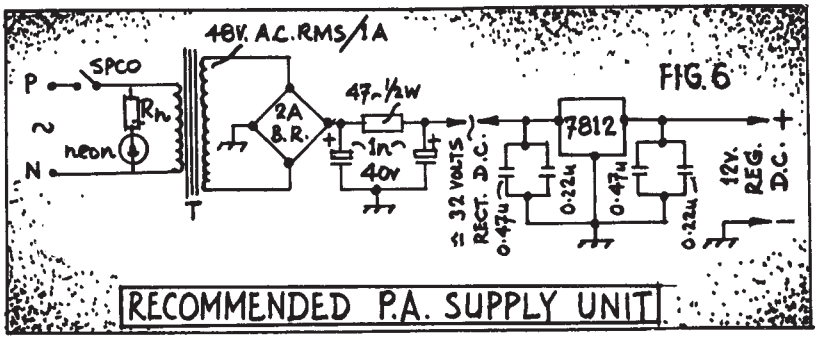
The "VF-1U" VFO is connected to a 260 volt HT DC/6.3volt AC supply using an internal octal valve base, 35mm film "can" and three short leads, as shown in Fig. 5. The VFO controls are set for 40 metre operation as follows:-

Left hand switch to "40,20,15,10" position.
Right hand switch to "Standby" (key inserted in VFO socket).
The PA PSU is a 32 volt rectified DC unit "rescued" from an old "Truvox" reel ot reel tape recorder, "tamed" by the addition of a regulator circuit, as per Fig. 6.

An 80 metre prototype is already under construction, and at a later date, an intermediate doubler/tripler for the HF bands. The writer will be pleased to answer any queries on this article, via QTHR (SAE please!). Good hunting!

GW4OKO has a number of 3560,7010 and 7050 xtals which he is prepared to exchange for other 10X,10XAJ or FT243 types which fall into or double to the exclusive cw portions of bands 3.5-18MHz. Also a number of out of band xtals swap 2 for 1 in band xtal. Dave (GW4OKO) QTHR or (0446)750763.





A Useful FT7 Modification by Colin Turner G3VTT

One of the most popular lower power transceivers available in recent years has been the FT7. This is a fairly simple transceiver for 3.5MHz to 28MHz, primarily designed for Novice use in the U.S.A. and Japan. With 10 watts output and a modification available to reduce power output still further (see Rad Comm) it is a fine QRP rig.

The FT7 has one major draw back, at least for CW operation, and that is its selectivity. The IF bandwidth is 2.7KHz and the AGC time constant is set for SSB operation. Two useful modifications can be carried out :-

1. AGC time constant, for CW operation, should be reduced to prevent AGC 'breathing' when working near to strong stations. This can be done by reducing C 427 2.2μfd to 1.0μfd, a fairly easy modification. There is little effect on SSB operation.

2. An active filter can be wired between pin 15 on the 'AF UNIT' PB 1648 and pin 12 of the 'MOD/DEM' PB 1624, (see FT7 manual). The MFJ filter has proved to be a good choice here.

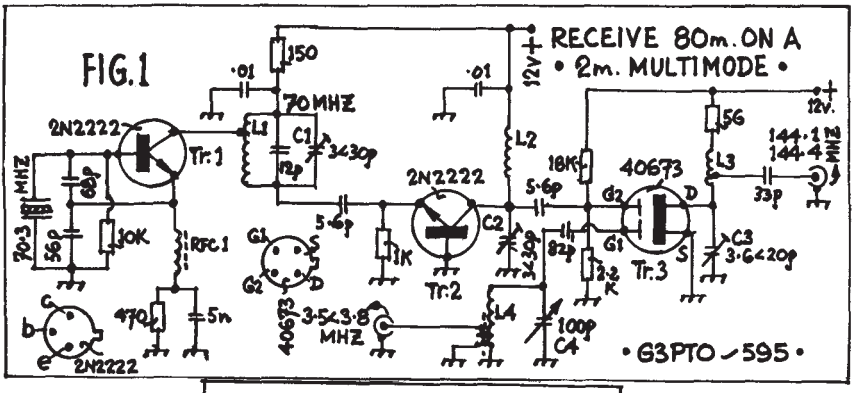
It is hoped these modifications will help members with the FT7 copy CW a little more easily. I am indebted to Gordon, G4GAV for the use of his FT7, and for allowing me to attack it with a soldering iron.

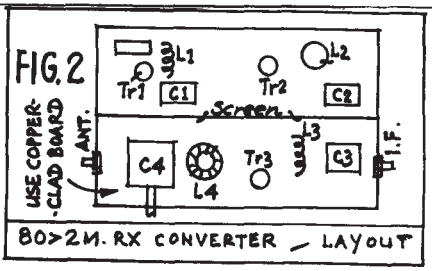
CORRECTION: SPRAT 34, p.3. The driver of the transmit circuit (2N3053) shows a ground connection from the top of one section of the 10t bifilar coil. This should be via a decoupling capacitor of 0.1uF.

HELP..J.E.Pogson,15 Goldsmith Rd.Balderton,Newark, Notts. a beginner and new member would like to buy a simple receiver (homemade?) for amateur use, with circuit details etc.

SILENT KEY: We regret to announce the death in November of George Pearson, G3AWZ a club member and keen QRP operator. George had 200 countries on-QRP.

80 to 2metres Receive Converter John Reynolds G3PTO





It is hoped that this converter will be of interest to many aspiring Class A amateurs and also to those Class A licencee's who are short of cash and wondering what commercial HF transceiver to buy, ugh!

I constructed my prototype using copper clad board and usual VHF type construction, i.e. the board acts as a ground plane and the componenets form a rats nest above. All of the components were from old computer boards or TV spares, with the exception of the crystal, which came from a rally stand. The only problem which is likely to occur during testing is in the oscillator and doubler stages. I used a G3RJV RF probe and multimeter on the lowest current range. Possible improvements may be in the front end, but first results seem to indicate no problem.

My VHF transceiver is an Icom IC260E and 144.1MHz corresponds to 3.5MHz, 144.4MHz to 3.8MHz. It is eventually hoped to construct a transmit converter but in the meantime a simple QRP solid state transmitter is used.

Rich... on UBoats and Monsters !

(AHEM...) The following is an open thank you letter to those radio amateurs who took the time to send me cards and letters on my 37th Birthday (March 6). Also I'd like to thank all the club members who attended the gathering at at G3RJV's QTH on March 5th. It is heart warming to share a birthday with friends. My Loch Ness Monster full of whiskey sits on the self next to the WWII U Boat Tube with the scroll and paperweight. Thanks to GM4JJG,GM3OXX, G3VTT,G3RJV and Jo. Contrary to rumour G3RJV CAN cook (burnt toast aside) and did a super job on the cake complete with club logo. One last thank you goes to the planning committee of one who had the brainstorm to set this up namely my wife, Patricia. Thanks for loving me enough to put up with my Amateur Radio,me,and the QRP Crazies...not necessarily in that order. It was a WONDERFUL birthday and I'll cherish the warm memories for the rest of my life. 73s es GUD DUX de G5CSU (Rich).

SAD NEWS.....TENTEC have finally announced that the Argonaut range is now discontinued. We had rumours in the past but this has been confirmed.

CLUB NEWS

G3RJV 20/20 Competition Results

G3RJV de G3KFE

Dear George,

Thanks for the invitation to judge the 20/20 competition, and a tough task it was too!

Sentiment made the clear winner in my mind to be the OK1DKW Tot 30 rig - the idea is stunning in its simplicity and originality, taking a difficult exercise and making it harder!

However, I had, prior to the event sat down and made a 'scoring sheet' out for the entries, listing such things as receiver sensitivity, dynamic range (the most important parameter in a QRP rig, if there is to be hope of QRP/QRP contacts) RIT, the presence of a VFO, stability, power level adjustment, the power requirements in terms of simplicity or otherwise, and the 'Ideas' rating.

You know I have always had a 'thing' about the modern trend from elegant circuit design towards mere sophistication (youngsters, look at the dictionary for the different definitions!), and I was very pleased to see so much elegance in the entries, design-wise.

Anyway, to cut a long story short, I scored each entry in accordance with the list just mentioned, giving a maximum of forty points possible. On this basis, GM3OXX's 'SUPER OXO' RIG came out a clear winner with 28 points followed home by G3LDO who scored 26 points.

Perhaps a few final comments are justified; five of the entries had clearly given considerable thought to the question of dynamic range, but I was a little disappointed that so few of the entries made serious provision for side-tone as a part of the rig - it is so easy with the simple direct-conversion type of rig to embody this facility. Personally, one feels that side-tone is an essential, unless some sort of monitor in the station is mentioned. One feels that the argument that a less than super-sensitive receiver is enough is fallacious; it may be true when you are in QSO with a station running normal power; but in a QRP/QRP contact, one exp cts to exchange equal signal reports, and so good sensitivity of receiver becomes as important as it is to the QRO operator.

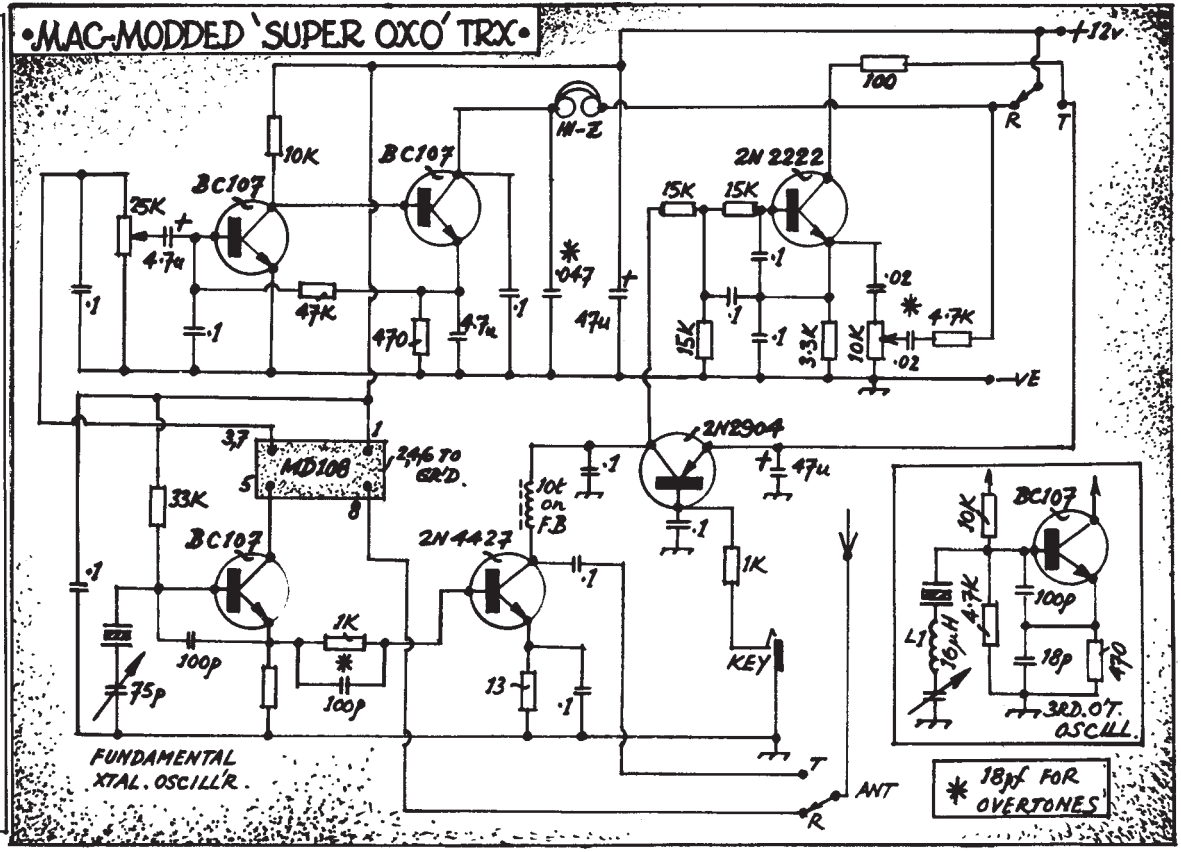
However, a fine contest, and some interesting entries - I wish I could have found time to build them all and air-test them for myself!

73 de
G3KFE (Editor "Short Wave Magazine").

WATER SLIDE TRANSFERS

Like me you may recall the popular range of water slide transfers available from the old "Radio Constructor" magazine. These transfers, always better in my opinion than dry rub-down lettering, were used to provide the legends on equipment front panels.

G4RPK, a new club member, has sent me a set of waterslide transfers he has produced with titles suitable for amateur radio equipment front panels. These are in white "futura face". They look very neat and useful. I have already used some and will use them again. At present they cost £1.25 per sheet of various legends, symbols and numbers for the amateur radio market. The price may go down if demand is high enough. I am investigating the possibility of a sheet of the club logo in a range of sizes to add to equipment panels. I hope to be able to announce this in the next issue. In the meantime, the front panel titles can be had from; John Kaine, G4RPK, 74 Camden Mews, London. NW1 9BX. for £1.25 per sheet of amateur radio titles. (G3RJV)



It seems appropriate in the issue which announces the GM3OXX Super OXO as winner of the RJV20 Competition that we have a look at the circuit again. Those avid constructors from Fife HB3G,VTH and RKO have built their fellow countryman's transceiver and offer a few useful mods. The sidetone (a unijunction in the original) has been replaced with a silicon transistor circuit and the insert circuit shows a suitable VXO using third overtone crystals for the higher HF bands.

SSB NEWS Ian Keyser G3ROO

We start this month with a first that must beat all firsts! In a very long letter from Dave, GM4EDV where he casually mentions that he was very pleased to receive his five band WAC. It was not pure SSB, but how about VK on eighty SSB! Well done Dave. I cannot list all of Dave's news, but suffice to say that it is impressive and includes a 7X2 who is keen on QRP and might join the club. Dave also claims 14,760 points in in the Marconi contest.... Um, I thought that the bands were completely dead!

A letter from Ed, K5BOT is mainly about the SSB frequencies and it is interesting to note that the 15M SSB calling frequency is 21.385 and not as us on 14.285. I suggest that we monitor this frequency as well when the path is open until I get this clarified with WQF. Also Ed is going to try and drum up support for the 'short' contest, but more about that later.

The next letter is from Ken, GM4JMU (again north of the border) who is active on 10MHz. I think that Daves interest is more constructor than operator as he has not included any news of anything worked.

Now to welcome John, G3DBQ to the fold. That callsign brings back memories of the good old days on SSB. For those who don't know John published a design which he called the 'Natterbox' which was the first really constructable SSB transmitter and many of us in those days got on SSB using that design. John has been active on QRP SSB on 14 and 7 MHz, 20 m pulling in UA4 and 7Z2 (where is that, I must look it up! On 40M only G land, but the list includes some members. He also points out the lack of activity on 3690. In the past I have tried to monitor SSB frequencies, but the problems of having yo continually tuning in to stations while working is annoying. I hate to have to admit that I now monitor 3560 or 7030 with the receiver on 'wide' then I can evesdrop without retuning. Anyone with any ideas on this matter.

From Bob G3IQF again disappointed with the activity on the SSB weekend, He managed Eight QSOs on eighty, two of which were two way QRP but G3CDJ was not a member. The other was with G3SZW which was Bob's 90th member worked. This all adds up to one thing, that if we have another activity weekend it should be restricted to one band to help ensure that we hear each other. I prefer forty metres as the noise level on 80m at my QTH is high to say the least due to overhead power lines but if you drop me a line to state your preference we will fix another one for the winter period.

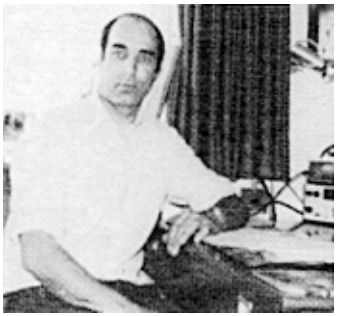
Finally a letter from Felix, 17CCF again bemoaning the low SSB activity. During the spring activity weekend I think that we must have all been listerning and calling on different frequencies. This is reflected in the Weekend net (1430Z 14285), I call on at least one of the two days and have not had a QRP/QRP QSO in ages. As an example I called yesterday (15th Mqy) without reply, but when I called CQ a few minutes later I was rewarded by a ZS6 who gave me 54.

Now for the short contest. There has not been too much reaction to this idea, but worth giving it a try. I'm going to set if from 2100 to 2400Z all bands, scoring as the Marconi contest (SPRAT 29 P.21) on Friday 26th August.

Well that's it for now, 73's

Ian

Members News:



Chris Page G4BUE

There is no doubt that the event this Spring was The R.S.G.B. HF Convention at The N.E.C. in Birmingham. From the Clubs' point of view the week-end was a great success, and from a personal point of view it was great to meet so many of you for the first time and to put face to the call signs, in particular a first ever meeting with Gus, G8PG. Roll on next year....

Next I have an apology. Due to the size of the Club, my post bag has just grown and grown Don't get me wrong, I am not complaining, but it is just not possible for me to reply to each of you personally. Obviously if there are any particular aspects of the Club I can help you with I shall give all the assistance I can, but when submitting information for this column, I shall acknowledge your letters here. Many thanks in advance.

Next a plea. Due also to the size of the Club I have taken on an assistant to run the Club's QSL Bureau, my wife Pam. She has assisted me in sorting the QSL cards for the last two issues, but now she has taken the job on in total. Please send your cards to her (same address as mine, hi). In answer to several of your queries, QSL cards received up to a month prior to publication date will be sent out with that edition of Sprat. (Sprat is published at the end of March, June, September and December so cards should be with Pam by the end of February, May, August and November) As Pam is now dealing with the cards it is even more important that I ask you to write the members Club number in addition to his call sign on the cards.

Now to congratulations. Firstly to Gordon, G3DNF, who after ten years of trying, has won The Winter AGCW QRP Contest, Class A - well done Gordon. Next to Bruno, OE1SBA who has just had his 100 DXCC cards checked for The K8EEG QRPp DXCC Trophy. Congratulations to the xyl of Alan, G4JJN who has just become G4ROK (she will obviously be *crystal controlled with that call sign - oops, sorry about that!*), *and to Mike*, ZL1BLJ who was the first Australasian station to work BY1PK, although he admits it took him QRO.

The Spring CW Activity Week-end can best be summed up by some of the comments from your letters. Tony, G4FAI says he was "disappointed with the conditions", I7CCF "worked no members", W9PNE "worked only EA in Europe", SM4KL "Bad conditions", DJ1ZB "Conditions not favourable", although Ha-Jo said he heardW9PNE on 21MHz, N3KZ (KH6CP at his home QTH) "Worked F9YZ and G4FOL on 14MHz", and in contrast G3SZW "First QRP Activity Period and enjoyed the experience." Oh well!, better luck for the WQF sponsored week-end on 10/11 September. I have not seen anything from WQF, so I imagine it is still being held. I suggest you check 0700-0800 EU/Oceana, 0800-0900 EU/JA, 1600-1800 EU/North America and 1900-2000EU/South America and Africa on the highest band which is open. Also do not forget The AGCW Summer QRP Contest on 16/17 July.

Adrian, G4GDR would like a transvertor for 4 metres to go with his 515 Argonaut. Anyone who can help should contact Adrian on Swindon 762970. Allan, G4NNJ has recently added the G5BIU RIT mod to the HW7 and can thoroughly recommend it. Frank, G3BFR has recently been in hospital, but by now should be home and on the mend. PY2TU has also got interested in computing. Moser has recently purchased a TK82-C, which is the PY version of the very popular ZX81 microcomputer.

A letter from Ha-Jo, DJ1ZB reporting on a QSO with C6 on 24MHz. Ha-Jo was the only member to report on the new 18 and 24MHz bands and has suggested that QRPers may like to look for each other around 24930 and 18090-18110. G4SCT, Jim despite the new call sign describes himself as "an old 'un who is just feeling his way into the transistor world". Jim has started building some of the rigs in recent editions of Sprat and says that it is a good job he is retired or he would not have the time to go to work!

DXCC seems to be getting closer for several members: G8JR is 61 worked with his HW8 and an indoor antenna, including VK; G4EBO is 102/91, YO6HQ is 80/72 with ZL1AH answering Gig's CQ call to give him greatest pleasure; EA2SN is 94 worked, including 47 worked in the WPX SSB Contest. F9YZ is 242 worked, latest being 9N1MM and two ZD7s. I think Jacky is the Club member to have worked the highest number of countries or are there any challengers? Jacky also commented on the poor signals from the two VKØ DXpeditions which meant he was unable to work them on QRP. I also spent many hours calling them with QRP, without success.

G4EBO recently worked OHØPA who was running a battery rig for a new one on two-way QRP. He also heard VK7VV but Eric couldn't raise him. Felix, I7CCF was luckier, as he worked VK7VV on 14MHz. Eric also heard KL7IBT at 0700z on 14060 one morning, but again no QSO. Bob, G3IQF managed to work CN8CY just a week before he left, and VK6RU in The BERU Contest to complete his WAC. Brice, W9PNE made 61 QSOs with one watt output in The Michigan QRP Contest, and has added a TI2 QSO on 3.5MHz to his DXing. G3DNF has recently worked ZD7, TR8, UI8 and UG6 for new ones. G4GTU has made his first QSO with USA. Steve was using a sloping G5RV, which slopes away from the USA and says he has a problem working the USA with QRO...just goes to prove what we have been saying for ages, hi.

CT4CH will be back in Portugal at the end of July, but in the meantime is QRV as SM6YF/MM. Ben has been experimenting with helically wound dipoles, just 35% of full size. He has worked V3, PYØ, ZS3 and 5N8 with them, so he has obviously got them working efficiently. Yenii (Club 1231) a SWL from Nigeria is now listening for Club members. He heard CN8CY on 26 March, but no others so far. He hopes to be QRV by the end of the year so two-way QRP with 5N should be on. Zack (KH6CP) N3KZ now he is back home in PA is anxious to work European members on 7MHz. He commented that it was much easier to work DXCC from PA than it was from Hawaii! SM7KWE sums up the Spring Activity Week-end "as a flop". Leif is active on the HF bands with an indoor antenna. G5DEH is looking for Nevada to complete his WAS. Tim is due to return to the USA in November, but is trying for another two year tour of duty over here in the UK, guess he must like our rain!

A sad story from Dave, GM4ELV. He exchanged a QRO rig for an FT7 and after using it for a bit (to work FY7, YBØ, 7X and TU), Dave found the guy on his doorstep wanting his FT7 back. When Dave refused things got a bit rough and a 999 call was made to the local Police. They didn't arrive (tut tut!), and now the matter is in the hands of solicitors. In the meantime Dave is QRT, as the other guy has got both the QRO rig and the FT7. Hope things get sorted out Dave. Dave (I think) is the only G Club member to hold one of the new Home Office 6 metre licences, but says he has not made any QSOs yet.

Many members are using the soldering iron to good effect with the OXO and JU6 rigs being amongst the favourite being built. G4HOM has a OXO TX/JU6 RX transceiver and has worked OX and the USA with it. G4MIJ is on 10MHz with an OXO with an antenna that starts in the front garden, goes through the house into the back garden...am just trying to think a good name for it! G4KKI is doing a lot of construction, including building the Silver Tern. Bill is QRT due to work on the QTH (I know the feeling, hi), and has crystals for 1910, 1930, 1940 and 1849 which he is willing to exchange for either 7030, 14060 or 21060 - four for one if you are interested. Bill would also like to hear from anyone with a PM1 and for any mods for it. He has changed the dual gate mosfet for a MC1496 chip. G4IKR has been building a crystal controlled ½ watt transmitter for 20-80 metres, and has worked LZ on 14MHz with it. GM3OXX has been building some more simple rigs (look for further info in coming editions of Sprat), and SMØFSM has built the OXO and JU6.

WA8TCG, Herman is QRV from WVA with a 515 Argonaut and a three element beam at 50 ft for anyone who needs WVA for WAS. G4FAI and G3FTQ have a weekly sked on Thursdays between 1930-2030 local time on 144.390 and invite Club members to join in. KX6GO is located 50 miles north of Kwajaileun in The Marshall Islands and is active with a HW8 and 515. Walt has worked OK on 28MHz and is looking for QSOs with members in ZL and VK. GW4OXB is using a TS130V at two watts to a HF5V, and Norman G4LQF has been on the air in between looking after the morse cassette tapes.

Just in time to say I shall be at The Sussex Mobile Rally with Colin G3VTT on 17 July and would like to meet any members who intend going. Let me know how your Summer goes (by 20 August please).

Best 73,

Chris

Changes in Club Structure

The rapid expansion of the club over the last six months (we were 1455 at Christmas and on June 1st were 2150) has been a source of satisfaction but at the same time quite a headache. We were not entirley geared up for such an increase and members have been very tolerant as the "system" creaked. In view of the increase in workload for the committee, several changes have been made.

Membership Secrectary

From now on all membership details will be handled by our new Membership Secretary: Fred Garrett, G4HOM, 47 TILSHEAD CLOSE, DRUIDS HEATH, BIRMINGHAM B14 5LT. Our new enrolment forms bear Fred's name and new members will be processed via G4HOM. Fred will also handle all changes in address and callsign. Many members will know Fred from his very active CW operating on 40 and 80M.

Computer Listing

As from this issue no lists of new members or membership changes will be given in SPRAT. The increased size of the club now means that the volume of these would seriously cut into the editorial content of SPRAT.

Steve Hallam, G6GZD, is in the process of loading all membership details onto Floppy Disc storage. When this is completed, not only will the SPRAT address labels be computer printed, but members will be able to request updated lists of membership details. Complete lists, inclding call, name and QTH will be available but most members may be more interested in a Callsign/Club number listing which will be available in callsign order or number order. More details in next issue of SPRAT.

Morse Tapes

The club CW tape scheme "collapsed" at the beginning of the year. Gareth had made great efforts to individually copy our tapes onto members cassettes. The number of requests linked to the fact Gareth is now rarely at home because of his work caused the system to completely block. Gareth has undertaken to clear his outstanding orders and we thank him for his work over several years.

A new system will now operate in which the club will sell, at low cost, sets of pre-recorded tapes. This service is kindly offered by Norman Field, G4LQF, who runs the Neovox Record Company. Norman will bulk copy tapes in his studio and distribute them to members. The details are:

THE G QRP CLUB MORSE CODE TAPES.
A series of tapes prepared by G8PG produced by The Neovox Record Co.
MORSE CODE TEST PREPARATION COURSE. two C90 cassettes £2.25 inc.
C.W. IMPROVEMENT COURSE (14 to 20 wpm) two C60 cassettes £2.25 inc.
Cheques made out to "G QRP CLUB" with name and address to: Norman Field, G4LQF, 14 Regent Road, Harborne, Birmingham. B17.

By the way if you happen to be interested in vintage jazz or '20s and '30 dance music, write to Norman for his very extensive list of recordings.

Summing Up

So some new places and people to deal with.....

CHANGES IN MEMBERSHIP INFORMATION, QTH AND CALLSIGN CHANGES TO G4HOM.

PRE-RECORDED C.W. TRAINING TAPES AVAILABLE FROM G4LQF

RENEWAL OF SUBSCRIPTION STILL GO TO G4DVW, GENERAL ENQUIRIES AND SPRAT MATERIAL TO G3RJV, DATASHEETS FROM G3VTT, AWARDS FROM G8PG, MEMBERS NEWS AND QSLs TO G4BUE, VHF ITEMS TO G8SEQ, SSB NEWS TO G3ROO.

IN ALL CASES PLEASE QUOTE YOUR MEMBERSHIP NUMBER WHEN WRITING TO CLUB OFFICERS.

Have you contributed to SPRAT?

You dont have to be an author or a draughtsman. All we require is a circuit sketch and a few notes. Mac, G3FCK, our illustrater does wonderful drawings from simple sketches, but he does like all the circuit values clearly marked. The club probably has more active constructors than any other radio organisation and SPRAT is our forum for the exchange of ideas. Send any material or ideas to G3RJV. You may have to wait an issue or two to see your article but it will appear....