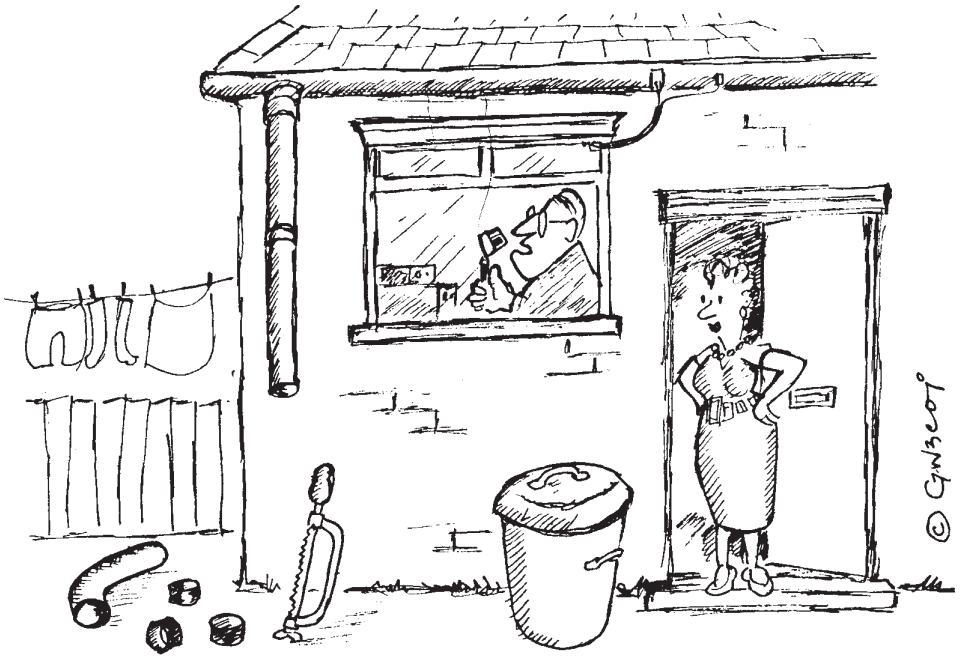
SPRAT

THE JOURNAL OF THE G-QRP CLUB

DEVOTED·TO·LOW·POWER·COMMUNICATION

ISSUE NR. 76 | © G-QRP CLUB | AUTUMN 1993



"... WELL SYD I FINALLY GOT THIS "INVISIBLE" GUTTER ANTENNA RESONANT..."

MINI-CONVENTION - DUAL BAND CRYSTAL MIXER - DSB GENERATOR
LAZY H - CROSSFIELD ANTENNA - FREQUENCY COUNTER - CW KEYER
TOUCH KEY - TOKY VFO - FT7 POWER MOD - SINGLE COIL Z MATCH
MORE CHATTERBOX MODS - BAD HW8 CORES - UB40 JIG - YALATU
SUPER 40 RECEIVER - 10.7MHz SSB GENERATOR - EMC AND KITS - ADS
ACCOUNTS 1993 - COMMUNICATIONS FORUM - QRP CALENDAR - NEWS
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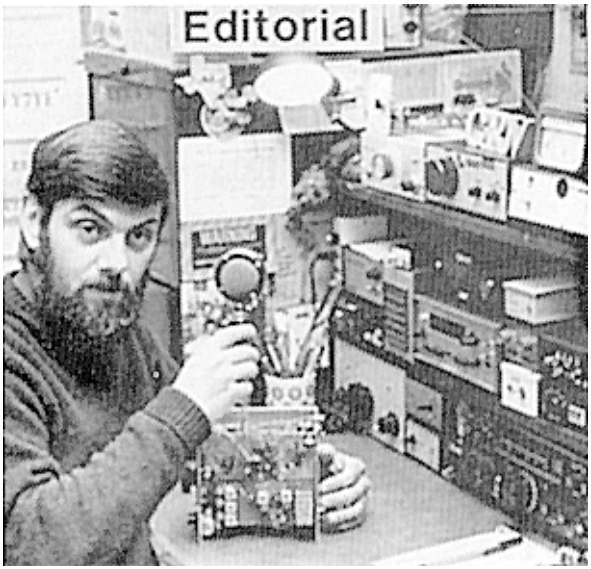
JOURNAL OF THE G QRP CLUB



Rev.George Dobbs G3RJV

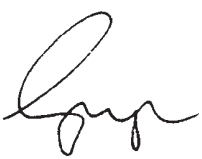
St. Aidan's Vicarage
498 Manchester Road
ROCHDALE, Lancs,
OL11 3HE. England.
Telephone and FAX
0706 - 31812

EDITORIAL

These days there seems to be an every increasing interest in QRP. No sooner had Ten Tec announced their Scout transceiver, than I received the first information about the QRP PLUS Transceiver for Index Laboratories in Longbranch, Washington. An all band 160-10m 5w CW and SSB transceiver with built-in digital audio filters. I hope to have more details for the next issue.

More radio magazines seem to be publishing QRP designs. The Practical Wireless recently did another QRP Special and the CQ magazine in the USA are running a multi-part QRP transceiver design. All quite a change from the interest when the club was first launched. Next year will be the 20th year of SPRAT, so we hope to make it a special year. Please keep sending in your ideas and circuits. We do ask anyone to be a 'technical author' Circuit sketches [please mark all values] can be turned into fine diagrams by G3FCK and I am pleased to work on brief notes. So, however, simple, or sophisticated, please share your ideas with other members.

Hope to see you in the Winter Sports,
72/73 fer nw



G3RJV

THE G QRP CLUB

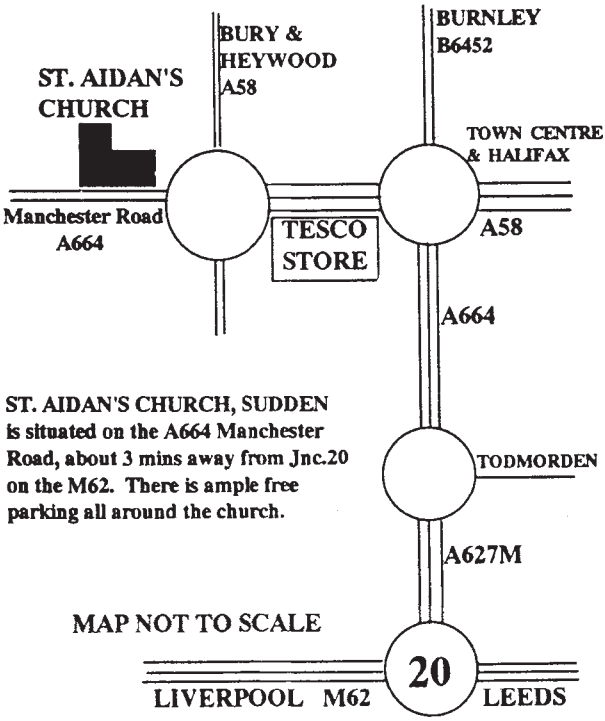
MINI-CONVENTION 1993

The Northern Gathering of the G QRP Club

SATURDAY OCTOBER 16th

10.00am to 5.00pm

St. Aidan's Church Hall, Manchester Road, Rochdale, Lancashire
Admission £1 : Doors Open at 10am : Talk-in on S22 from 9am



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A DUAL BAND CRYSTAL MIXER & ANCILLARY CIRCUITS FOR THE CHERITON TRANSCEIVER OR OTHER 9MHz I.F. TRANSCEIVERS

Graham Adcock, G4EUK, 120 West Way, Lancing, West Sussex, BN15 8NB

G3ROO's Cheriton transceiver has been around for a while now but is still an excellent set.
I built one back in 1989 and learnt a terrific amount about radio and particularly SSB in the process, the unit being 'improved' as my experience developed.

I thought I'd add a digital dial simply reading the VFO frequency but the 20m/80m 5 MHz VFO and 9MHz filter band imaging set-up has one disadvantage - the VFO swings from 5.0 to 5.5MHz on 20m but from 5.5. to 5.0MHz on 80m.

One solution is to use a different local oscillator scheme putting the L.O. above the filter frequency (some might well say where it belongs!).

A crystal mixer circuit is employed, utilising the 5MHz VFO but mixing with 7.5MHz to give 12.5MHz for 80m and with 18MHz to give 23 MHz for 20m.

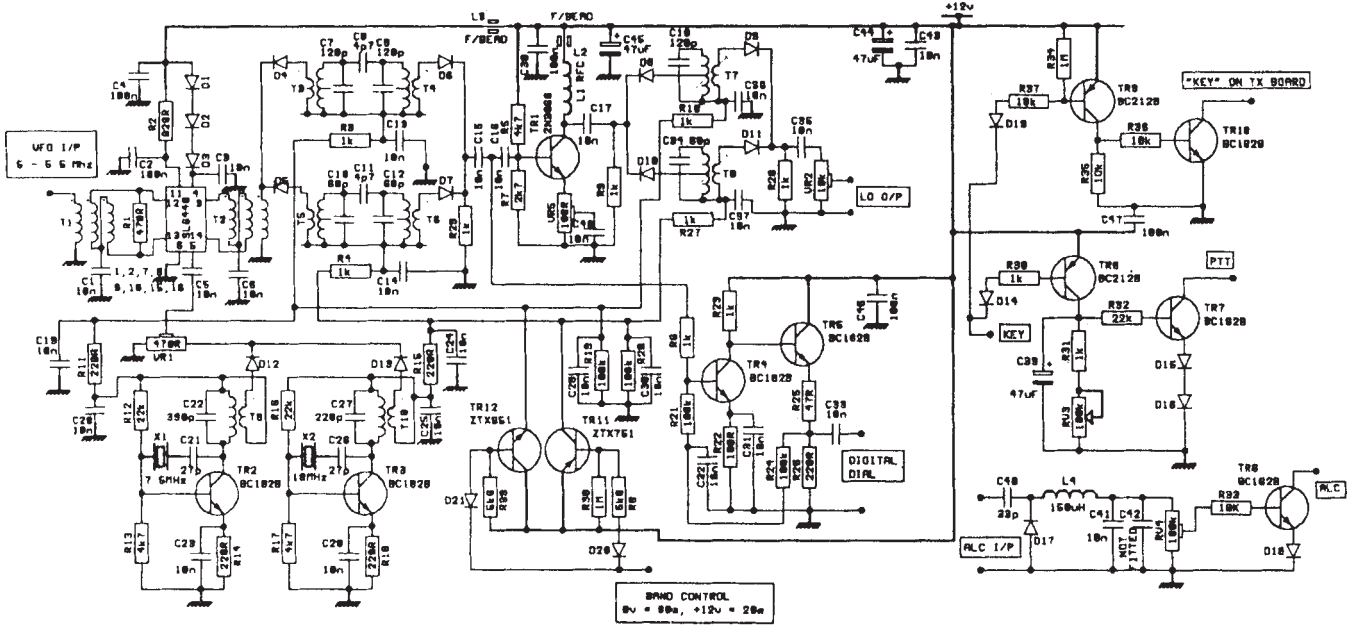
The circuit is basically Ian's circuit for the Kitten project from SPRAT 65 and consists of a pair of crystal oscillators, a mixer and an amplifier. As it was for a specific project, I've added some extra bits for keying, TX/RX control and a simple ALC circuit all of which were used on my Cheriton but built 'ugly style on scraps of PCB.

One of two crystal oscillators is diode selected and feeds into a Plessey SL6440 High level mixer. The Cheriton VFO feeds into the other port and the resultant signal is filtered by a top coupled band pass filter. The signal is then amplified by a 2N3866 and further filtered. A digital dial drive amplifier is also included.

Band selection is by a control line.
Ov for 80m and +12v (or o/c) for 20m.
VR1 sets the level to the mixer - approx 150mv p/p.
VR2 sets the output level to the Cheriton's mixer (an SL6440, so about 150mv p/p again).
VR3 is in my case a rear panel mounted pot which sets up the delay between key up and the transceiver returning to the receive mode.
VR4 sets the ALC level - The ALC pad goes to the 10k Ohm ALC resistor on the Cheriton's tx amplifier.
VR5 sets the gain of the 2N3866 stage if necessary. (Watch for instability!!)
The BC182B transistors used have a fairly high Ft but BSX19/20, 2N3904 or similar devices might be better. (Mine uses BC182B's).

The digital dial I used was one offered by the Club a while back. This is capable of reading the LO frequency direct and giving the 'kHz' figure directly. (I hopefully know which band I'm on!) There is the possibility of reading the VFO frequency directly as the tuning is now in the same direction for both bands but the accuracy is lost without some very careful trimming of the crystal oscillators.

I used a computer grade crystal for the 18MHz oscillator but found it to be 20kHz high. The 7.5MHz unit came from KcKnight Fordahl and was spot on.



CIRCUIT DIAGRAM - DUAL BAND CRYSTAL MIXER + CONTROL CCTS
CHERITON DUAL BAND TX/RX G.A. Dec 1992.

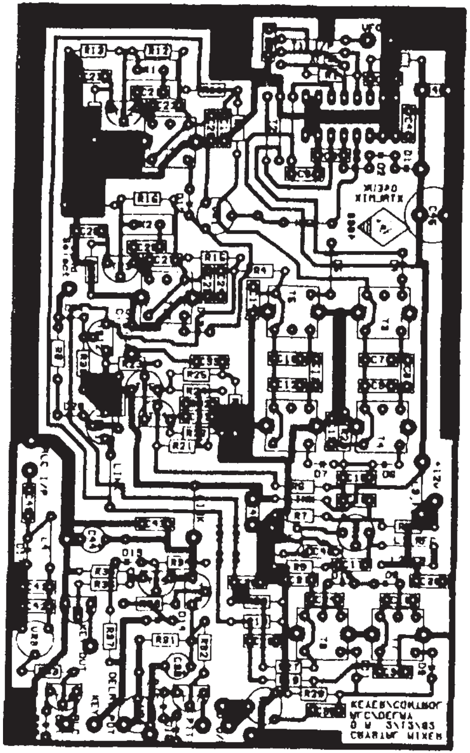
CRYSTAL MIXER PARTS LIST

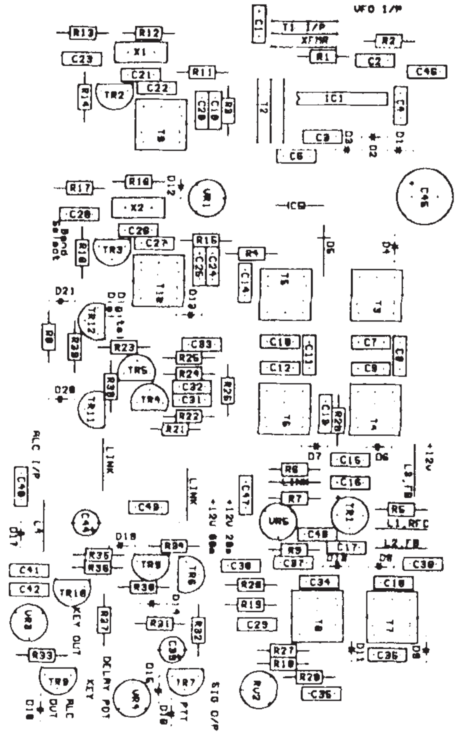
R1	470R	C12	68p
R2	820R	C13	10n
R3	1k	C14	10n
R4	1k	C15	10n
R5	4k7	C16	10n
R6	1k	C17	10n
R7	2k7	C18	120p
R8	5k6	C19	10n
R9	1k	C20	10n
R10	1k	C21	27p
R11	220R	C22	1nF
R12	22k	C23	10n
R13	4k7	C24	10n
R14	220R	C25	10n
R15	220R	C26	27p
R16	22k	C27	220p
R17	4k7	C28	10n
R18	220R	C29	10n
R19	100k	C30	10n
R20	100k	C31	10n
R21	100k	C32	10n
R22	100R	C33	10n
R23	1k	C34	68p
R24	100k	C35	10n
R25	47R	C36	10n
R26	220R	C37	10n
R27	1k	C38	100n
R28	1k	C39	47uF 16v Radial
R29	180R	C40	33p
R30	1k	C41	4700p pol
R31	1k	C42	100p cer (NOT FITTED)
R32	22k	C43	100n
R33	10k	C44	100uF 16v
R34	1M	C45	47uF 16v
R35	10k	C46	100nF
R36	10k	C47	100nF
R37	10k		
R38	1M	TR1	2N3866
R39	5k6	TR2	BC182B
		TR3	BC182B
C1	10n	TR4	BC182B
C2	10n	TR5	BC182B
C3	10n	TR6	BC212B/ZTX751
C4	100n	TR7	BC182B/ZTX651
C5	10n	TR8	BC182B
C6	10n	TR9	BC182B
C7	120p	TR10	BC182B
C8	4p7	TR11	BC212B
C9	120p	TR12	BC182B
C10	68p		
C11	4p7		

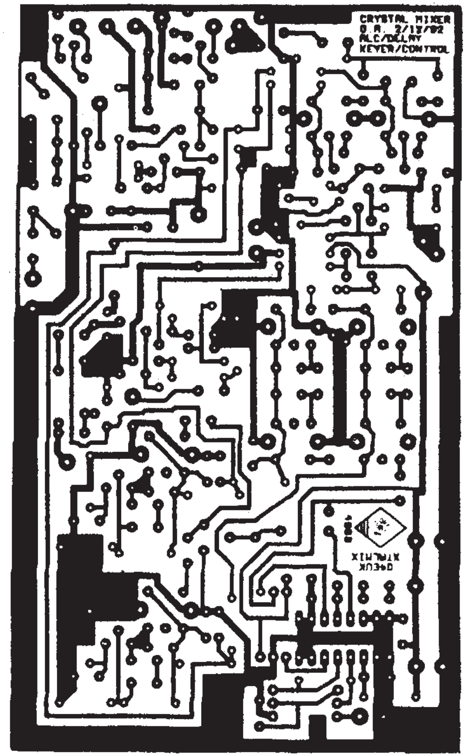
T1	10t Trifilar FX1115
T2	10t Trifilar FX1115
T3	KANK3335
T4	KANK3335
T5	KANK3335
T6	KANK3335
T7	KANK3335
T8	KANK3335
T9	3+3+3+3:1 on Toko 10k former
T10	2+2+2:1 on Toko 10k former
L1	RFC 10t Ferrite bead FX1115
L2	1t FB FX1115
L3	1t FB FX1115
L4	150nH
lk 1	Ferrite beaded link
lk 2	Ferrite beaded link
lk 3	Ferrite beaded link
D1	1N4148
D2	1N4148
D3	1N4148
D4	BA482 Schottky
D5	BA482 Schottky
D6	BA482 Schottky
D7	BA482 Schottky
D8	BA482 Schottky
D9	BA482 Schottky
D10	BA482 Schottky
D11	BA482 Schottky
D12	BA482 Schottky
D13	BA482 Schottky
D14	1N4148
D15	1N4148
D16	1N4148
D17	1N4148
D18	1N4148
D19	1N4148
D20	1N4148
D21	1N4148
VR1	470R
VR2	10k
VR3	100k
VR4	100k
VR5	100R
IC1	SL6440 Plessey High Level Mixer

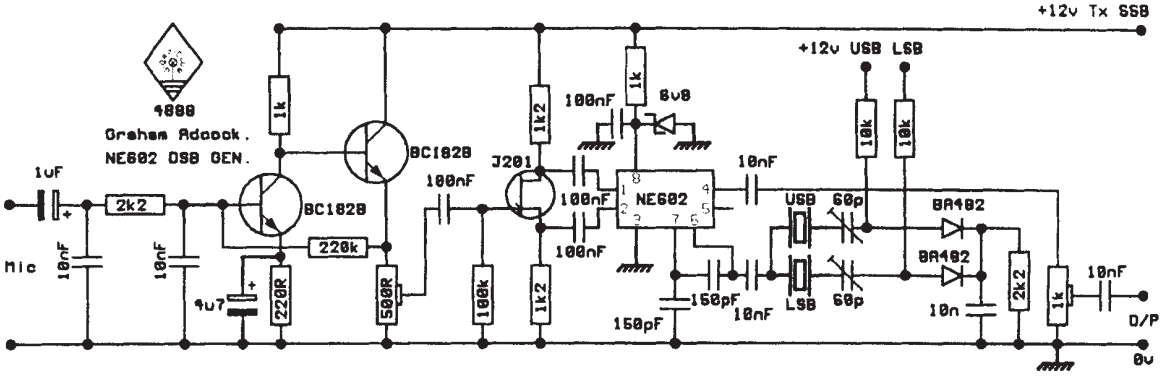
Board Dimensions.....

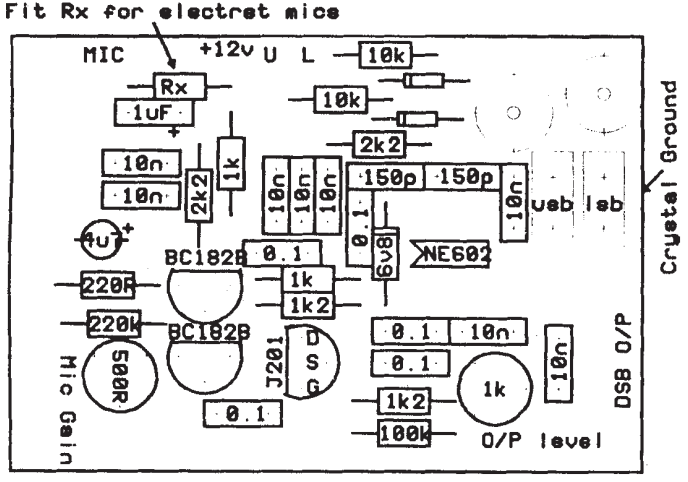
5.65 x 3.45 inches.
146 x 88 mm

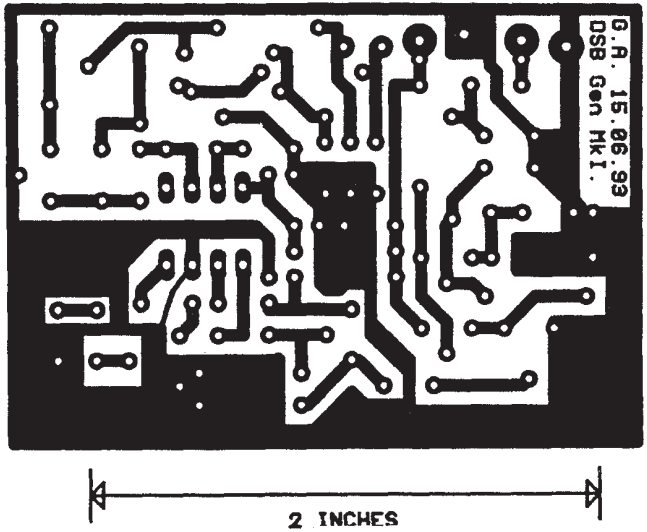





CRYSTAL MIXER
ALC/DELAY
KEYER/CONTROL


+12v Tx SSB
+12v USB LSB
1888
Graham Adcock.
NE602 DSB GEN.
1uF
Mic
10nF
2k2
10nF
4u7
220R
1k
BC182B
BC182B
220k
100nF
500R
100k
J201
1k2
100nF
1k2
100nF
NE602
8v8
1k
10nF
150pF
150pF
10nF
USB
LSB
60p
60p
10k
10k
BA482
BA482
10n
2k2
1k
10nF
O/P
0v


Fit Rx for electret mics
MIC
+12v U L
Rx
1uF
10k
10k
2k2
10n
10n
2k2
1k
10n
10n
10n
150p
150p
10n
usb
lsb
Crystal Ground
4u
BC182B
0.1
6v8
NE602
220R
1k
1k2
220k
BC182B
0.1
10n
0.1
10n
J201
D
S
G
500R
1k
1k2
100k
0.1
Mic Gain
O/P level
DSB O/P


G.A. 15.06.93
DSB Gen Mk1.
2 INCHES

A DSB GENERATOR USING THE NE602

FOR THE CSP OR OTHER TRANSCEIVERS

Graham Adcock, G4EUK, 120 West Way, Lancing, West Sussex, BN15 8NB

I don't remember seeing the NE602 used as a Modulator before and having had problems with the diode version on the CSP I thought I'd try it out.

The mic amp is plagiarised from the CSP with a phase splitter employed to drive both inputs of the NE602. Distortion was experienced it if was driven single endedly. The FET could be replaced by a bipolar device with, say, a pair of 22k's for base bias.

Pin 4 is used for outputs there was considerable carrier leakage on pin 5.

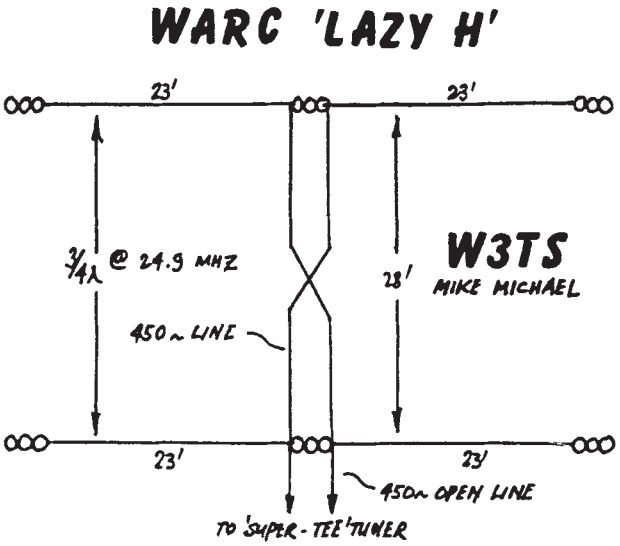
Carrier suppression is of the order of 40dB. I tried unsuccessfully to improve the balance of the NE602 with dc adjustment. It certainly seems to work well and I've had good audio reports using it with the CSP. Output is approx 700mv.

This particular version has USB and LSB facilities, diode switched by applying +12v. About 12k should do for 10mm electrets. Reverse the polarity of the input cap! Don't forget a 2k2 switching bias resistor on the output if using it with the CSP.

THE LAZY H WORKS FOR ME

Mike Michael, W3TS, POB 593, Church Lane, Halifax, PA 17032-0593

During the 1993 Winter Sports I first used a 10 Mhz dipole with open-wire feeder on the hf bands. It would put a signal across the Atlantic, but I was not happy with its performance. Looking for something better I remembered the Lazy H, and soon had the antenna shown in the diagram up on my tower. Using a Super T tuner it proved far better than the dipole on the WARC Bands, and almost as good as my A3 tri-bander on 14 MHz. Tests also showed it to be a good antenna on 7 and 3.5 KHz, so it seems very versatile and well worth a try if one has sufficient height and space to be able to erect it.



THE MARK II CROSSFIELD ANTENNA

Alec Anderson, GD3HQR, 7 Howstrake Drive, Onchan, Isle of Man

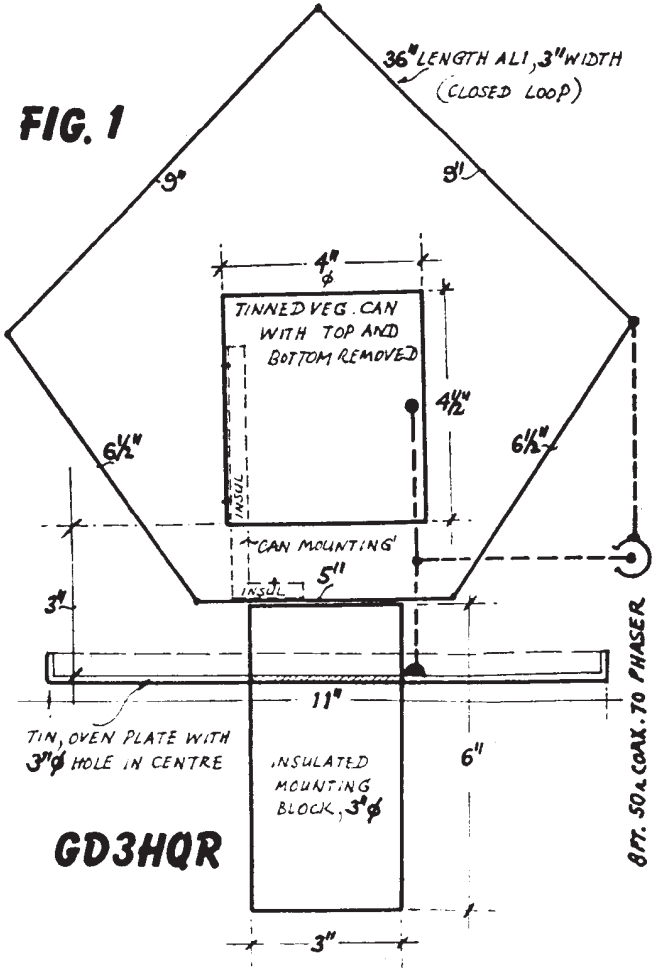
The general construction of the antenna is shown in the diagrams. Although the antenna does not show directivity at hf, the loop shape adopted allowed TV time base noise from a set in the next room to be nulled out. The phasor is similar to that used in previous models of the antenna. If a valve rig with a tuneable pi section output is used, the L-network may not be necessary, but it is essential when using transistor rigs with fixed-tuned half wave filter outputs. When tuning the loop, first approximately resonate the L-network by adjusting it for maximum received signals on the desired band. Then, using low power, adjust C2 in small steps, at each step adjusting C1 and the L-network tuning for minimum swr. When the position of lowest swr is found, note the settings for future use. Repeat for the other bands. Note C2 requires less capacitance at lower frequencies, and more at higher frequencies. When properly tuned the swr on my model did not exceed 1.5:1 in the worst case.

Note that on 3.5 and 1.8 MHz covering the whole band will probably require the phasing capacitors and L-Network to be re-adjusted. also that placing a 1m square sheet of metal (NOT earthed) under the wooden base improves high angle radiation for short skip contacts on 3.5 and 7 MHz. Finally, do make sure that no dc earth is connected to the co-axial cable used to connect the L-network to the phasor (it has a capacitive rf earth, which is all that is required). My model is used indoors, six feet above the floor. I find it very good from 7 MHz upwards, quire useful on 3.5 MHz, and able to obtain the odd QSO on 1.8 MHz. Not bad for such a tiny antenna!

(Having been able to listen to this antenna during a fairly long QSO on 7 MHz one can vouch for its effectiveness G8PG.)

THE PHOTOGRAPH

Shows a version of the CROSSFIELD ANTENNA as built by Mac, G3FCK, who does our SPRAT Artwok



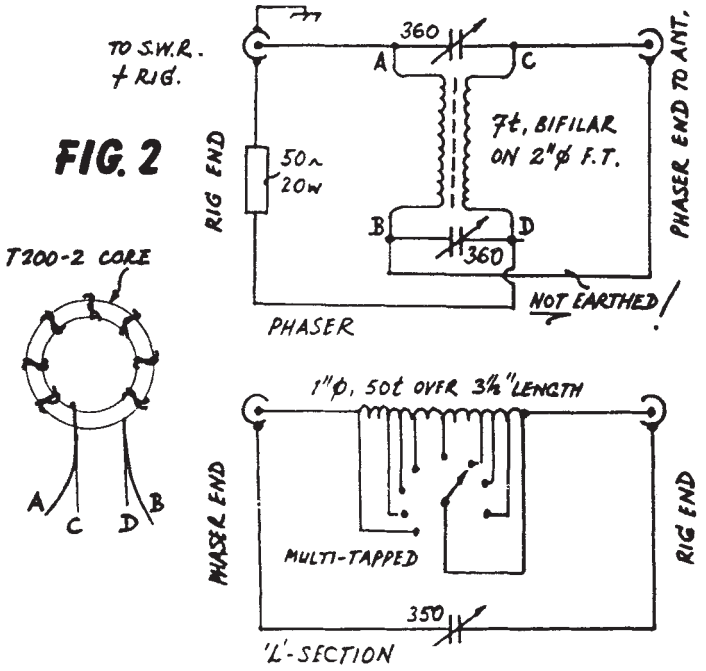


FIG. 2

CROSS — FIELD ANTENNA

CROSSFIELD ANTENNA AS BUILT BY MAC, G3FCK [OUR SPRAT ARTIST]

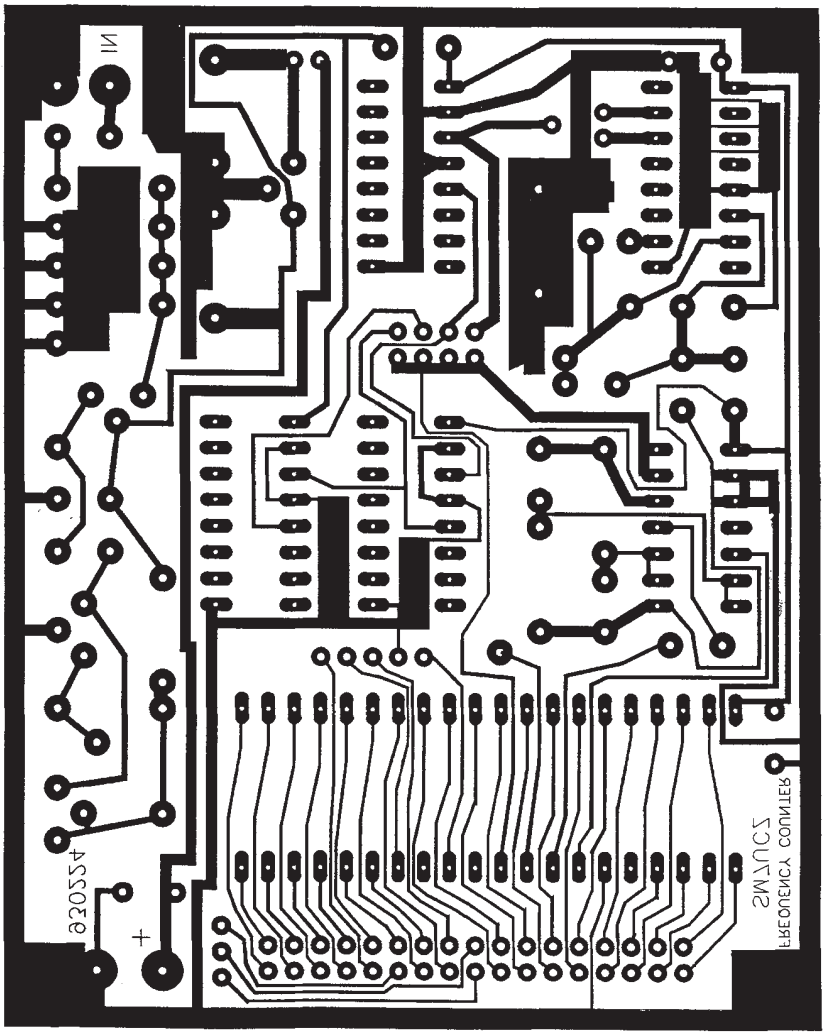
FREQUENCY COUNTER USING THE THE 7224 CHIP

Johnny Apell, SM7UCZ, EKEDALSVÄGEN 11, S-373 00 JÄMJÖ. SWEDEN

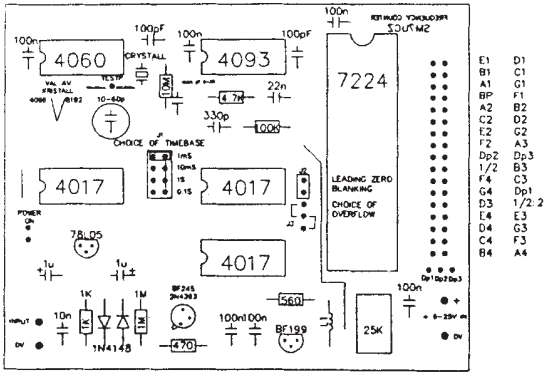
This is a 4½ digit counter with LCD display. The counter draws 15mA of which 13mA is from the two transistors. The sensitivity is about : 25mV to 5MHz, 50mV to 10MHz, 80mV to 14MHz and 300mV at 19MHz. My version worked to 23.5MHz : the factory guaranteed 15MHz for the ICM7224 but say most will work to 25MHz [naturally you lose the "2" over 20MHz]

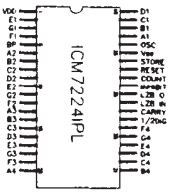
The transistor, 2N4393 was in my junk box : I tried the BF245 and BF246 but the sensitivity was halved. Adjust the trimpot, R5, for best DC level for the input to the 7224. The counter is very useful for DC receivers.

I have all the drawings on AutoCad ver 12. if they are required : please send postage or IRCs



79.5mm





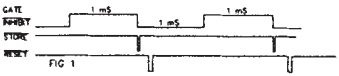
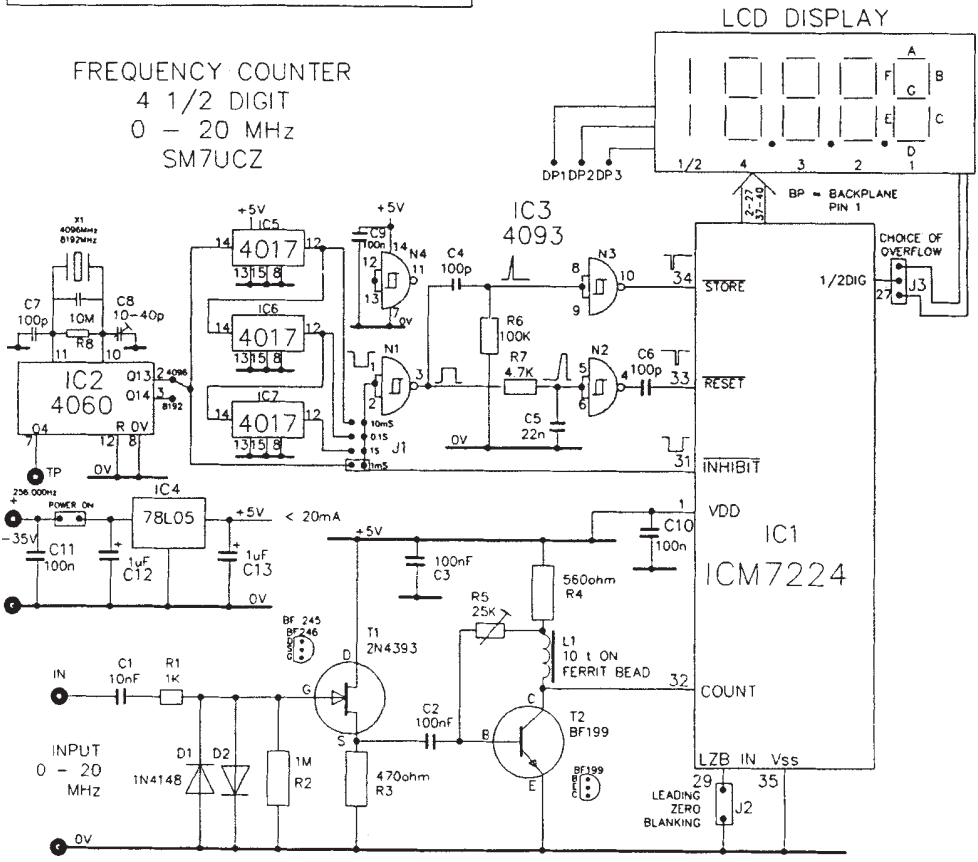


FIG 1

FREQUENCY COUNTER
4 1/2 DIGIT
0 – 20 MHz
SM7UCZ

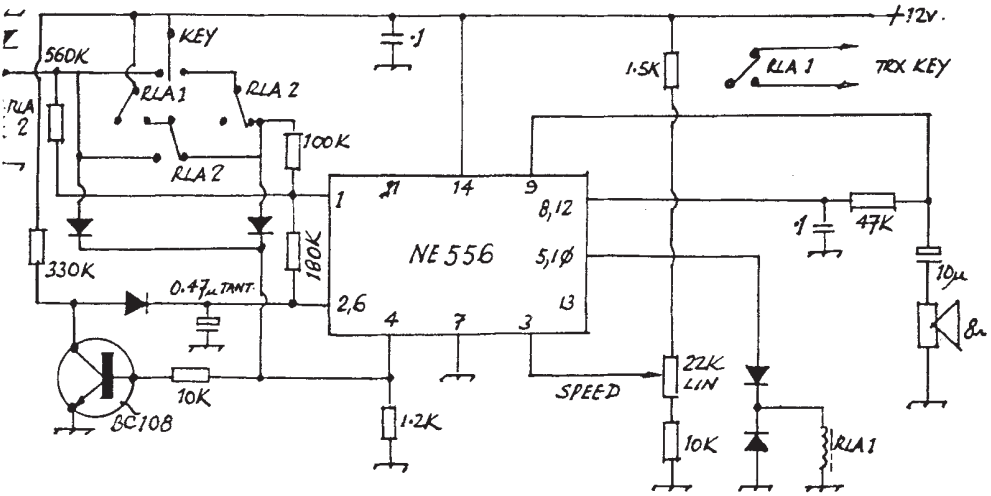


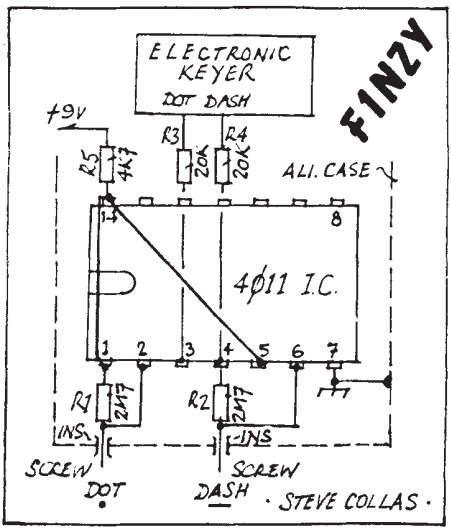
CW KEYER AND SIDETONE

Peter Howard, G4UMB, 188 Dashwood Ave. High Wycombe, HP12 3DD

CIRCUIT DESCRIPTION

Anyone familiar with the NE556 type IC will see how the timer circuit works but perhaps the circuitry around the transistor needs a little explanation. The 0.047uF Tant capacitor is held charged up by the 330k resistor and Transistor is switched off. This ensures that the first character is the same length as the rest. Pin 4 of the IC is kept low by the 1.2k resistor which stops it oscillating in the absence of a keyed movement. You can alter the dot Dash ratio by adjusting the values of resistors 560k (Dash & 100k Dot) The circuit can be further simplified by making it a fixed speed by removing the components connected to Pin 3 namely the 22k pot and the 1.5k & 10k resistors. The speed then becomes about 12 wpm. Adjustment of the 180k Resistor between pins 2+6 & 1 will alter the speed. An even more basic circuit can be built around an NE555 where the sidetone can be a piezo sounder fitted across the Relay coil RL.





SIMPLE TOUCH KEYER

Steve Collis F1NZY

This is a very simple but useful touch keyer circuit which has probably been described before. It requires just 5 resistors, 2 screws and a 4011 CMOS chip. Touch the box with one hand and the screws with the other and enjoy the digital key.

R5	4K7
R1,R2	2K7
R3,R4	20K
IC	4011 [CMOS]

THE TOKY VFO

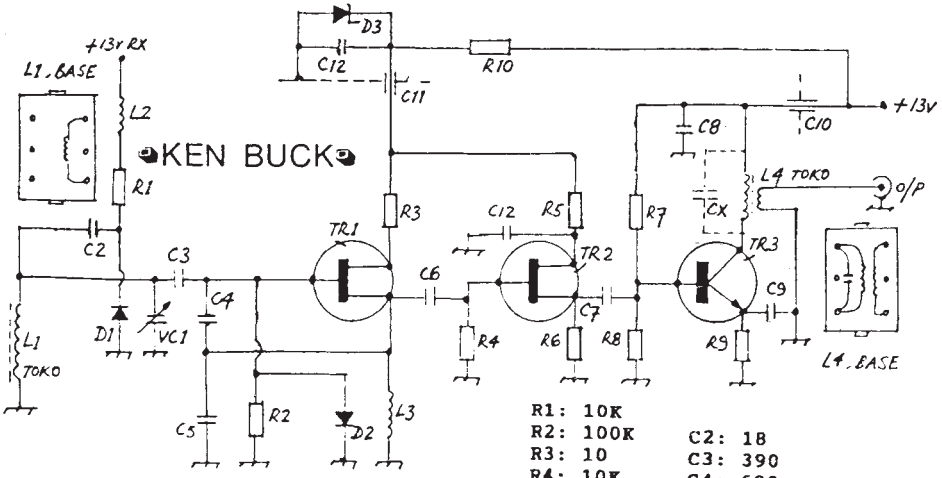
Ken Buck, 112 Fairfax Av. HULL. N. Humberside. HU5 4RB

The oscillator is the ages old parallel tuned Colpitts with a TOKO inductor. A TOKO IF transformer is the collector load of RF amp. TR3. Capacitor CX is an integral part of L4.

SOME FACTS AND FIGURES;

An ex equipment former was first tried for L1 and produced several unwanted signals close to the fundamental. Other out of band signals were noticed at unexpected frequencies. This was found to be the tuning slug of unknown material. There should be no such problems with the TOKO coil and the VFO output is clean. A schottky diode is used as a varicap for receive offset. On transmit, C2 and D1 are effectively in series. When receiving, D1 is reverse biased and C2 becomes parallel. The combined capacitance is the shunted across the tuned circuit and gives an increase in frequency, taking the VFO signal out of the receiver's passband. A BB105 varicap was tried but the VFO could still be heard. This component is now obsolete and the new replacement version gave similar results as did a 1N4148. The fitting of a BAT85 produced superior results and a 6KHz shift was noted. It may be worthwhile trying other more easily available types.

The circuit can be refined to RIT. 3KHz of offset is all that is required. Reduction in value of C2 may be necessary for alternative diodes. VC1 is a junk box 'lucky dip' component - a Jackson C804 of unknown value. Vanes were removed and the frequency coverage compared against a 10pF trimmer which gave a coverage of 130KHz. Further doctoring resulted in a coverage of 90KHz. A 5pF VC produced 30KHz range and this value would be a good choice if interest lies only on 7030 and adjacent frequencies. The results indicate an ideal value for VC1 of 7 or 8pF. To set up the VFO, fully mesh VC1 and adjust L1 slug with a plastic tool to about 6996. Tune to 7030 and peak L4 with RF meter. The slugs are self locking so no need to seal them.



TOKO INDUCTORS
L1 - KACS 35160
L4 - KACS 35873
L2 - 4.7UH FL4 Series
L3 - 100uH .. ..

R1: 10K
R2: 100K
R3: 10
R4: 10K
R5: 68
R6: 820
R7: 12K
R8: 6K8
R9: 270
R10: 100

C2: 18
C3: 390
C4: 680
C5: 680
C6,7,8: .01
C9: .22
C10,11: FT
C12: .1
VC1 5/10p

·TOKY 40M VFO·

VARIABLE OUTPUT FROM THE FT-7

Walter Farrar, G3ESP, 1 Barnsley Rd. Ackworth, PONTEFRACT. WF7 7BS

In SPRAT No. 67 there was an article by me on getting QRP CW from an SSB transmitter. Since that was written I have devised a simpler and more convenient method, utilising the existing circuitry of the FT-7, plus a simple external addition.

This transceiver has an ALC (Automatic Level Control), to prevent the PA transistors from overheating. If the ALC line can be manually controlled, the power output can be varied at will. A look at the (complex) circuit diagram shows that the ALC line is connected to an unused pin (no. 3) on the Power Connector. The ALC line can therefore be accessed via pin No. 3 of the socket on the power cable. The total addendum can be seen in the diagrams. Increased positive voltage on pin No. 3 reduces the power output; reduced voltage increases it. In order to prevent the power output increasing beyond its designed level a 1K8 resistor is included as shown. A miniature DPST toggle switch is included to isolate pin No. 3 from the applied voltage, so a quick flick switches between the QRP and "QRO" (10W!) states. A miniature panel lamp shows when the switch is in the QRP mode (I used a 6V 0.1A lamp in series with a 100 ohm wirewound resistor).

Having completed the job and mounted the device on top of the case, above the Mic. Gain, using existing threaded holes for fixing, I tuned around 14.060 MHz on a Saturday afternoon and set the power out at 2 watts. Almost immediately I had a QSO with a G-QRP-C member in Warsaw (SP5SDA) with 559 both ways. Since the power can be turned down to zero, I look forward to some interesting experiences (miles per milliwatt??).

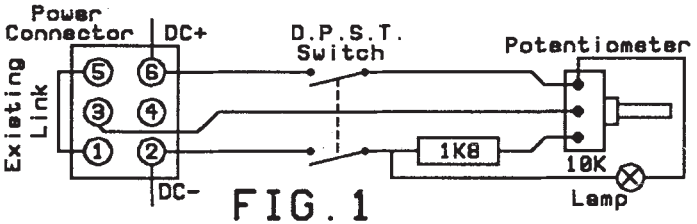


FIG. 1

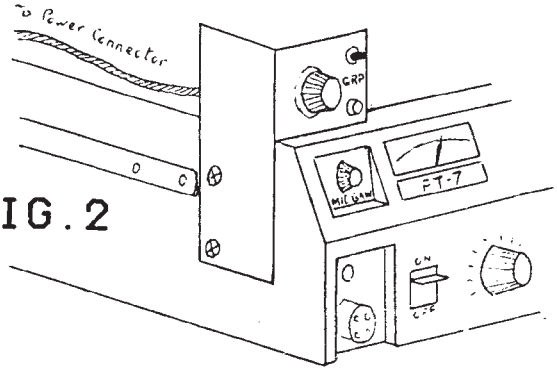


FIG. 2

☹ SPRAT MAILING PROBLEM : ISSUE 75 ☹

A problem with the club database resulted in a number of members [most of whom were in the 7000+ series] being missed from the mailing list for SPRAT 75. We believe that this has been rectified and all the members have received their issue 75. We are sorry for the inconvenience. Should any members know of other members who did not receive issue 75, please contact G4WZV

Dave Aizlewood, G4WZV, 36 King Street, Winterton, Scunthorpe. S.Humberside DN15 9TP.

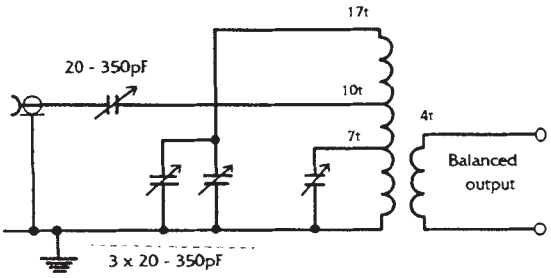
HF SINGLE COIL 'Z-MATCH' ATU

Peter Linsley G3PDL 12 Cambridge Crescent, Brookenby, Lincoln. LN3 6HB

"I wonder if ..." doesn't often produce the desired results but this time it did! The thought was provoked by a Technical Topics article in RADCOM for August 1993. This described a single coil Z-match covering from 80 to 10m based on an idea by ZL3QQ and development work by VK3AFW and VK3OM. The original Z-match circuit covers the same range, uses a pair of coils and is inconvenient when changing from HF to LF bands. Being greedy I wanted to include 160m as well. The thought went something like "I wonder if a three gang capacitor and a little more inductance ....."

A shack full of the local QRP gang one evening provided the right environment to try it (or was the ale the driving force?). The mock-up tuned up my 132ft long doublet on all nine bands from 160m to 10m perfectly.

The coil, wound with 18SWG and diameter 55mm, has the first 7 turns spaced over 40mm and the top 10 turns spaced over 30mm. The output coupling coil, wound with 14SWG and diameter 65mm, is spaced over 40mm in length and placed over the earthy end of the main coil. The capacitors were small broadcast types as mine was intended for a small QRP portable ATU but with increased plate spacing the coil should be suitable for 200W or more *(did I really say that?)*.



There is scope for lots of experimenting. I don't know what range of output impedances it will match over the entire HF range. Perhaps a 6 turn output coil tapped at 3 turns and switched for high or low impedance would increase the range of impedances it could match without unduly complicating things. For QRP a SPST toggle switch would suffice. It is presented to generate interest and experiment rather than a completed project. It appears to be a versatile and efficient ATU with a balanced output free from baluns or an unbalanced output by earthing one side of the coupling coil. Give it a try and pass on your experiences to the rest of us.

G QRP CLUB WINTER SPORTS 1993

DON'T FORGET TO JOIN IN THE FUN OF THE WINTER SPORTS
GET ON THE AIR AND WORK AS MANY OTHER MEMBERS AS POSSIBLE
DECEMBER 26th to JANUARY 1st [Inclusive]
All QRP Frequencies Call " CQ QRP"
Logs to G8PG [See Communication Forum] before 1st February 1994
G4DQP Trophy and Certificates for Best Overall Contributions

MORE CHATTERBOX MODIFICATIONS

Ian Liston-Smith, G4JQT, 48 Swansea Rd, READING, Berks, RG1 8HA

Les Jackson's mods in Sprat Nr 74 for the excellent Practical Wireless "Chatterbox" transmitter reminded me of the mods I did to mine some time ago. These were mainly to improve the mod depth and stability, and may be of interested to other readers who have built this little rig. The values of components quoted worked well in my experience, but may well differ slightly with other layouts.

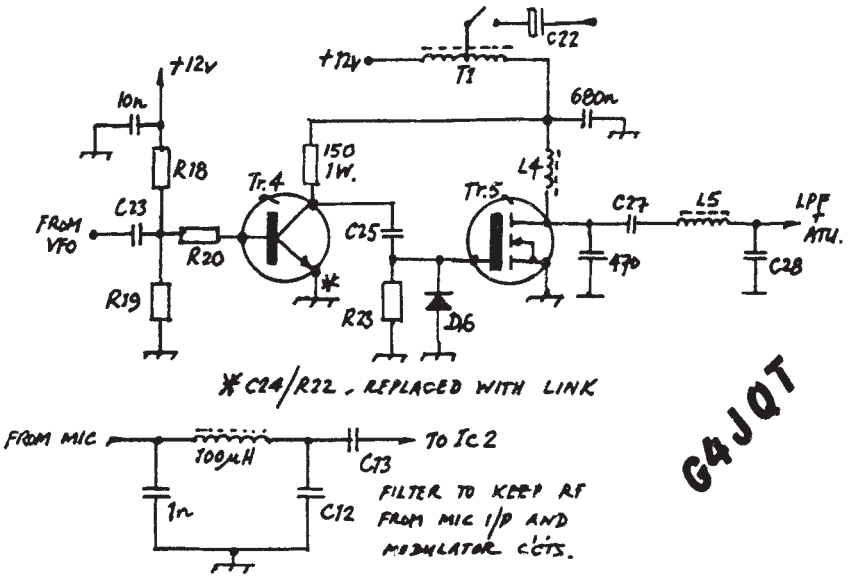
In the original circuit it is only possible to achieve about 60 - 70 percent modulation. This can be increased to nearly 100 percent by bringing the 12 volt end of R21 to the top of L4, thus extending the modulated supply to the collector (but not the base) of driver transistor TR4. To improve stability ad modulation quality under all load conditions, remove L3 and reduce the value of R21 to 100 - 150 , but increase its rating to 1 watt and replace R22/C24 with a wire link. To remove the possibility of unwanted RF reaching the biasing of TR4, solder 0.01 uF from the 12 volt end of R18 to earth. I also found that with no drive to the PA during receive, any knocks to the microphone produced voltage transients at the modulation transformer which "kicked" the PA into producing bursts of RF. This was completely cured by removing C26 and soldering a 680 nF capacitor directly between earth and the tag of the modulation transformer leading to L4. While still in the PA section, a 470pF capacitor from the drain of TR5 to earth produces a much "cleaner" output. A ferrite bead on the gate is probably a good idea too. Incidentally, L5 (T50-2, not T50-12!) is quite critical and it is worth adding or subtracting a couple of turns to peak the output in the part of the band of most interest. Don't forget to use a low pass filter on the output!

Now to the modulator section. To increase the gain here if you have a low output microphone, change C14 to 100 uF. I found that with no drive to the PA and no audio input, the modulator tended to oscillate very strongly at about 30 Hz, leading to the over heating IC3! This seemed to be satisfactorily cured by increasing R16 to 4.7 k ohms. Any other tendency towards instability in this section may be helped by putting a Zoble network (4.7 ohm in series with 470 nF) between pin 4 of IC3 and earth, although in practice this did not seem necessary. C17 affects the audio frequency response and can be increased to 280 pF - 470 pF if the rig sounds too "toppy". If the microphone sounds a little "thin", this can be improved by increasing C22 to 1000 uF (or more) to improve bass response slightly. To prevent RF from reaching this section via the mic lead, the little RF filter shown (added just before C13) does the trick.

Although not originally designed for CW, I have successfully used it in this mode by disconnecting the 12 volts from all AF sections and removing C22 from the mod transformer (T1). All this can be done with one double pole switch. The capacitor (C22) can be left, but since the PA current still passes through T1 during keying, C22 produces a very odd keyed envelope as it charges and discharges across D4/D5! The key can be inserted in the emitter of TR4 - with a capacitor resistor combination to give the required keying characteristics.

I have successfully used this little rig with a full wave loop aerial held aloft with a kite - and help from G4VSQ - which provided contacts all round Southern England during daylight.

If anyone else has modifications for this rig I would be interested to read of them in the pages of Sprat.



BAD HW-8 OUTPUT CORES

Michael Czuhajewski WA8MCQ 7945 Citadel Dr. Severn, MD 21144

Do you have an HW-8 which has low output on 80 and/or 40 meters? When all else fails, cast an evil eye on the ferrite cores in the output networks on those bands. This was presented in more detail in my article in the QRP Quarterly in the October 1992 issue and in QST (Hints & Kinks) in April 1993, but the bottom line is that the permeability of the cores can shift, increasing the inductance and throwing off the tuning network. The cores used are type FT37-63 and FT50A-63 for 80 meters, and a pair of FT37-63's for 40 meters. (The other bands use powdered irons, which are more stable and do not exhibit this problem.)

The fix is simple- replace the suspect cores with fresh ones of type 63, or type 67, which is a replacement material. Wind the same number of turns as the original coils, although you may have to add or remove a few due to variations in the new cores. Warning - do not substitute other materials, even if you scale the number of turns to get the p roper inductance, or pull turns off the original cores to restore the inductance. I tried both, and neither worked properly.

This is not an isolated occurrence - there are now 8 HW08s in the world which work properly after the owners took my advice and replaced the cores.

By the wry, the HW-9 output network is a high impedance circuit, and can develop surprisingly high voltages. The highest is seen on 80 meters, and can exceed 400 volts peak to peak. You can confirm this with a high impedance scope or by touching one end of a neon bulb to the rotor of the output tuning capacitor.

UB40 JIG : POORMAN'S SOLDERING AID

Peter Mcbeath, 12A Priors Walk, Morpeth, Northumberland

I suppose all of us who do any "home brew" have chased the circuit boards across the table trying to solder the bits together and holding the components in place with the teeth. The device described saves the dental anxiety and the 3rd Degree finger burns.

You need:

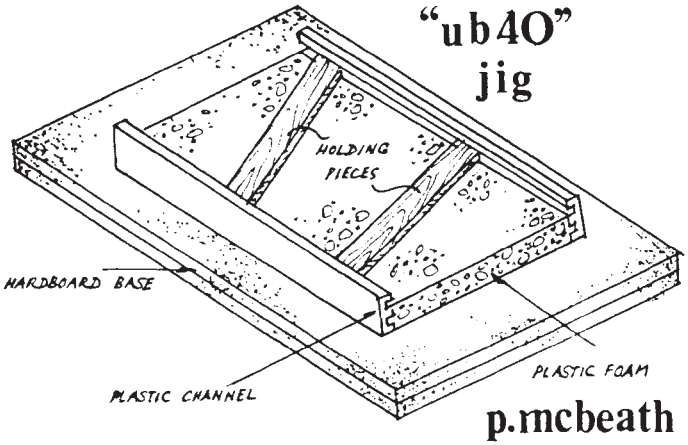
Two pieces of hardboard 8" x 5" with a cut-out in one piece of 5 1/4" x 2 3/4".
Two 6" pieces of plastic double channel used for sliding doors 3/4" x 5/16".
One piece of plastic foam 6" x 3" x 1/2" thick.
Two pieces of wood 1/4" thick to fit in channel x 1/2" wide x 3 1/2" long.

1. Cut the opening in one piece of hardboard, or if you haven't a fretsaw make four pieces to fit around this size.
2. Glue this/these to the other piece of hardboard.
3. Glue the two pieces of channel on each long side of the opening with the grooves facing inward.
4. Put the plastic foam in the cut-out.

Having assembled the jig, put the components, a few at a time through the circuit board, with a heat shunt where necessary, turn upside-down on to the plastic foam, put the two holding pieces of wood across the board into the channel to hold everything in place, and the solder.

The indented underside of the hardboard stops the jig sliding about, but the extra length is useful to clamp the jig to the table if this becomes necessary.

Try not to drop the soldering iron onto the plastic foam, as you could be banned from the kitchen and finish up with the extension lead and soldering iron at the bottom of the garden.



THE MICHIGAN QRP CLUB 14th ANNUAL CW CONTEST

1200 gmt on January 1st 1994 to 2359 gmt on January 2nd

An open-to-all QRP event following the Winter Sports

FULL DETAILS IN G3RJV QRP COLUMN IN RAD COM or send an SAE to G3RJV

YALATU [YET ANOTHER L. ATU]

Peter Brodribb, 20 Ipswich Road, Debenham, Stowmarket, Suffolk, IP14 6LB

This ATU has been in use for a number of years on all HF bands. It can feed balanced or unbalanced loads. My present antenna is 95 ft end-fed. At a previous QTH it fed a Doublet. If unbalanced operation only is required the balun L3 and switch may be omitted.

Fig 1 shows that the inductor is in two sections. L1 for fine tuning is useful at higher frequencies and consists of 10 turns, 3/4 in diameter, 22 SWG. The length of L1 will depend upon the circumference of the pinion wheel, One full turn of the pinion allows the ferrite rod to be fully inserted or withdrawn. The rack and pinion were salvaged from a Meccano set but similar items should be available from a model (toy) shop. Construction details and any other method of sliding the ferrite core are left to the ingenuity of the constructor.

L2 consist of 36 turns, 22 SWG wound on an Iron Dust toroid T106-2. The tappings will depend upon the number of switch positions.
For a balanced load, the balun L3 consists of 6 turns trifilar wound on a 2 in. length of ferrite rod.
If the load is exceptionally low impedance, C may be moved to the input. The Mark 1 ATU switched C between input and output but the input position has long been discarded because it was never used.

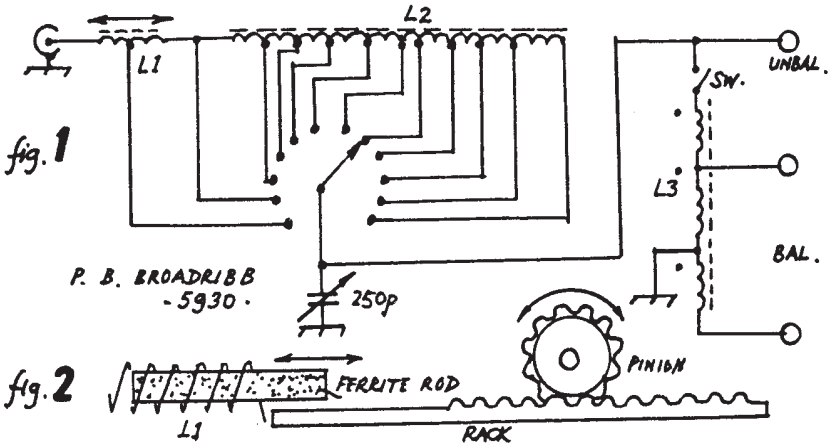


fig. 1

fig. 2

RENEWING SUBSCRIPTIONS 1994

The next issue of SPRAT will contain renewal details for 1994
Currently the club is paying over £1,000 a year bank charges !
This is because we are a 'very active' account. Lots of small amounts are paid in.
WE CAN SAVE MONEY BY INCREASING THE NUMBER OF STANDING ORDER PAYMENTS FOR UK SUBSCRIPTIONS
THINK ABOUT PAYING BY STANDING ORDER FOR NEXT YEAR

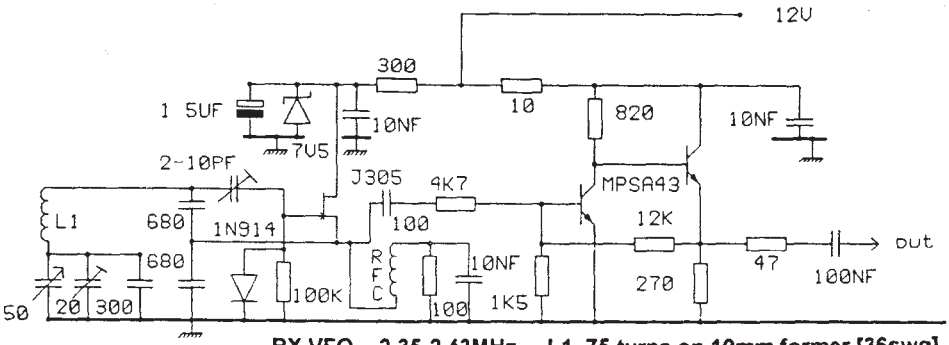
THE SUPER 40 RECEIVER

Richard Cook, G4XHE, 3 Pyecombe Ct. Bewbush, Crawley, RH11 8UF

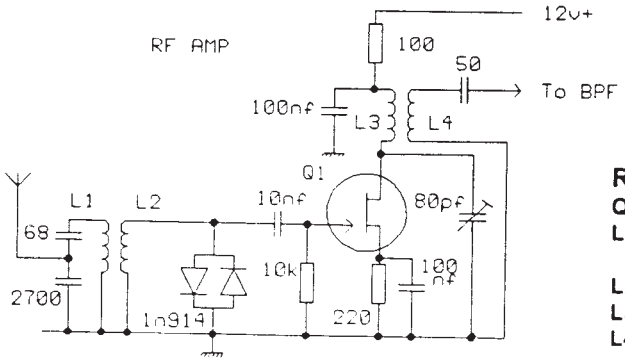
This is a 40 metre receiver built with junk box parts which I call the SUPER 40. Several members I have worked on the air have enquired about the circuit. The IF is 9.4322 MHz owing to the fact there were some crystals in the junk box. Not the best idea as the 3rd harmonic of the VFO falls in band at around 7.07 but as there are no CW stations at that end of the band it does not spoil my enjoyment.

No doubt the IF frequency could be changed to suit available crystals, as can the VFO. The VFO is very stable and the 2-10pf trimmer should be adjusted for minimum capacitance consistent with reliable oscillation.

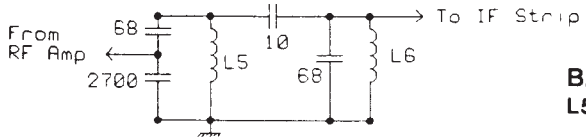
All parts except the 2 LM386 ICs came from the junk box. Note there are 2 LM386s : one acts as a agc amplifier. There may be a few odd transistors but there should be no problems in finding generic substitutes



RX VFO 2.35-2.43MHz. L1 75 turns on 10mm former [36swg]



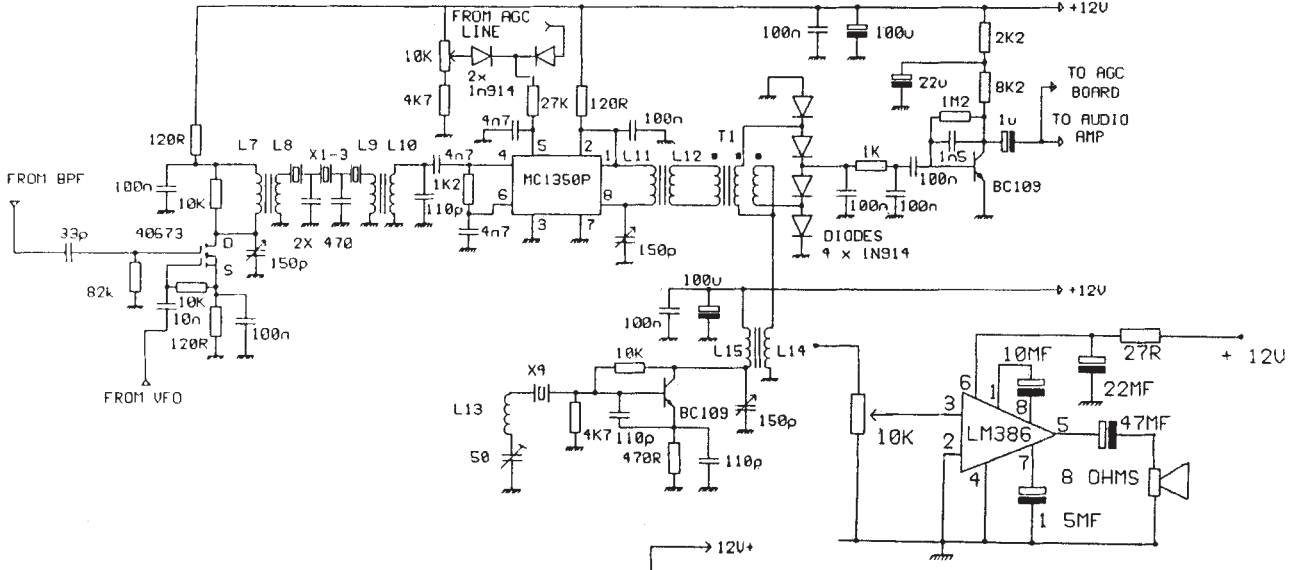
RF AMP
Q1 J110
L1 33t. 36swg on 7mm former slug tuned
L2 4t. over L1
L3 42t. on T68-2
L4 12t over L3



BANDPASS FILTER
L5 33t. on 7mm former slug tuned
L6 as L5

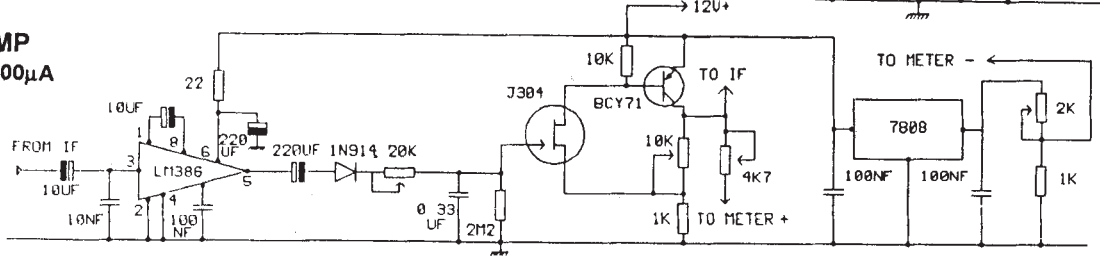
IF STRIP Inductors [Wire size is not crticial]

L7 pri 2.95uH, 25t. on T68-6 [49 cm of wire] L8 sec 3 turns over L7 L9 pri 6t. over L10
L10 sec 2.63 uH, 24t. on T68-6 [46 cms of wire] L11 sec 2.95uH [as L7] L12 pri 4t over L11
L13 45t. 36 swg on 7mm former-slug tuned.
L14 pri 6t. over L15. L15 sec 4.22uH, 30 t. on T68-6 [58 cm of wire]
T1 8 to 12 t. trifilar [3 wires twisted together] on a balun style core



AGC AMP

Meter : 100µA



A 10.7MHz SSB GENERATOR

Derek Pearson G3ZOM (JANDEK)

Fig 1 gives a block diagram of a system used to generate ssb. Audio from the microphone is amplified by a device known as a VOGAD (Voice Operated Gain Adjusting Device). This is an amplifier with AGC (Automatic Gain Control), so that its output signal is compressed, giving a higher average level; particularly useful for QRP work. The audio is then applied to a DBM (Double-Balanced Modulator) where it is mixed with a carrier from a CIO (Carrier Insertion Oscillator) to produce DSB (Double SideBand) and suppress the carrier. Output from the DBM is passed through a crystal filter to remove one of the sidebands, thus producing SSB (Single SideBand).

VOGAD (fig 2)

This function is performed by the SL6270C IC, the fet being added to provide a high impedance input. Low impedance microphones can be catered for by connecting a resistor of value equal to the required impedance across the input (shown as Rin). Capacitor Cd should be included across the input to decouple rf; its value ranging from 22nF for a 600ohm microphone to 100pF for a 100kilohm type. The sensitivity of the circuit can be controlled by adding a feedback resistor (Rf), maximum sensitivity being obtained when Rf is omitted. The value of Rf must not be less than 600ohms. High frequency roll-off is provided by C5. AGC attack and decay times are determined by C3 and R4.

CIO (fig 3)

This consists of two similar crystal oscillators and a shared buffer stage. Crystal frequencies are 10.7015MHz for lower sideband and 10.6985MHz for upper sideband, the required oscillator being selected by applying +12V to the appropriate supply pin (A or B). To set up the circuit, connect a 56ohm load resistor across the output of T1, set RV1 to mid-travel and adjust the core of T1 for maximum level across the output. RV1 should then be adjusted to give approximately 300mV rms output. Trimmers CT1 and CT2 are used to set the correct oscillation frequencies. Remove the load resistor when setting-up is complete. T1 is a TOKO type KACSK3892A and the three RFC's are each 3 turns of 30swg enamelled copper wire on a FX1115 ferrite bead.

DBM and FILTER (fig 4)

The DBM is the popular '1496' mixer IC, a favourite of mine because its performance can easily be controlled by the use of external resistors. The value of R3 determines the amount of audio input that can be handled, its value of 100ohms allowing up to 100mV peak (a value of 1k0 would allow 1V peak input). The buffer stage after the filter provides for a 50ohm output. T1 and T2 are TOKO types KACSK3893A and KACSK3892A respectively. The filter is an eight pole, 2.2kHz bandwidth, NDK type 10.7F2.2D. To set up the circuit, connect a 56ohm load resistor to the output of T2 and apply either a 10.7015MHz or 10.6985MHz carrier (300mV rms) to the carrier input. Adjust RV1 for minimum carrier signal across the load resistor. Apply a 1.5kHz sine wave signal (less than 100mV peak) to the audio input and adjust the cores of T1 and T2 for maximum rf across the load resistor. Remove the audio and re-adjust RV1 for minimum output. The load resistor can now be removed, but remember that, for correct operation, the output needs to 'see' a 50ohm (approx) termination from any circuit which follows it.

Once each module has been set up correctly, the system can be assembled and used to generate a very clean, yet 'punchy' SSB signal of up to 400mV peak across 50ohms (carrier suppression >50dB), which can then be mixed with a suitable vfo signal to produce an output on an amateur band

Each of the above three modules (inc pcb's, components and instructions) are available from JANDEK (for address see advert this issue): (Please add £1-00 for p&p)

VOGAD JD018 @ £7-60, CIO JD024 @ £9-95, DBM/FILTER JD025 @ £22-50

*** SPECIAL OFFER: All three modules for £36-00 (save £4-05) ***

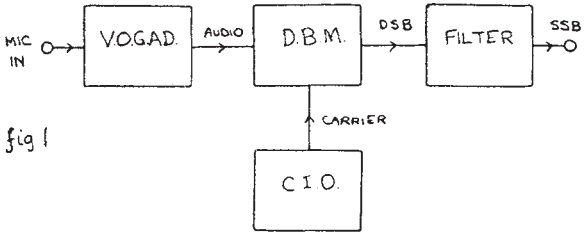


fig 1

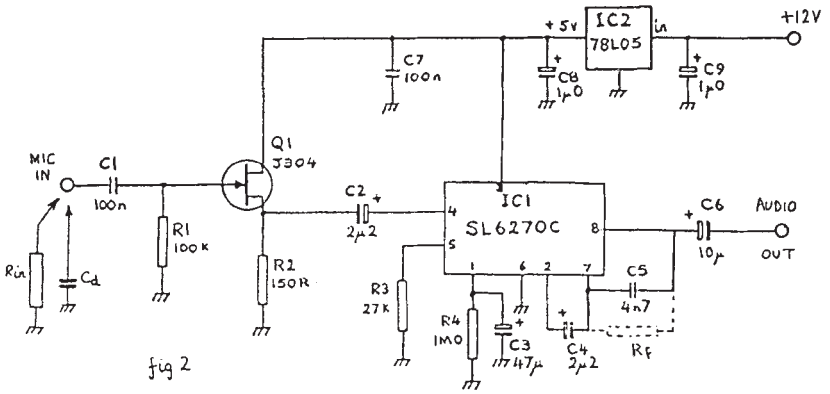


fig 2

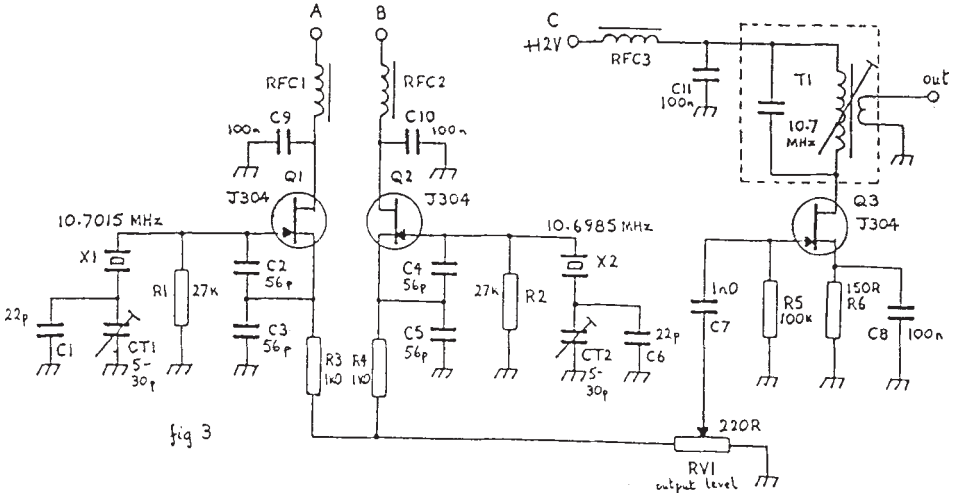


fig 3

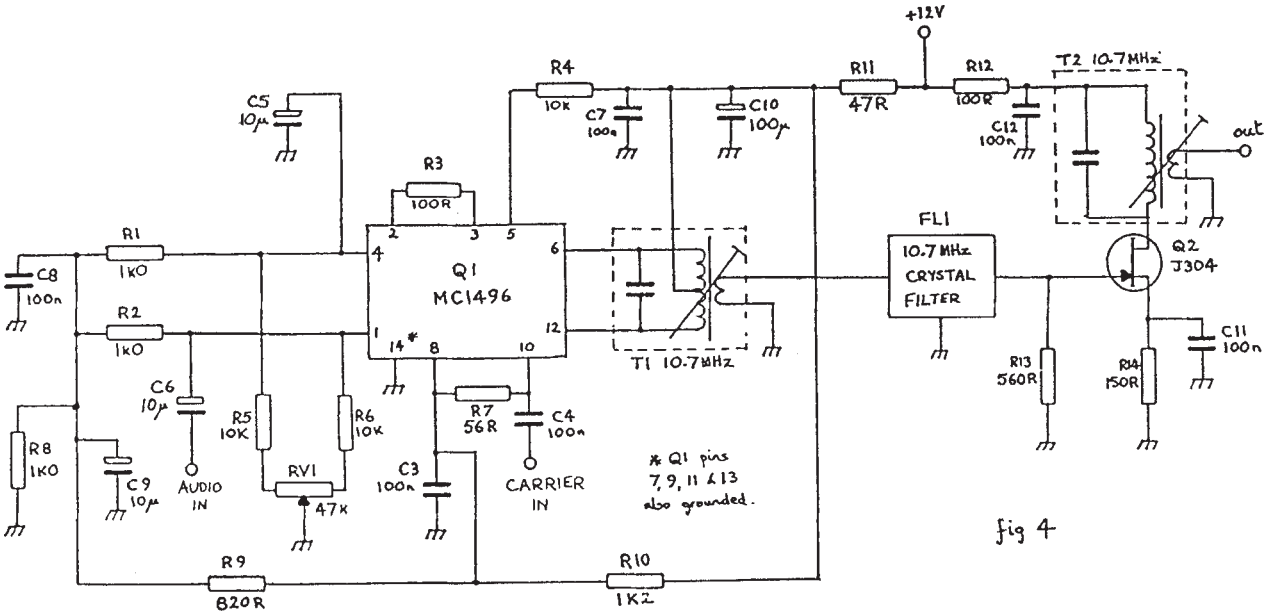

+12V
R4
10K
C7
100n
C10
100µ
R11
47R
R12
100R
T2 10.7MHz
C12
100n
out
C5
10µ
R3
100R
FL1
10.7 MHz
CRYSTAL
FILTER
Q2
J304
R1
1kO
C8
100n
R2
1kO
Q1
MC1496
2
3
5
4
6
1
12
14 *
8
10
T1 10.7MHz
C11
100n
R13
560R
R14
150R
C6
10µ
R5
10K
R6
10K
R7
56R
C4
100n
R8
1kO
C9
10µ
AUDIO
IN
RV1
47K
C3
100n
CARRIER
IN
* Q1 pins
7, 9, 11 & 13
also grounded.
R9
820R
R10
1K2

fig 4

ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS-ADS

SWAP LEICA R4S with f2 Summicron. mint and hardly used, with leather case. Also 28mm f2.8 Leitz Elmarit wide angle lens - For quality receiver, Drake R8E, NRD535 or W.H.Y. Phone Ian on [082-623] 461 with details [near Dundee, Scotland]

FOR SALE: [Offers, Exchange - Whatever] Rather nice KW200A Complete with PSU and Shure Mike, Mainly new valves plus some spares. Happily runs 90w CW but only used for QRP in my hands. Occasional intermittant fault. Would swap for good 13.8v QRP Transceiver etc, or what you have in the QRP line, or Vibroplex or sim. Tony GW0NSR, Tel: 0492-596854. North Wales.

FOR SALE: TEN-TEC ARGONAUT 515 with TenTec outboard CW and Notch Filter, Mic, Mint condition, £300. John White G4BCY, QTHR or 0428 712121.

FOR SALE: Components for MARCHWOOD PSU, FT200, RadioVision Commander, Practical Wireless Mags 1940/50. G3KJX QTHR Tel: 0609 772702.

WANTED: Digital Frequency Readout YC7B for Yaesu FT7 and YD148 Desk Mic. Phone Bev on 0495 - 757221. GW0OSQ

FOR SALE: HOWES CTU30 ATU Kit - unbuilt £25. Ring Pete, G4GSA on 0454 61793

WANTED: MLX Board for G3ROO's Transceiver. Please contact Ian Wye, G0OKY on 0724 784471 or write: New House, Hook Rd. Amcotts, Nr. Scunthorpe. DN17 4AZ

FOR SALE: Complete Packet setup: IBM Comp. Tiny2 TNC and Icom 2m rig : ring Bill 0278 455923

WANTED: Tech Manual/Circuit for Racal RA17A, has 3 xtal bandpass filters, 100Hz/300Hz/750Hz [not RA17L] also 2 letter code year of manufacture. GW4WHP, 24 Alma St. Dowlais, Mid Glam. CF48 3RP

FOR SALE: MFJ 9020 QRP Transceiver, as new with original packing etc. £150 or swap for HW9
FOR SALE: TEN-TEC CENTURY 22. vgc with new pa and on board calibrator, manual but no box. Call Wayne on 081-420-7354.

WANTED: "Buyers Guide to Amateur Radio" by G3OSS. Write to Noel Cameron, EI4DZ, 16 St. Mary's Crescent. West Port, Co. Mayo. Eire.

FOR SALE: Wander u Goltermann Selective Level Measuring Meter, SPM6 MultiConversion Superhet usb-lsb-am 6KHz to 18.6MHz plus 21/28MHz with extra crystals., Full details. G3DOP, 25 Parc Croft, The Lizard, Cornwall.

FOR SALE: Original White Rose Receiver board, built £5, Fully built Converter Boards for White Rose, complete with transmit components and correct crystals £5 each. If anyone wants all four, I will throw in the DIN41617 socket. Dave Cooper, 22 Kettering Place, Cramlington, Northumberland NE22 9XP.

HELP WANTED: Information required on Marine receiver manufactured for Marconi International Marine Co. by Eddystone Radio Ltd, Type 958/5. Serial 2170 name Nebula on front panel. Write to Salim, S. Room No H-209, Hall 4, Indian Institute of Technology, KANPUR - 208016. INDIA

FOR SALE: KENWOOD TS530SP, ATU FC902 ex condx £550, G0LHM 0302 859451

WANTED: Handbook for Wayne-Kerr Type B221 Universal Bridge. Reasonable copying and/or postage expenses reimbursed. Contact Phil Mayer 0202 742453.

EEC EMC REGULATIONS AND THE FUTURE OF KITS

Extracts From A Statement from the UK Kit Manufacturers Association

The Law

On 28th October 1992 a set of EMC regulations came into force in the UK as a response to an EC directive. These regulations (Statutory Instruments 1992 No 2372) set out requirements for the control of radiated and conducted emissions and immunity from electrostatic discharge, mains disturbances and surges for most electronic and electrical equipment marketed in the CE.

A 'stay of execution has been granted until 31st December 1995 to allow time for suitable technical standards to be agreed upon and for manufacturers to ensure their products conform to them. The standards must be based upon appropriate European Norm (EN) standards. From 1st January 1996, all equipment (relevant apparatus) must conform and carry the CE mark; and will be illegal to sell goods within the CE which do not conform (even to sell goods in the UK which are produced in the UK).

Kits

So, where do kits stand in all of this?

The answer, at present, is that they will be covered by the same regulations as any other amateur radio equipment! An earlier attempt by the RSGB to get kits exempted from regulation failed, even though home constructed equipment will not be regulated. We have the ludicrous situations that, for example, a constructor can build a transmitter from a design published in a magazine, obtaining the components and hardware from various sources, without regulation; if a firm provides the items as a kit, then regulation applies!

It has been suggested that one way around the regulation problem is to offer only part kits, leaving purchasers to 'scout around' for the remaining items. The definition of a kit, according to the EMC Regulations is: "a collection of all or substantially all the necessary components, for supply as a single commercial unit, required for the construction of an item of electrical apparatus and intended for such use, whether or not accompanied by instructions". So what is meant by "substantially all" (60%, or 70% of components, all except PCB, etc.)? Not really practical is it?

There are three ways to obtain certification of compliance:

Self-certification, technical construction file and CE type-examination. The first of these offers the only real route to most small businesses, due to the high costs of the other two. In either case, products must attain the same standards and products need to be properly tested to show conformance to self-certify; our CE counterparts must use the very expensive type-examination route!

In Support of Exemption

Amateur radio is a technical hobby in which kits play an important role in self-training, particularly with regard to the recently introduced Novice Licence. Kits offer a low cost entry into the hobby and encourage understanding and the development of skills. The majority of amateur radio related kit manufacturers are very small businesses, or small subsidiaries of larger concerns, set up to provide a service to would-be constructors who prefer to obtain all, or the majority of items for a project from one source, as a kit of parts. Profit margins are low to keep prices down, so any increase in overheads, due to extra EMC testing and compliance costs, would be reflected in large increases in kit costs. Put in a nutshell, many kits sold in small quantities would no longer be commercially viable!

The KMA

The UK Kit Manufacturers' Association was set up following the 10th June meeting with the RSGB with the initial aim of trying to secure exemption for kits from EMC regulation.

This will involve making representations to the DTI and other relevant bodies and we will need to put up a strong case if we are to succeed. We therefore need your support and will appreciate any comments which may help our cause. We believe that regulation will impose an obstacle to trade within the CE with regard to kits; the opposite of what was intended under the Single Market. No such obstacle exists at present. So PLEASE, if you agree with the sentiments of the KMA:

Lobby your local MP, write to the DTI and RA, tell the RSGB and amateur radio magazines what you think. Encourage radio amateurs and other electronic constructors to do likewise.

UK KIT MANUFACTURERS ASSOCIATION

DEREK PEARSON [JANDEK] Hon. Sec. DICK PASCOE [KANGA] Chairman. ALAN LAKE [LAKE] Treasurer

CLUB ACCOUNTS

12th February 1992 to 31st March 1993

INCOME	
Bank interest	£634.26
Donations	£3.95
Morse tapes	£281.50
Sales at rallies etc.	£4,138.81
Sales by post	£6,875.69
Subscriptions	£24,129.72
TOTAL INCOME	**£36,063.93**

Bank b/f	£21,192.08
Income less Expenses	-£4,277.94
Bank c/f	£16,914.14

EXPENSES	
Artwork & drawings	£120.68
Awards and trophies	£215.50
Bank charges	£1,239.84
Books	£9,178.63
Components for kits/sale	£2,499.18
Duplicating & copying	£258.25
Miscellaneous expenses	£387.04
Officers expenses	£1,035.92
Postage - large items	£3,208.84
QSL printing	£136.12
Rally costs etc.	£2,995.44
SPRAT mailing costs	£8,977.12
SPRAT printing	£8,756.00
Stationery etc.	£1,333.31
TOTAL EXPENSES	**£40,341.87**

Somehow we are still keeping our head above water despite all the rising costs. Some of the increases are good news - SPRAT in part costs more to print and distribute because membership continues to rise *(and I recall a meeting three years ago where we agreed that we had reached a plateau!)*. Most increases however are of the type that never seem to reflect the official rate of inflation. One of the biggest is again due to the National Westminster Bank, with our charges more than doubled since last year, and we have just been informed of further greedy increases to come so the time has come to shop around. Whatever happened to the law of diminishing returns? Paper prices are rising and that will mean that SPRAT will cost more to produce this year. An increase in postal charges may also be in the pipeline. Most of the Officers expenses are postal costs.

The figure under Books is particularly large as we published the Antenna book during the year but much of our outlay has been recovered already and we still have a considerable stock in hand. Sales by post and at rallies have again helped us to keep us afloat and to maintain our low subscription rate. QSL printing has come to an end and the figure shown was payment for the last few cards to be printed in 1991.

In addition the club has opened an account in USA supervised by Luke Dodds, W5HKA, which holds $3349.15 (31/3/93). This helps us to buy some of those goodies we offer without rewarding the bank with exchange commission etc. Mike Sheffield, ZL1ABS, has an account holding about 100$(NZ).

Again we must thank our two auditors, Peter and Betty Jackson (G3KNU and GØNYL), for their their time and help.

G3PDL July 28th 1993

QRP COMMUNICATION FORUM

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

BOY IT LOOKS LIKE I'VE JUST WASTED $ 2,000 ON THIS LINEAR was the remark made by KS1C during a recent QSO with Mike, G0IFK. They were running 1.5 KW and one hundred milliwatts respectively ! No prizes for which one was showing respect for our amateur environment.

NO DOUBT ALL MEMBERS will wish to extend their sympathy to our Chairman, Gordon, G3DNF, and his XYL who recently suffered considerable damage to their home as the result of a lightning strike. Gordon also lost much of his equipment from lightning damage. Fortunately neither of them was hurt.

A TWO WATT SSB DXCC using a Mizuho MX18S and antennas of his own design, all on 18 MHz, is the outstanding achievement of Byron, WJ2U. Well done OM.

THE FIRST MEMBER OUTSIDE THE UK to clock up confirmed QSOs with 500 other members is Rene, ON4KAR. Great work OM.

THE CENTRAL HEATING SYSTEM HAS BEEN USED AS AN ANTENNA by G8PG, G0IFK and others with satisfactory results. In a recent QSO G3KSU (of the Isle of Wight Wireless Museum) announced that he was loading his Argo into the metal cold water pipes in his house, and that using this system he had already worked 20 countries on 7 MHz cw. Just shows that with QRP and a little ingenuity one need never be off the air. (And that KS1C really had wasted his money!)

I WONDER IF ANY OTHER MEMBERS were amongst the Battle of The Atlantic Veterans who marched through Liverpool on 29th May? If so, like me they must have been amazed and humbled at the ovation we received from the people of my native city. It was a fitting tribute to those on both sides, many of them radiomen and some of them radio amateurs, who never saw the end of that long and bitter struggle.

BACK TO THE STORY OF USING TWO LENGTHS OF CO-AX instead of open-wire feeder. Fred, GI4PCY, replaced the 300 ohm slotted feeder to his 170ft doublet top with two 85 ft long lengths of RG58 co-ax, with the screens strapped together at the top and the bottom, and fed via a G5RV type ATU. The system worked well on all bands 1.8 to 21 MHz (28 was not tried) Fred estimates the feeder loss at 20% of power, but says this is a small price to pay for having feeders which can if necessary be run back by separate paths, run close to walls etc. Fred is now experimenting with the possibility of multi-band feed via a single length of co-ax and a balun. (For further details of this latter system see "Radio Communication" May 1993, page 54 for a PA0SE system using a co-ax balun, and also August 1992, page 51 for the balun Fred is tying) Even with 20% loss the system offers great advantages for those in difficult locations or where one wishes to run tuned feeders through a building. It might also allow those with "no antenna" restrictions on their building lot to run "invisible" feeders to a nearby lot where such restrictions do not apply.

ARE YOU TAKING ADVANTAGE OF the G3XJS QRP Expedition Information Service? Peter is doing a great job in sending out advance information on QRP operation from rare spots (the current sheet covers Oho, FY, ZD8, 9K, OY, and HB0). To receive the sheets just keep Peter supplied with sase P. Barville, G3XJS, 40 Watchet Lane, Homer Green, High Wycombe, HP15 6UG

HEARTY CONGRATULATIONS TO THE ARRL BOARD OF DIRECTORS who in an emphatic and unequivocal statement have rejected the idea of a no code hf licence and have called upon ARRL members throughout the world to oppose it. Congratulations to the NZ Government who have also rejected the idea. One can only hope that, following its own so far rather misleading approach (see "Morsum Magnificat" April 1993, page 2) RSGB will also have the courage to reject the suggestion. For

the information of our own members, following the revelations in "Morsum Magnificat", a copy of our paper on this subject was sent direct to the UK licensing authority, so they now know that at least 90% of our UK members oppose the idea.

RULES FOR THE WORKED OK QRP CLUB AWARD appeared on page 34 of SPRAT No 75. Having recently been issued with one, one can say it is a colourful, well presented Award which would grace any shack wall.

DO NOT FORGET THE WINTER SPORTS, 26 December to 1st January. Open to all QRP operators. Get on the QRP frequencies, have fun working as many QRP stations as possible, and let G8PG have your log. You could win a nice Award.

THE 1993 QRP CALENDAR appears elsewhere in this issue. Keep it in the shack and support the various events please.

DESPITE FALLING SUNSPOT COUNTS there have been some very useful hf band DX openings at times, including occasions when our Members PY7FNE and KP4DDB were working two-way QRP with Europe. There have also been many good Es openings on 28, and the odd surprise like RL7. Indeed once again one has to wonder how often "bad conditions" are actually lack of activity. It is always worth while having a go!

WE HOPE TO HAVE SOME KITS FOR THE W3NQN 600 Hz AF FILTER on sale at the Rochdale Convention. A first class buy! 23 NOVEMBER 1993 WILL BE THE 70th ANNIVERSARY of the first inter-continental amateur radio contact, made between Delay, F-8AB, and Schnell, U-1MO, on a wavelength of 100 metres. Let uspay tribute to these two treat pioneers of out art.

THE 1993 INTERNATIONAL QRP DAY PLAQUE goes to Randy, AA2U, for a log containing some fine DX. A few small miracles with his milliwatts gave John, G3DOP, the runner-up spot. Well done!

BOOK THE WEEKENDS 26/17 February and 8/9 October on your shack calendar. It could save you money.

AWARD NEWS
QRP MASTER: Hearty congratulations to new Masters PA3FGI and LY3BY
QRP WAC; LY3BY.
QRP COUNTRIES: 175 G3DNF (nice work!), 100 WU2J, 75 PA3FGJ, 50 G0FYJP, 25 G3DOT.
WORKED G QRP C: **1000** G4JFN (nice one Bob!), 500; ON4KAR, G0FYP; 440 GM3RKO; 400 G3INZ, 380 G4XVE; 300 G0NEZ; 260 G4XAF; 220 G0KCA; 180 WN2V; 160 G4VGS; 140 G3YLL; 120 G0KJN; 100; GM0KAE, G0MOU, 80 G4XHE; 60; G0ADH, PA3FGI, LY3BY, D3DOT, GM0PQE, 40 G3ZHE; 20 2W0ACD (1st Novice-FB!), FD1RQG, G4ZFE, G3KCJ.
TWO-WAY QRP; 60 G4JKN (nice Bob!); 50; GM4UYE; 30; G0EYX; 20 G0BOP, PA3FGI, LY3BY; 10; G3DOT, DJ7RU; G4XHE.

FOR GENERAL INFORMATION
Valuable items to the Ukraine. I recently had occasion to send some text books and other teaching material to Tonya, wife of our member Peter, UB5REO, who lives in Nizhim. I did this via Parcel Force International, who assured me they had no trouble about secure delivery in the Ukraine, and that it would take 14 to 16 days. It actually took 16, and was delivered intact and with nothing missing. It costs a lot more than parcel post, but seems an excellent way of sending valuable items to the Ukraine. (Tonya teaches English at high level.)
Has anyone used it to other CIS republics?

QRP CALENDAR 1994

1 Jan	Last day of 1993 WINTER SPORTS	
8 Jan to	1500gmt	AGCW DL QRP CONTEST
9 Jan	1500gmt	[Note 1]
1 Feb	Last day that G8PG can accept Winter Sports logs	
25 Feb to	1600gmt	CZEBRI 94 [Replaces OK/G Weekend.]
27 Feb	2359gmt	Now open to all. Big Prizes. Rules in Next Issue of SPRAT
2-6 May	YEOVIL FUNRUN. Logs to G3CQR within 21 days	
8 May	Yeovil Convention	
17 Jun	IARU REGION 1 QRP DAY	
	Plaques and Certificates : See Members Handbook	
	Suggested Max. Activity : 0900-1200, 1300-1600, 1900-2200gmt	
17 Jul to	1500gmt	AGCW DL QRP CONTEST
18 Jul	1500gmt	[Note 1]
19 Jul	Last day for International QRP Day logs to G8PG	
7 Oct to	1600gmt	EUROPE FOR QRP WEEKEND
9 Oct	2359gmt	Valuable Prizes and Certificates [Rules Later]
19 Nov	Last day for Europe for QRP logs to G8PG	
26 Dec to	G QRP CLUB WINTER SPORTS 1994	
1 Jan 95	Maximum Activity on All QRP Freqeuncies	
	Logs to G8PG by 1 Feb 1994 [G4DQP Trophy and Certificates]	

NOTE 1.
Information from DJ7ST, Schlesierweg 13, D-38228 Salgitter, Germany
Serious entrants are advised to obtain rules from DJ7ST.

SPRAT BINDERS : OVERSEAS ORDERS

The cost to mail SPRAT binders outside the UK is quite high and the club has lost money on several overseas requests. If you wish to order binders from overseas, please enquire from G0OKY [see page 42] sending him an address sticker and IRC, about the cost to your country.

WANTED Any Ham Radio Software for a Spectrum Computer. Not easy to find in the Netherlands! Contact : B.Goddijn, PB0ALZ, Csardasstraat 7 NIJMEGEN 6544 RV The Netherlands

FOR SALE: Magazines in Complete Sets [boxed in 2 year lots] Short Wave Magazine 1949-1984 also Radio Communication 1959-1993. £30 each set [over 400 magazines per set] About 150 Wireless World magazines[unsorted] £10. Also Hundreds of Valves - Ring for details all ex G3YJM 0254-55939.

THE G3YCC QUARTER CENTURY AWARD

To celebrate being licensed for 25 years, Frank is offering a small trophy for the winner, with certificate and small cash prize and certificates to runners-up for a construction competition.

- 1 The competition is open to all members of the G QRP Club.
- 2 The project is to construct a 40 METRE "SPY TRANSCEIVER"
- 3 The rig must be:
  a] Capable of up to 5 watts output, CW only.
  b] VFO [not VXO] controlled

c} Self Contained. i.e. the set is housed in a container which will include power source, key or keyer [to be home made] , antenna, phones etc., in fact everything needed to operate the rig under portable [emergency] conditions.

- 4 No commercial kits or modules
- 5 A log of 25 contacts should be submitted, these having been made 'in the field'.

Consideration will be given to originality and results using the equipment.

Ideally photographs of the equipment will be submitted, in addition to **full circuitry**, which may be used in SPRAT, if required. Only items constructed after 1st January 1994 may be submitted.

ENTRIES TO G3RJV BY 1st JULY 1994

MORSE FOR RADIO AMATEURS Course at Telford College of Arts and Technology, Thursdays at 7pm. Tel: 0952 641122.

CORRECTION : In SPRAT 75 we wrongly named the winners of the Yoevil Construction Challenge. They were: 1st: G4BMO, 2nd: G4GUM, 3rd: G8BPE.

USING THE RSGB SPECTRUM ANALYSER: As mentioned in the last issue, G3TLH still has some copies of his paper. The paper will be added to the club Datasheet collection.

QSL NEWS

The OK QRP Club and the G QRP Club now have an agreement for the bulk transfer of QSL cards, between members of the two clubs. It is vital however, that G QRP Club members obtain the Club number of the OK Club member and that number is written prominently on your QSL card.

ANY QSL CARDS WITHOUT THE OK CLUB NUMBER CANNOT BE HANDLED

Bob Hudson, G4JFN, G QRP Club QSL Manager

WORK NIGEL AND HELP SAVE HIS CHURCH ROOF!

Rev. Nigel Eva, G4KNE, , member 2364, Rector of Mawnan in Falmouth is attempting to complete 100 QRP QSOs before the end of the year. He is to be sponsored to raise money to re-roof the church. Please watch out for him on the bands.

NOVICE NEWS

DAVID GOSLING G0NEZ 31 Semphill, Hemel Hempstead Herts HP3 9PF

A very warm welcome to more news of our ever increasing number of Novices; both HF/VHF.

Phil Bennett (2W0ACD) writes in to say that his Novice Tutor, Bill Rees (GW7AXK) has now also joined our Club. Welcome Bill.
Apparently, Bill has a Degree in tbeology; but is struggling with Morse but is now up to 8wpm. Phil says its great to belong to a Club such as our own, receiving/sending QSL's; + letters from other friends made.

John Henson (7805) and a potential Novice (he is in the middle of the NRAE) and asks: "I have built the Sudden 80 mtr Rx; and would like to know which is the best Tx to accompany it. Well, John, the OXO would be a good one and you could use the Switching Circuit designed and modded by Paul Pierre Bel (FB1MQO) and my Dad G0NNI (5911) on page 10 of Sprat Number 74.

Jeff Saxton G0BBS up in Huddersfield is trying to build the Novice Amateur Tx (NAT) as designed by George GM3OXX. Jeff is finding difficulty in locating the VN6AFD, but George assures me that the VN6AF will be satisfactory with a small mod. More from Phil Bennett - who reports more than 500 Qso's in the Log on CW/HF/QRP (stroke / is the illegal thing) so just send your Call G0NEZ/QRP; or if in QSO with another QRP'er; send De G0NEZ Bth QRP.

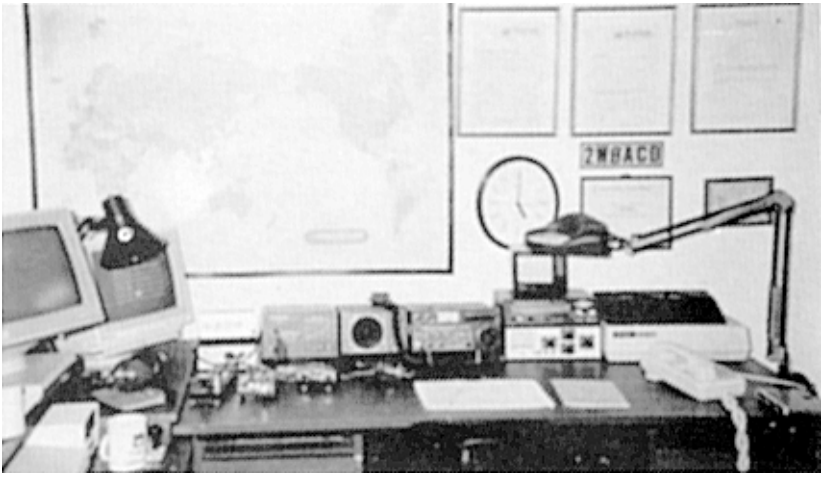
John Leak spotted an error in Sprat Nr 75 the Novice Allocation by RA is 10.130 - 10.140; and NOT 10.113 - 10.114 as printed in error. What a small allocation THAT would be hi!

Carlo IW1QH (7288) writes in with a "better" type of Antenna for Hand Held VHF than the usual small rubber covered Helical ("Rubber Duck") Carlo has both built, and tested the following Antenna:
Buy a BNC Connector and small Telescopic Whip (e.g. Maplins); Solder the bottom end of the Whip into the INNER of the BNC Connector; but a small Jubilee type clamp., Bare the end of a piece of wire (I would suggest 28 swg Enamelled Copper and tightly clamp Clip + Wire over the OUTER base of BNC. By altering the lengths of both the Whip, AND the Counterpoise/Radial; you can, Carlo reports after experimenting, get a much improved Radiation/Reception form your UHF Handie. If you want further details write to Carlo at; Carlo Bonamico; Via Cecchi 4/12/A 16129, GENOVA, ITALY. And don't forget - you can use UK Stamps because like us, Italy are EEC Members - but watch the weight of your letter!

Michael - G3GVY - writes in to say that he's taking Morse Classes at Ripon ARS; and has 10 People in his Group, the youngest of which is Kirsty at 14 years; and the oldest at about 78 Years old!! All but one have passed the NRAE; and their current ambition is to change their 2EI into a 2EO and get on the air with Morse/CW QRP.

Michael had a good QSO (2 way QRP) with Pat (a YL) who is 2E0ADP Pat is Club Number 7026 so very warm welcome to our Club Pat, and hope to eithert copy/work you on the Bands soon. Good hunting es Good Dx.
Mike ends by saying "How wonderful it is to have such splended British Novices on the Air now". Thanks Mike on behalf of our Novices, God Bless and take care there.

Bits N Bobs.
Tom Cannon 2E0ACY has changed his address to 35 Lodden Bridge Road, Woodley, Reading, Berks. RGS 4AP.
Jenny 2E0ABC in Liverpool - says she is so pleased about the wider allocation for the Novices on 80 Metres. At least we now have the general QRP Calling Frequency free for Novices to QSO with the G2/3/0 etc.
Phil - 2W0ACD - is the first Novice to gain the Basic Worked G QRP Club Award (20 Stations confirmed by QSL. Both Stations QRP). Well done OM!



THE SHACK OF PHIL [2W0ACD] FIRST NOVICE TO GAIN THE WORKED G QRP CLUB AWARD

That's all for this time around. Please let me have anything for your Column by November 1st for the Autumn Sprat. For now - good hunting, best 72's es 73's and take care. Dave GONEZ [Novice Manager]

SSB COLUMN : Dick Pascoe G0BPS

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

At this time of year I am always looking forward to the annual trip to Rochdale to see lots of old friends over the mini-convention weekend. For those members who have not had the opportunity to get to George's QTH I can highly recommend it. A great day of chat about our aspect of the hobby with visitors from all over Europe and, at past times, further afield too. Do remember this event on the Saturday!

Summer Party

Talking of get-togethers I was pleased to pop in very briefly to see Chris, G4BUE, and his delightful wife, Pam, for the re-instated annual summer party at Chris' home [accompanied by Paul, G1PJJ, Chairman of the Dover Club] Having seen the garden over the past few years I can see the hard work that Chris has done, much more concrete and sandstone providing a very nice set of pools and a small waterfall. Oh yes, a few small additions to the aerial farm too. It is at such events we get a rare opportunity to chat face to face with those we work on the bands. Many of the usual faces were there including Vince [N2AXV] who got into my van at Folkestone after I offered him a lift and promptly fell asleep! It must be the English weather. This visit was much briefer than usual as I had to dash off to pick up the caravan on the way to Wimborne for the hamfest, another chance to meet more members!

On the Home Front

I am glad to say that the tower is up and the dipole out, even the rig is now out in the shack so I shall be heard on the bands a little more. I still have a lot of work to do to the house as visitors will have seen, the council work keep me busy too [At present Dick is acting Leader of the Folkestone Town Council : Editor] but the tribander will get dusted off and erected in the near future.

The only letter this time is from 28 year old Carlos in Barcelona who neglected to give his callsign. He is having great fun with QRP SSB both on the HF bands and also on VHF. I have also done a little on VHF recently bagging SM and OZ with under 5 watts of SSB on 2m.

I do love to get your letters, so please write and tell me what is going on in your area, and what you are doing, and with what. That's all for now, except for a change of address, my BBS for Packet radio is now via GB7RMS. 72 et al de Dick G0PBS

VHF MANAGER'S REPORT

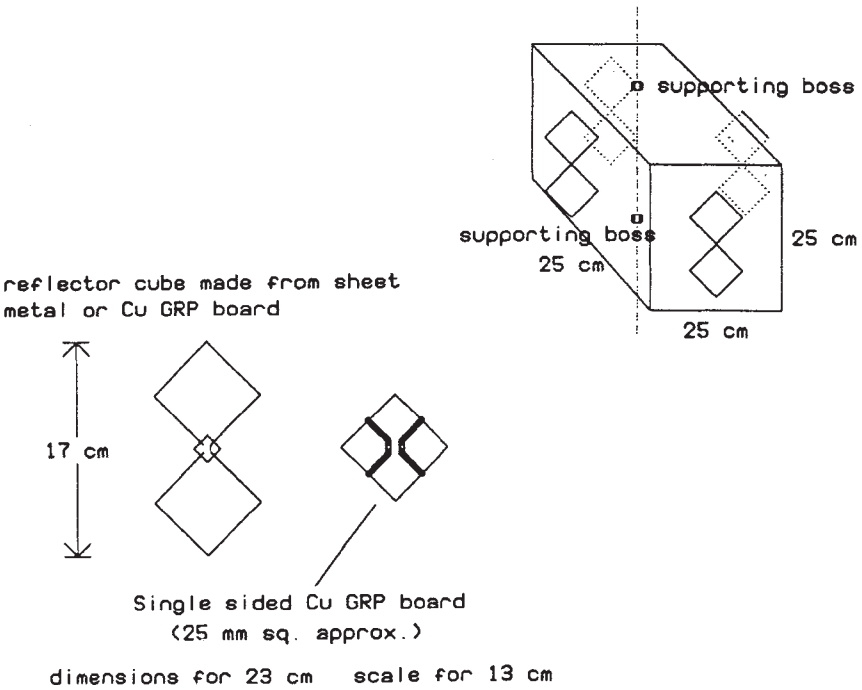
John Beech, G8SEQ/VK2XYD,
124 Belgrave Road, Wyken Coventry CV2 5BH Tel. or Fax 0203 617367.

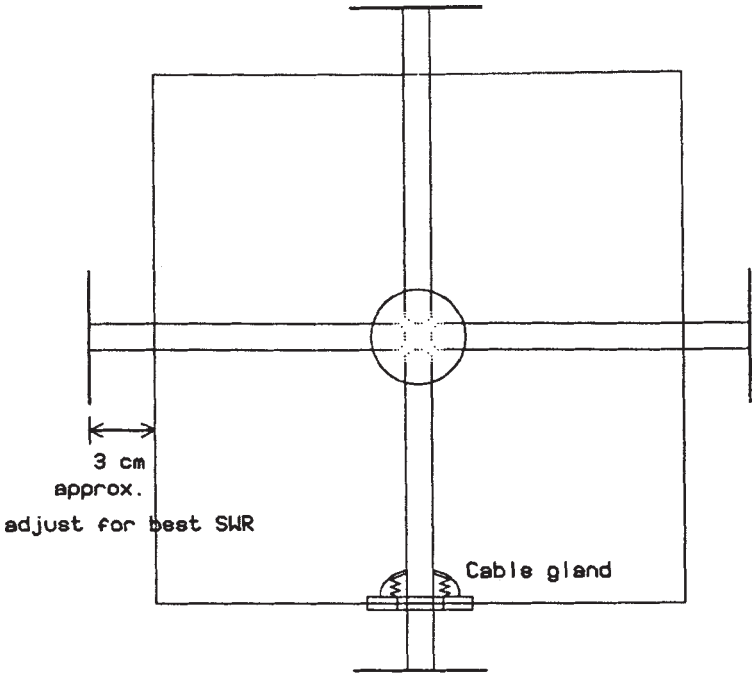
At my own QTH I have recently come up against the problem of lack of room on my rotatable mast. It would take either a 70 MHz antenna or a 432 MHz Yagi & a 1.3 GHz Yagi, but not all three. Not wanting to go to the expense of yet another rotator, I took a look at some omni directional set-ups. For 70 MHz I opted for a double turnstile antenna, which would have a modest amount of gain.

However, I also wished to monitor activity on 1.3 GHz & 2.3 GHz as well so I designed this set-up. The antenna is based on the Double-quad radiating element. Four of them are used attached to a reflecting cube. At these frequencies, they are small enough to fit on the pole between the elements of the 70 MHz antenna. The phasing harnesses are made from standard cables and the coaxial baluns made either from copper tube from a plumbers merchant or from braid removed from coaxial cable. The driven elements are made from 14 SWG copper wire for 1.3 & 2.3 GHz. (If you wish to make a 70 cm version then use copper brake pipe tubing from motor accessory shops (5mm / 3/16" diam.) for the elements. Scale dimensions to suit.)

The gain is about 10 dB in ANY direction although their are 4 nulls where the gain dips by 3 dB or less. (A single d-quad & reflector has a half power beam width of 68 deg.; at 90 deg. where the patterns from two adjacent elements in this array start to overlap the gain is down by about 4 dB, but as two antennas are adding at this point the theoretical loss at this point is only 1 dB) I refer you to Karl Weiner's (DJ9HO) book "The UHF Compendium Part 1 & 2" Pages 358 to 364 (English Edition) for further info.. The use of friction-locking cable glands (RS part no. 388-827 or Farnell 143-607) to mount the driven elements is recommended, as these allow accurate adjustment of the element to reflector distance which governs the SWR & radiation pattern.

Good DX! 72 & 73 de G8SEQ.

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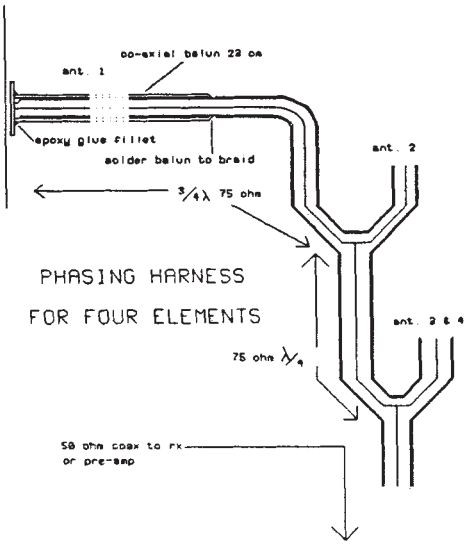
co-axial balun 22 ga
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3/4λ 75 ohm
ant. 2
PHASING HARNESS
FOR FOUR ELEMENTS
ant. 3 & 4
75 ohm λ/4
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or pre-amp

MEMBERS' NEWS

by Chris Page G4BUE

"Alamosa", The Paddocks, Upper Beeding, Steyning, West Sussex, BN44 3JW.

Tel/Fax: 0903 814594.

Packet: GB7VRB or via the DX PacketCluster

This is being written on the 31st August, which is a rather special day for me! Tomorrow, I shall retire and so today is the last day of me being a police officer. Most of you know that ever since I was 16 years old (in 1960) I have been employed in the Police Force, most of it in the CID (Criminal Investigation Department) chasing the bads guys! The hours have often been long and stressful and I am now looking forward to a complete change. I am going to work from home and have formed my own business as a printer and publisher, called Adur Village Press. I am still developing the business but intend providing amateur radio stationery, amongst several other ideas I have, (I am already doing QSL cards!). Look for my advert in SPRAT in due course.

Still on a personal note, Pam and I held our Summer QRP Party this year after missing 1992. Once again we were lucky with the weather and those who came saw the changes that have occurred in the back garden (the reason for not holding it last year). Vince, **N2AXV** and Robert, **PA3BHK** provided the DX input and everybody seemed to enjoy themselves, which is the main purpose of holding it! Pam and I thank all those who came and also to those who brought food and drink and helped in the kitchen. See you again in 1994, when the garden will be completely finished!

GØNEZ has sent details of the new Scout 555 rig from Ten-Tec (see front page of last SPRAT) which he received from the UK agents, Waters & Stanton. Despite a price of only $495 in the USA, the W & S price is going to be £599, which is going to make it an expensive rig. I shall be interested to hear from members who buy one, what they think of it and how it performs on the air.

2EØADM has taken his DXCC to 31 on 10m SSB. Les says the openings are mostly tropo between 350 and 1000 miles. **ON9CJP** has been working islands for IOTA including taking part in the recent IOTA Contest, with SSB and end fed LW only 3m high. Patrick also worked two-way QRP QSOs with TK/FE1MWW (6004), SV8/DL1TQ/P and CT1DSW. Other DX includes 7X, JX and VP5. G3XJS worked two-way QRP with OY/G4XRV (2771), CX3EU, SV5/SM7DAY and HBØ/HB99AMZ (3112). Peter says a couple of these stations were using the new MFJ9020 QRP rig, which is proving to be a very popular QRP rig.

DK8OK recently tried 'milliwatting' with only 10mW to a 3 element yagi at 8 metres. In the middle of August, Nils worked two W1s and a W2 on 15m and EA8 on 10m. He was using an IC729 with the output reduced via the ALC. The power was controlled via a WM-1 wattmeter. Nils had to go up to 5W to work a W6 on 20m! **GØSDD** wants to reduce the power of his TS450 from 20W to QRP and wonders if an attenuator is the way to go. Chris will appreciate any ideas. **GØNYD** took part in the last ARRL 10m Contest and made 129 QSOs with 5W, including ZF, ZS and C5. This gave him a certificate for 10th overall in Europe but first in Great Britain for QRP.

Now to the debate about the QRP frequency for 30m. **G3XJS** thinks 10106 is "almost useless as a QRP frequency and if we are to retain the idea of having a frequency ending with a 6, then our choice is limited to 10116, 126 or 136. 10136 seems to me to be rather remote....10126 seems to have a permanent carrier whenever I listen there.....**GØBXO** raises the point about novices, but **GØNEZ** lists their 30m allocation as 10113-114 (page 31 of last SPRAT), which surely would support the adoption of 10116 as the closest suitable frequency (not 10136). **GM4XQJ** agrees that 10106 is prone to QRM but thinks 10136 is worse. Brian has been monitoring the band for sometime and has found the area between 10135 to 10147 very busy and SSB activity down to 10125. He suggests CW activity is kept below 10121 and finds 10116 is usually clear. Brian therefore suggests 10116. **GM3MXN** also agrees that 10106 is no longer suitable and disagrees with the suggestion of 10136. Tom suggests 10126, which he uses regularly with some success, but adds he has a problem from time to time with the incursion of French SSB stations. **DJ1ZB** finds the 'optimum choice' to be 10116 as 10136 suffers QRM from French SSB. Ha-Jo also says CW ac-

tivity is best below 10123 and usually finds 10116 to be clear. **G4VXJ** agrees with DL1GPK's suggestion of 10116 being a better frequenbcy than 10106. Leonard says it is a pity that more members do not make greater use of 30m, despite the commercial QRM to be found there. He says the band is "sufficiently 'low' to preclude the use of beams by most amateurs, thus giving the 'classic' QRPer with his 3W and dipole a bit more of a chance - and 'high' enough for good DX to be worked."

Finally, **G3FCK** says "having logged 935 QSOs on ±10106 during one year using a homebrew one watter to a low dipole, I am afraid that **GØBXO** is somewhat adrift!" Mac goes on to say that he found it so easy, he dismantled the antenna and migrated to 18MHz! He says that if a QSY is to be made, the G-QRP-C should ensure there is a plentiful supply of reasonably priced crystals available before an official announcement is made to ensure the large numbers of rock bound members are not marooned. A good point Mac.

The consensus view appears to be 10116. I suggest until the end of the year, we give that frequency a try. That will give sufficient time for 10116 to be evaluated by more members, especially with the increased QRP traffic during the Winter Sports, some further debate including the views of other QRP clubs, and for the G-QRP-Club to consider the point raised by Mac. Nothing is 'officially changing' at the moment, just a suggestion to 'trial' 10116 until the end of the year. Please keep your views coming. You may also like to comment about the use of 10116 when you send in your Winter Sports log to Gus, G8PG in due course.

DJ1ZB operated with two others in the new QRP class for CW Field Day and (like my comments in the last SPRAT), found conditions on the HF bands to be bad. **G3PTO** has only been QRV on 50MHz for the last few years but has recently become disillusioned with the operating habits on the band. John says operators only seem interested in square chasing and not in conversation and inter-UK operation is almost non-existent. I share John's view of 50MHz; it's only the interesting propagation on the band that keeps me QRV on it. John has built a series of HF converters and is using them with his FT690 on HF with his "old trusty doublet of 67ft top and 42ft open wire feeder" John hasn't lost his DXing talents as QSOs with VK and ZL on 20m with 4W prove

My comment in the last SPRAT about **DL1GPK** operating from Borkum in March prompted **G3KCJ** to write. Tony was one of the two members to work Peter. **G4KKI** brought a TS120 for his first commercial rig and now has "the best of both worlds, QRP and QRO". Bill also has SSB for the first time but is still 99.9% CW! He is now using a half size G5RV over the house with the Z match ATU from SPRAT 50. Contacts with JX, FP and PY7FNE at 4W prove it is all working OK. Bill agrees that the major CW contests are an excellent opportunity to increase your DXCC/band scores. Last year he worked KL7 in a contest when he was only running 100mW. **G3DNF's** QTH was struck by lightning in April and 'killed off' a lot of electronics, including his rig! Gordon was waiting for the insurance to settle when he wrote. We hope that went OK and he is now back to normal.

Another Summer QRP Party was held at the end of June. This one was in Meylan, near Grenoble where several members live, including FE6GNK, FE6IPN, F6IPI, F1JBK, FB1ODS. Chris, **FD1RQG**, one of the organisers, says this is the second year it has been held. His own station is a MTX20 to a dipole. **2E1BMT** says he finds it hard to believe that **GØNEZ** hears nothing on 70cms (page 36 of SPRAT 73). He says there is a thought in his area that simplex contacts over a few miles are impossible on the novice power allocation of 3W on the band. He and his father (also a novice) have proved that wrong, having worked into PA and ON during a lift. He says, "70cms isn't just for working through repeaters, we have much more than just one frequency."

G2HKK is "starting to get organised again after a lapse of some years." Eric has a R1000 receiver and was considering a new Argonaut when he wrote. **G3OEP** reports on the successful meeting for QRP/Novices in Great Yarmouth at the end of April. David says he never ceases to marvel at the excellent signals heard on the bands from QRP stations. He finds it very amusing when using 2 to 3W to be 'ordered' to QSY from someone running well over 100W! David is convinced that the best wire antenna is "a centre fed bit of wire with open feeders and at least a half wave long on the lowest frequency." An examination of the antennas used by the successful stations in the Restricted Section of Field Day over the last few years would support this. **SMØFSM** commenced working in Washington DC for two years from June and has his licence to operate /W4. Per will be looking for QRP QSOs with Europe. **UZ3ZK** had 69 QSOs on 20 and 40m with 5W in the WPX CW Contest at the end of May. Igor worked JA on 20m and UA9 and Europeans on 40m.

That clears the files for this issue. Please let me know how your autumn goes, by 20th November please. 73, Chris

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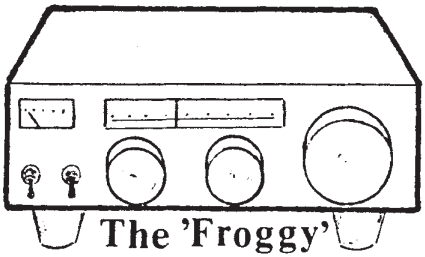

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