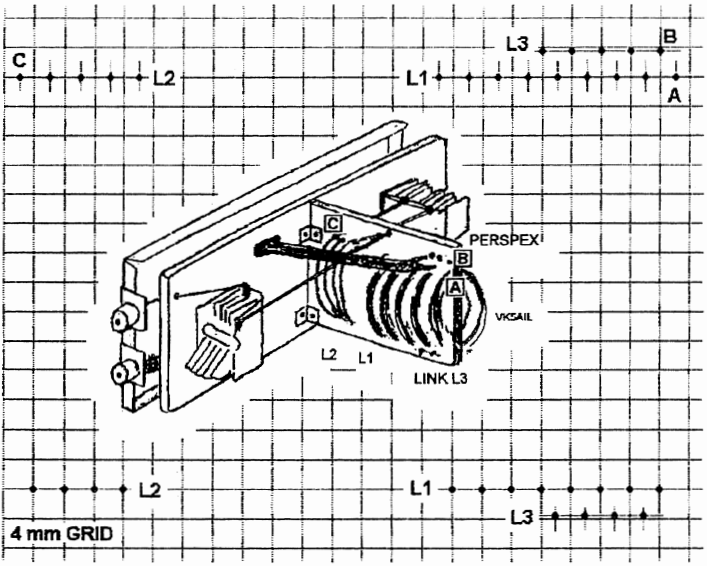
June 1994 - Issue No. 42

Lo-Key



Z-MATCH ATU - FIGURE 3 - DRILLING TEMPLATE FOR COILS (p.29)

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Editor: Don Callow VK5AIL #75
5 Joyce St., Glengowrie SA 5044

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VK5 BLS Chat ...

A few words from Barry Samuel VK5BLS, our new club President ....
(P.O. Box 158 GUMERACHA S.A. 5233 Australia)

Greetings to all members !

As the club president I would like to take this opportunity to write a few words to you all. The activities of the club have slowly grown over the years and Kevin VK5AKZ and Don VK5AIL now need more help. The club is progressing nicely and the new helpers are starting to appear. I have decided to be one of them. I believe that a club is only the sum of all the efforts of it's members and what we individually put in, all members can enjoy. So lets enjoy our club activities !

What sort of club are we ? Our activities are *not* summed up by the club name "CW OPERATORS' QRP CLUB", we are much more than that ! Many of our members use CW all the

Welcome To New Members ....

The first nine are 'almost new' members we missed from the March list. *Better late than never !*

368	VK7LF	Tom VAN ANDEL	GLAZIERS BAY	Tasmania
369	VK5ZSM	Jim SCHOLZ	WHYALLA STUART	South Australia
370	VK6AAK	Alan KING	KEWDALE	Western Australia
371	VK3WAC	Ross CHRISTIE	MONTROSE	Victoria
372	VK2XMN	Martin NELSON	SEVEN HILLS	New South Wales
373	JA3IG	Yuu YOSHITANI	OSAKA	JAPAN
374	JA1BRK	Tac YONEMURA	KAMAKURA KANAGAWA	JAPAN
375	VK6EB	Les BRADSHAW	BEDFORD	Western Australia
376	VK2FUN	Humfrey COWLED	MANNERING PARK	New South Wales

INCORPORATION UPDATE

The initial formal meeting of the first Committee of the incorporated club was held on 7 March 1994. This was the night on which our 'working bee' finalised production of Lo-Key ready for posting.

We sorted out 'who does what' in the Management Committee. Barry Samuel VK5BLS is President and Chairperson of meetings. John Bishop VK5JO is Vice-Chairperson of meetings. Kevin Zietz VK5AKZ continues as Treasurer and his position of Membership Secretary is replaced by the

time, others very infrequently. QRP or low powered transmissions are used often by many but not by all. Many activities, such as packet radio, RTTY, contesting, constructing our club kits and experimenting to develop new equipment to name just a few are also vital parts of our activities. We are a small club with diverse interests in the field of amateur radio.

So where do we go from here ? This is a question for us all to consider. What about advancing on from where we are now ? Let us join in more activities. Introduce others. We will all benefit from this. Enter in one of our friendly club scrambles. Join the CW or SSB nets. Turn the power down to 5 Watts and see how far you can reach. Buy a soldering iron and discover the thrill of getting "on air" with equipment you have constructed! Write an article for Lo-Key. Start simply if you are a beginner, delve into the depths of a advanced scientific theory if you are an expert. There is a place for you in all club activities ! Participate and just plain enjoy being a member. It is easy and lots of fun.

We have a fine tradition in this club and the future is as good as we like to make it. Let us see how we can do !

My best wishes to you all.

Barry VK5BLS

380	VK3GDM	David MAYES	CAMBERWELL	Victoria
381	VK3DTF	Doug FLYNN	TRARALGON	Victoria
382	VK4LDJ	David JARICK	BALD HILLS	New South Wales
383	VK1RY	Fred RYAN	CANBERRA	Australian Capital Territory
384	SWL	Colin WATSON	LEEMING	Western Australia
385	VK2CMR	Colin REID	BATEMANS BAY	New South Wales
386	VK3CYD	Clem JARVIS	NEWBOROUGH	Victoria
387	SWL	Chris KOUFOPOULOS	RICHMOND	South Australia
388	VK6MV	Roy MELLING	CUBALLING	Western Australia
389	VK2DHH	Harry HANIGAN	SOUTH HURSTVILLE	New South Wales
390	VK3EAR	Alan RYAN	CHELTENHAM	Victoria
391	VK3DTC	Frank TALBOT	ELTHAM	Victoria
392	VK5YY	John SCOUGALL	CRAFERS	South Australia
393	VK2AAX	F. MEYER	HAMILTON	New South Wales
394	VK4BDV	Noel KOHLER	KIRWAN	Queensland
395	VK4ALL	Denis WAUGH	CORNUBIA	Queensland

new position of Secretary; Kevin also is our club's Public Officer. Don Callow VK5AIL continues as Editor of Lo-Key (and also manages the QRP Kit-Set Centre).

In order to maintain stability of administration, the terms of office for every member of this first Committee are such that members hold office until the third annual general meeting or annual plebiscite after their appointments.

Cheque signatories were decided upon and several administrative functions delegated to the Secretary.

The Gutless Wonder VCO

By Bill Currie VK3AWC #255
P.O. Box 107 MORDIALLOC Victoria 3195

When I first saw the circuit in an old copy of Elektor, I thought it was an April fool joke. Here was an RF oscillator that used a couple of CMOS chips and worked from 1 MHz to 30 MHz. The surprising thing was that the circuit used no LC components or RC networks. On further reading I discovered that the VCO depended on the transition delay of the gates for it's operation. This delay varies with the type of chip temperature, the stray capacitance and the supply voltage. The lower the voltage the greater the delay and so the lower the frequency. When an odd number of gates are connected in a ring, the thing will oscillate happily and the frequency can be controlled by varying the supply voltage.

Grabbing a 74HC04 (High speed CMOS hex inverter) from the junk box, I lashed up the circuit shown in Fig. 1. HCMOS chips work from 2 to 6 volts so a lantern battery was used as a power source. To my joy I found the thing would oscillate up to 30 MHz and down to AUDIO frequencies. The output is a cross between a sine and a square wave and unfortunately decreases in amplitude at low frequencies. The original circuit used a separate linear buffer powered from 6 volts to overcome this problem.

Grabbing another 74HC04 I haywired the extra circuitry shown in Fig. 2. This gave me better square wave output even on my old 10 MHz 'scope. I used a 10-turn wire wound pot to control the frequency but found that this gave 'steps' and needed a separate vernier control. This can be a small variable capacitor connected from any inverter to ground. One solution is to replace the 10-turn WW pot with a linear carbon pot and a reduction drive. As the frequency varies fairly linearly with voltage, an 0 - 50 uA meter can be wired as a voltmeter to indicate fre-

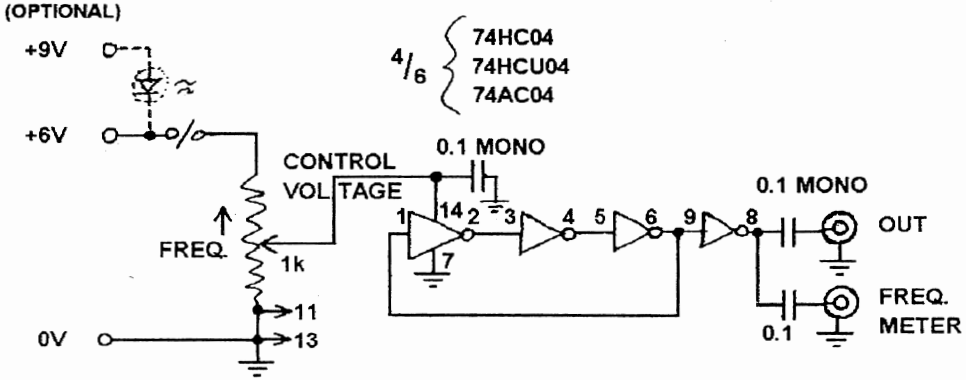


FIG. 1: 0 - 30 MHZ VCO

quency (0 - 50 MHz). There is room, here for improvement such as an expanded scale for 0 - 5 MHz and control of the 'hop off' spot with a trimpot and/or diode.

I tried 74AC04 (Advanced CMOS) chips and reckon the output went up to 50 MHz as my 30 MHz counter and 10 MHz 'scope both 'gave up the ghost'. I finally settled for 74HCU04 chips (Unbuffered) as I found a source of these at 10 cents each ! These chips are easier to tame than the buffered series when used in the linear mode and give a more 'sine like' output, but may not be readily available in the shops. I haven't tried 74C04's or the 4000 series CMOS but guess that the highest output would be about 10 MHz. One advantage with standard CMOS is the 3 - 15 volt supply range. On the unit constructed, the current consumption goes up as the frequency does, i.e. the first chip draws 2 mA at 10 MHz and about 20 mA at 30 MHz.

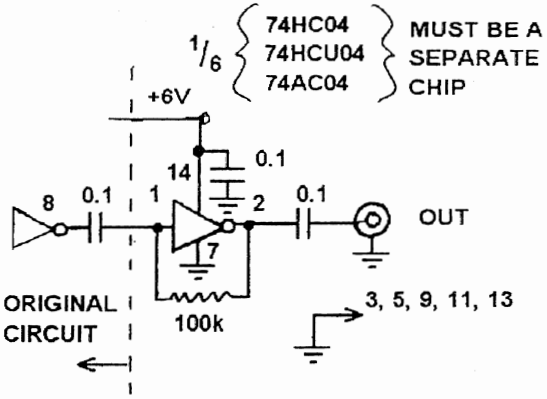
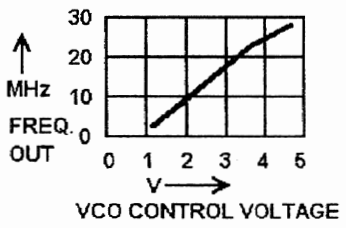


FIG. 2: LINEAR BUFFER

DO NOT use this circuit as a VFO ! The frequency is both voltage and temperature sensitive and cannot be depended on. As a 'rough' test oscillator it is ideal, due to it's wide frequency range. It is easy to apply a saw tooth waveform to the oscillator circuit to sweep the frequency and I am experimenting with that at the moment. The next project will be the addition of a 10 MHz crystal marker oscillator with harmonics at 20 and 30 MHz.

10 MHz Xtals at 30 cents, 74HCU04's at 10 cents and a nice little free catalogue are available from: VORLAC Industries at 261 Huntingdale Road, HUNTINGDALE, Victoria. Telephone: [03] 562 8559 The postal address is: P.O. Box 189, HUNTINGDALE 3166 but there is a $7 minimum freight charge unless you spend more than $300 !

Reference:
ELEKTOR July/August 1986



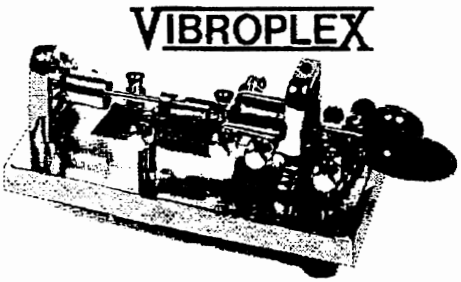
Editor's Note:
I have included this graph which is based on one in the ELEKTOR article, in which a slightly different circuit was used.

KEYERS - FROM DIT TO D.I.P.

By Steve Mahony VK5AIM #184

Only a short time after MORSE'S code was put into commercial use in the landline type telegraphy, users of the "pump handle" key decided that they wanted something that would enable them to send the code faster, even to send some of the dots automatically. Thus the side swiper type of key was born. Also, the sideways operation of paddles gave relief to those heavy users of conventional keys who suffered from the problem "glass arm".

The "Vibroplex" bug key was one of the famous designs and is still going. These automatic keys enable skilled operators to attain amazing speeds in sending.



It was not long after "wireless telegraphy" became widespread that someone decided that electrical systems could do better than the mechanical automatic Key. This was the birth of the electronic key. At first 'it' was done with relays - their contacts, with capacitors and resistors, controlling the timing of the dots & dashes.

Once someone realised that you could use triode valves for things other than radio transmitters and receivers, the true "electronic" key came into being. You still had the sideways paddle working the contacts, but from there on it was all electronic.

The unit must have been huge, with a valve for dots, a valve for dashes, possibly a valve for clock or speed, and one to key the transmitter, with a rectifier to provide the DC.

I can well remember seeing construction articles in the ARRL Handbooks of the 50's for valve type electronic keyers, using a couple of twin triodes. There were also circuits for relay type keyers.

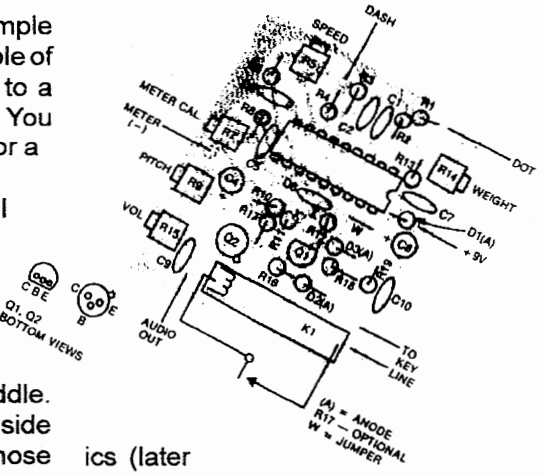
The advent of digital technology and the IC was the answer to the electronic key designers dream ! With flip flops available in dual and quad units in the one DIP IC, then it was a couple of IC's and a handful of components and you had your keyer.

The IC designers took it one step further and put it all in one IC - behold the CURTIS keyer in a chip ! A small PC board with the IC, a few components, trimpots etc. Make it small enough and it can fit in the base of the paddle. In fact such a small PCB is now part of the modern HF Transceiver.

Back to QRP equipment, the sort of gear the QRP'er can build for his/her own enjoyment of the hobby. A simple keyer using a couple of DIP or miniature relays and components is not beyond the enthusiast.

Paddles can go from the simple piece of hacksaw blade with a couple of brass wood screws for contacts, to a brass machine shop wonder ! You name it - and someone's used it for a paddle.

While researching this article I came across a paddle construction article using the contacts from an old PMG 2000 type relay. (Remember: PMG = Post-Master General !) It had the relay contacts on either side of the paddle. As you moved the paddle arm from side to side it closed the contacts. Those contacts having been designed for thousands of make/breaks you were guaranteed good, long lasting contacts.



Recently a UK manufacturer has made a delightful little paddle, solid brass, with dinky little ball bearing pivots, all in one solid block. It's about 2 inches / 50 mm square.

The best basic keyer I have seen and built (twice) is from a circuit in the ARRL's "Solid State Design". This uses the 555 timer IC. Another circuit in an English Amateur Radio magazine uses this same circuit and puts it in a diecast box. This circuit uses a 555 dot generator, a 555 dash gen., a 555 clock gen. and a 555 sidetone gen. Variations use relay or solid state keying. Dual 555's would bring the IC count down, while CMOS 555's would lower the current.

There is the "Accu Key" which uses a flip flop IC along with transistors and diodes. This design has been around for years and has been described in Electronics Australia magazine some time ago. It was available as a kit project from Dick Smith Electronics (later DSE) in the late 70's and early 80's, but sadly is no longer available. It used the New Zealand "Galbraith" paddle mechanism. This paddle was an honest attempt at a reasonably priced simple and basic mechanism. Some people say they were good while others prefer not to use them. There must be quite a few gathering dust in some corner. I brought two back from ZL after my holiday in 1985 and subsequently sold them without any difficulty. As to them being still available, I do not know. (I bought one in 1989 - VK5AIL)

You come across other keyer circuits in various Amateur Radio magazines, many using digital technology and IC's, Many of the more recent use CMOS IC's and draw so little current that you do not even have an ON/OFF switch.

The CURTIS "Keyer in a Chip" is still the simplest and best. The more recent IC has a keying speed circuit built in and a small mA meter that can be made to read W.P.M. You would go

Continued over ...

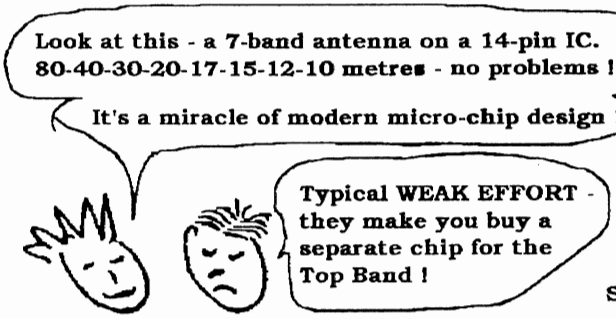
a long way to better it, with it's dot/dash memory and weight adjustment. It is iambic and can be positive or negative keying. It's also CMOS. This IC as a keyer, whether home made or built into a HF rig, along with a GOOD Paddle - something solidly built and mounted - would be the ultimate for the serious QRP CW operator.

To do away with the mechanical contacts of the paddle some have gone to a "touch" type paddle. This is truly electronic. Dots/dashes are initiated by touching a metal plate or paddle and the leakage current - only uA - through the operator's finger to a FET input IC is enough to trigger the rest of the electronics. The operation is completely electronic and silent ! This is ideal if the clatter of the key annoys or disturbs others.

A more recent method is to use the fingers to break an infrared beam, which in turn keys the rest of the works. In this design you use your fingers like playing the piano ! I recently built an infra. key, the "IROESK" from an article in QST, using this system. It is only an ordinary (straight) key; you make the dots & dashes by interrupting the infrared beam

with your finger in the gap in a "**U**" shaped wooden block. It is only a matter of tapping the finger on the table in the morse rhythm. According to the author in QST the design was made for OLD CW operators whose arthritis had caught up with them such that they could not handle a straight key any longer. Again, it is quite silent ! It is a delight to use; you have your hand, palm down, almost flat on the table with your pointer or index finger moving up & down. This key was loaned to an interstate member for a QRP display and took quite a while to find it's way back, so it must have been of quite some interest !

With the miniaturising of almost all electronic components, touch or IR keying a 1 watt QRP TxR could be made that looks nothing like our present concept of a Transceiver setup. The biggest problem would be getting the RF up & out via an antenna – or the antenna itself !?



VK5AIL

See References (opposite) ...

References:

1. Relay and Valve Keyers RSGB 4th Ed. 1968/69 p.8.11, 8.10, G3PEW keyer.
2. Curtis CMOS IC, 8044 keyer IC, Curtis Electro Devices, Box 4090 Mountain View, California 94040 U.S.A. Circuits in Digital Equipment chapter of ARRL Handbooks from 1980 onwards.
3. ICOM IC-735 manual.
4. Lo-Key - see published index.
5. Amateur Radio - see index available from W.I.A.
6. RadCom December 1993.
7. An Electronic Morse Code Keyer - Electronics Australia March1978. The EA78 article was reprinted in Lo-Key June 1989.
8. Solid State Design for the Radio Amateur, by Wes Hayward W7ZOI and Doug DeMaw W1FB, Chapter 7 p.178.
9. Amateur Radio UK, April 1984 p. 58. M. Hadley G4JXX.
10. Little Jimmy Keyer, QST September 1979 p.26, Dick Rose W7GMC.
11. IROESK Infrared Key, QST February 1992 p.30, L. Ceblik W4RNL.
12. Other keyers and information, all QST/ARRL including:

- Solid state keyer, MicroTO Keyer ARRL Handbook 1973 Ch.11 p.362.
- The Turkey QST September 1954
- The Ultimatic - QST February 1953
- The Corkey Tubeless Keyer - QST November 1950
- In Search of the Ideal Electronic Key - QST February 1951
- Accu-Keyer - ARRL Handbook 1977 Ch.11 p.364-366

BOOMERANG CIRCUIT BOOKS

Barry Samuel VK5BLS
P.O. Box 158, GUMERACHA S.A. 5233

Here again are the BCB circulation lists. An asterisk * means that you will be sent all BCB's. The BCB is sent out when we get at least 5 members on its list. You pay the postage to the next member (current postal rates are $2.65 interstate and $2.00 intrastate).

A double ** indicates the Moorabbin and District R.C. members who will be passing the B.C.B.'s from hand to hand.

If you are in VK and wish to go on the list for the BCB's please let me know.

BCB #2 - 6th flight (current)

*Shannon VK2EB
*Alan VK3NEA
*Peter VK3AKS
**Ross VK3ARC
**Alan VK3AUC
**Bob VK3DHV
**Joe VK3DJI
**Stewart VK3ESD
**Bill VK3AWC
*Tom VK5TL

BCB #3 - 8th flight (current)

**Ross VK3ARC
**Alan VK3AUC
**Bob VK3BBI
**Bob VK3DHV
**Joe VK3DJI
**Stewart VK3ESD
**Bill VK3AWC
*Alan VK3NEA
*Peter VK3AKS
*Shannon VK2EB
*Tom VK5TL

BCB #4 - 5th flight (current)

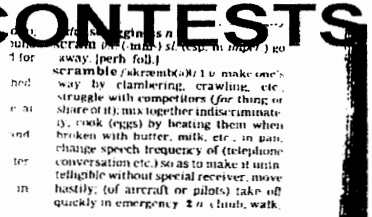
*Trevor VK5ATQ
*Shannon VK2EB
*Alan VK3NEA
*Ron VK4EV
**Ross VK3ARC
**Alan VK3AUC
**Bob VK3BBI
**Bob VK3DHV
**Joe VK3DJI
**Stewart VK3ESD
**Bill VK3AWC
*Peter VK3AKS
*Tom VK5TL

On Future Lists

*Cec VK2COH
You ?

AWARDS AND CONTESTS

By Ian Godsil VK3DID #112
25 Monaco St., PARKDALE Victoria 3194



Greetings to all Members, hope that you are well and getting ready for the BIG DAYS !

Firstly, my thanks to those who replied re the use of the WARC bands for Scrambles. I was unaware of the Agreement not to hold contests on these bands and I thank you for that information.

Secondly, I remind all Members that the weekend of **11th/12th June is QRP CW WEEKEND CONTEST** (see details in LO-KEY #41 page 5; also in May Amateur Radio page 23). I ask you all to make a special effort to take part in this, even for just a few contacts and to encourage all your friends to "have a go". Like the RD Contest, we would like this to be a success, both for the concept of a long QRP contest and for the honour and promotion of our Club.

Please get your rigs ready and join in and, having taken part, PLEASE send a log to **Ron Everingham VK4EV #130, 30 Hunter Street, Everton Park, Queensland, 4053**. Ron originally suggested the idea of the QRP Weekend and has volunteered to process the Logs.

We ask your help in making this weekend a great success !!!

SCRAMBLE RESULTS

Scramble 34 February, 1994

=1	**VK3BPG**	**Reg**	#7	10	points
	VK2WES	**Wes**	162	10	"

Scramble 35 March, 1994

1	**VK5BLS**	**Barry**	#209	25	points
2	**VK7LF**	**Tom**	368	10	"
=3	**VK3AAM**	**Phil**	224	5	"
	VK3DID	**Ian**	112	5	"

Scramble 36 April, 1994

1	**VK2WES**	**Wes**	#162	45	points
2	**VK2FKE**	**Bill**	217	41	"
3	**VK3AAM**	**Phil**	224	30	"
4	VK4EV	Ron	130	21	"
5	VK7LF	Tom	368	16	"

Scramble 37 May, 1994
No logs received as at 10th May.

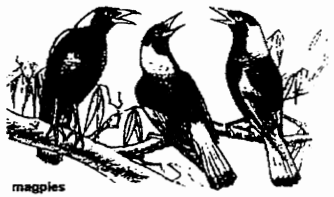
Again my thanks to those who took part and sent their logs; also another welcome to the newcomers who are starting to take part (and winning places !). Your participation is much appreciated.

It is evident that 80m is the most successful band, even despite the QRM/N levels, so for the Winter Quarter all Scrambles will be on 80.

CLUBTIVITIES

Greville Knight VK6GRK #133 has shifted to Western Australia and struck the jackpot with his 'initials callsign' (previously VK7ABH in Tasmania). Now we know why Greville moves between states so often !

Tom Van Andel VK7LF #368 has written about some April/May '94 DX working on QRP CW, including: I1TKB Gio in Genoa on 20m, WX7R/QRP John in Silverton, Oregon on 20m, F5IN Mike in Loiret, France on 40m and JP2UXX Hiro in Gifu, Japan on 15m.



magpies

QRO age, QRP pwr - Tom Laidler VK5TL (90 years) and Leith Cotton VK5LG (89 yrs) both had birthdays near the end of May. Both enjoy homebrewing as well as QRP.

Leith celebrated the night before his birthday by working stations including: a DJ7, a DL3, an OH4 and LG5LG an international station located between Norway and Sweden. All on 1/2 watt QRP CW using 'The Monster' (see Lo-Key #35 p.2).

Dates for Winter 1994 Scrambles:-

#38 Thursday June 23rd
#39 Wednesday July 13th
#40 Thursday August 4th

All Scrambles on 80 metres, 1030-1200 UTC. Rules in September 1993 Lo-Key #39 page 9.

Logs to me as soon as possible thereafter, please.

FINAL REMINDER

QRP CW WEEKEND 1994 Contest 11th/12th JUNE, 1994

73, Ken VK3DID #112

Two Other Contests of Interest to CW'ers:

The rules for these appeared in Amateur Radio magazine May 1994 - see page 23 - along with the rules of our QRP Weekend.

Jun 18/19	VK Novice Contest
Jun 18/19	All Asia CW DX Contest

(Don't scramble THIS egg !)

Simple Electronic Keyer Using 555 Timers

Contributed by Len McGowan VK4CWM #276
20 Catherine St., AYR, Queensland 4807

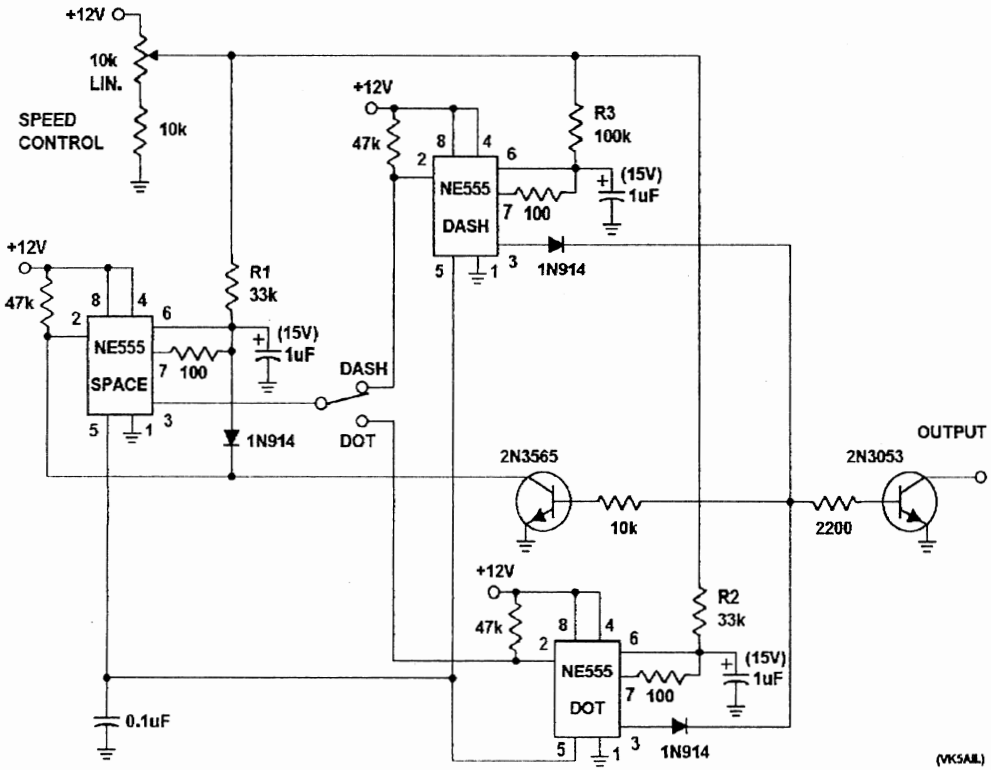
Members may be interested in a circuit for an electronic keyer taken from Solid State Design for the Radio Amateur by Wes Hayward W7ZOI and Doug DeMaw W1FB (ARRL). See pages 177 & 178 of the original 1977 edition.

I have built a couple of these keyers which proved to be very good compared with other circuits seen. As the Space as well as the Dot & Dash is timed, it prevents any tendency to cram characters. The timing of each of these is done separately.

Note that there is no sidetone oscillator, however I have used an audio amplifier from Dick Smith's Funway Series No.2 to good effect. Most transceivers have their own sidetone, anyway.

This keyer is simple to build and very cheap. I have built one on a prototype board, also obtained from Dick Smith Electronics.

(See circuit below, with values from Solid State Design, and notes opposite)



FROM THE EDITOR'S DESK

By Don Callow VK5AIL #75 **5 Joyce St. Glengowrie SA 5044**
Telephone (08) 295 8112 day/night

Thanks to **Paul Ireland VK2DMV and Reg Bedford VK3BPG** we now have some background papers on the old **VK CW QRPp Club**, organised by **Jack Swiney VK6JS**, which was the forerunner of our present club.

Do you have any ideas for a regular column in Lo-Key - and would you be prepared to contribute ? For example, a regular feature on DX working may be of interest. Several people who are active DX'ers mention contacts in letters to me and this information could go to a DX columnist. Some other possibilities: you may have a favourite area of homebrewing or be prepared to provide notes for beginner homebrewers.

When I came up on the CW Net on 31 May the Net ControllerTed VK2CW naturally thought I was chasing after his column for this issue ! Not so, Ted - I was just having one of my rare CW contacts. Condx were very noisy and I didn't make it easier for Ted when my signal dropped near the end. I suspect I rotated the CW Level control on the HW-9 anti-clockwise, mistaking the knob for the RIT. *Oops - lack of practice !*

Best 72 *Don VK5AIL*

NOTES:

The audio amp. mentioned by Len would be the intercom & general amplifier K-2630 listed on p.135 of the DSE 1993/94 catalogue.

The authors of Solid State Design point out that one advantage of this circuit is that "when a character is started (a dot or a dash), no more information may be entered into the circuit, irrespective of paddle position. In many circuits it is necessary that the user be 'off the paddle' before the end of the dot or dash. Otherwise, another character will be generated."

The timing of the space, dot and dash may be changed by altering the values of the timing resistors R1, R2 and R3 (respectively) "in order to adapt to any individual taste".

Apart from its value as an operational keyer, this is a good project to use for experimental purposes and to obtain a better understanding of electronic keyers. Merv Quinn VK3ADX has also obtained good results from this circuit.

Don VK5AIL

p.s. The Kit-Set Centre has stocks of both the transistors and NE555's.

U Can Help !

By Don Callow VK5AIL
5 Joyce St., GLENGOWRIE SA 5044

'The Experimenter' -

Do you have any copies of **"The Experimenter"** a publication on home-brewing put out by the late **Len O'Donnell VK5ZF #1** ?

At least two issues were produced, a couple of years ago. I have No. 1, dated Sept. 1990 and with an advertisement for the CW Ops Club on the back cover. Thanks to Peter VK3EOP I have a later (undated) copy, also No. 1 but containing different articles.

Was a No. 2 issued ? If you can help by giving, selling or loaning please let me know at the above address.

1 GHz frequency counter -

Peter Parker VK6BWI is building a 1 GHz frequency counter from an article which appeared in Electronics Australia in April 1993. However, Peter reports that he has problems getting it to work properly. If YOU have built this one Peter would like to swap notes with you, so pse contact him at:
14 Marquis St., BENTLEY W.A. 6102

OMEGA Orphan ?!

George Stewart VK5ALS (c/o 21 Brookside Ave., TRANMERE S.A. 5037) is building an Omega all-mode multi-band transceiver, details originally published in the British magazine **Ham Radio Today** late 1983 & early 1984. The Omega was available in kit-set form - there was a number of separate modules - from WPO Communications, based in West Sussex. Apparently WPO went out of business several years ago, before George obtained all the required modules.

If you know where to obtain Omega modules or even some of the parts, please contact George who would also appreciate hearing from others who have built this tcvr or used some of its modules.

The Omega is a major, long term project - one that many would never finish. George is doing well - the receiver and most of the modules common to Rx and Tx are complete and appear to work very well indeed. So, **CAN *U* HELP ?**

QRP Yaesu FT101EE -

Leith Cotton VK5LG now has a **Yaesu FT101EE** which he would like to operate at QRP levels. Do you have info., such as a pin diagram, on the octal socket associated with the ALC line ? This seems a promising way to obtain a reduction in power without interfering too much with the rig.

The ASAP (*As Simple As Possible*) Transmitter

By Dave Archer VK3DVB #183
6 Jerome Court, FRANKSTON Victoria 3199

The transmitter to be described is the simplest way I know of putting an SSB signal on 80 metres. It is bare bones, no frills and inspired by Stoner and Earnshaw back in the sixties.

The prototype was built section by section, proving out each till I reached the final. Everything was screwed to a piece of wood and fly-wired.

The philosophy behind it was that I wanted it, above all, to be simple and cheap. It had to be reproducible requiring fairly standard parts. The mechanical filter FL1 sets the lower limit on price as they are not "cheap". Many hams already have them lying around. I did. I used a crystal cut to the lower sideband. My filter was listed as a 28, meaning it had a 2.8 kHz band width. So my crystal would have to be 1.4 kHz below the centre frequency of 455, namely 453.6 kHz.

One important thing is that the whole thing is a junk box project, and the p.c.b. reflects that. Other constructors may have a different sized transformer, filter etc. and would need to modify to suit.

Transformer T3 is an interstage unit. Mine proved to have impedances of 3,000Ω to 500Ω, but anything from 10,000 for the primary and 2,000 for the secondary should do fine. Dick Smith Electronics sells one of those if you don't have one, for less than $2. The transformers T1, 2, 4 & 5 are all ordinary 455 kHz IF units (white, red or black cores).

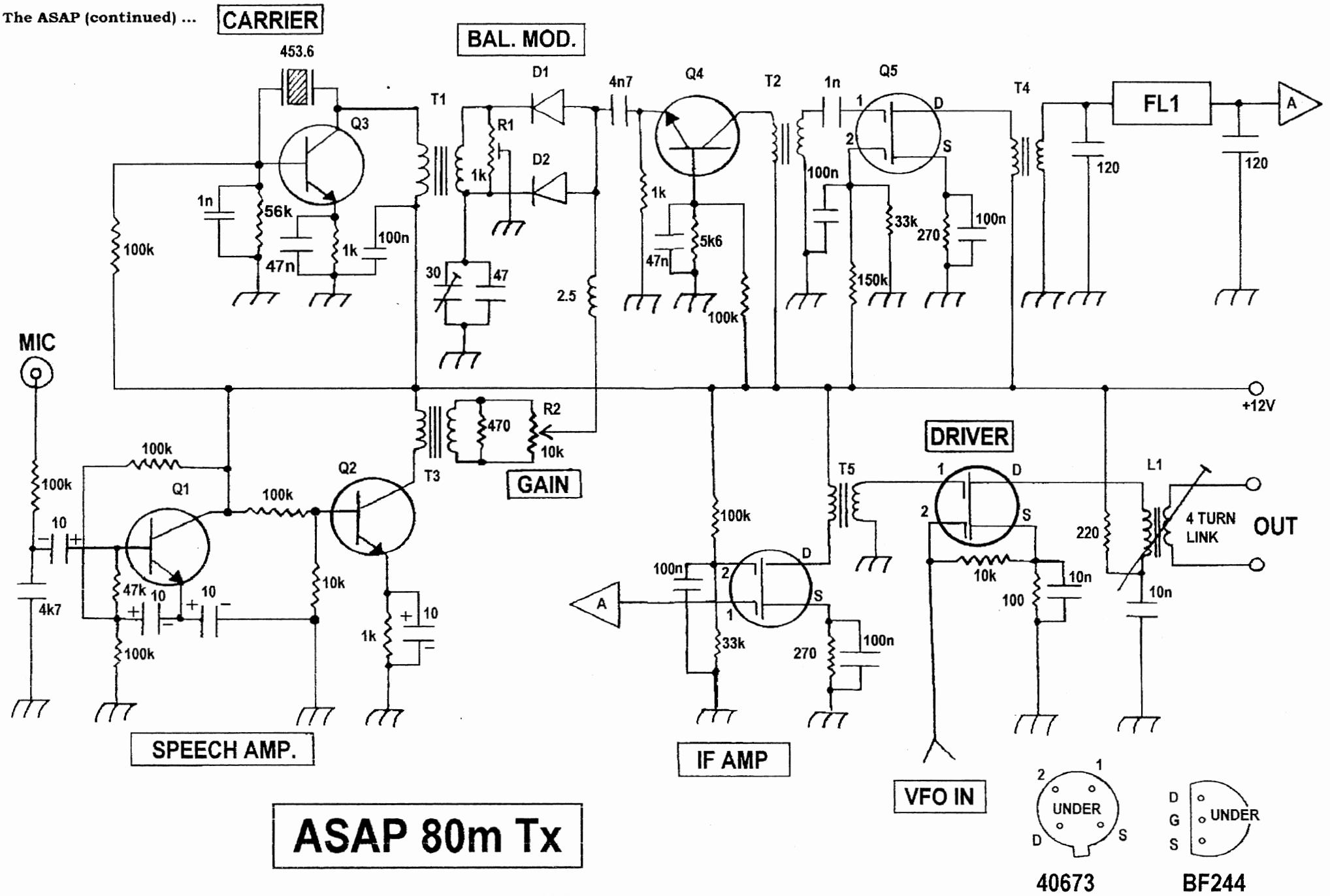
Don't worry if you don't have the same varactor I used. There are many that would be adequate, including BB119. (*BB119 available from the Club as Cat. No. C015 - VK5AIL*) I even got good results with power diodes, type 1N5059. Better stability is obtained with the back-to-back types. If you own a frequency counter it's a simple job putting oscillators on frequency. Sometimes just monitoring with a receiver does the job.

Although this little project by Stoner & Earnshaw originally had PNP transistors throughout and boasted no exotic circuitry, it is nevertheless a very worthwhile project. The transistors (Q1, 2, 3 & 4) are virtually any NPN's on hand; BC107, BC108, BC109,2N2222 or BC238 would do. The mosfets I used were 40673's. If you can't lay your hands on any of these I strongly recommend the BF981 or others such as MPF121, MFE131 or MFE121. (*BF981 available from the Club as Cat. No. C036 - VK5AIL*)

The diodes D1 & D2 need to have the same forward resistance. Use germanium types such as OA90, OA91 or OA83. The circuit will perform quite well with silicon type 1N4148 or 1N914.

The frequency determining capacitors are polystyrene, though you could no doubt use silver mica. Bring the balance control R1 out to the front panel so that if you want to run CW it's easy to unbalance things.

Continued over ...


CARRIER
BAL. MOD.
453.6
T1
D1
D2
4n7
Q4
T2
1n
Q5
T4
FL1
A
Q3
R1
1k
1n
56k
47n
1k
100n
100k
30
47
2.5
5k6
150k
33k
270
120
MIC
+12V
R2
470
10k
T3
GAIN
DRIVER
T5
L1
100k
Q1
Q2
10
4k7
47k
10k
1k
4 TURN
LINK
OUT
220
10n
100
SPEECH AMP.
IF AMP
VFO IN
UNDER
40673
BF244

ASAP 80m Tx

The ASAP (continued) ...

A key in the collector of Q3 will switch the carrier on and off - instant CW ! The VFO is a varactor controlled one because I got sick of looking for the right variable !

I'm sure you will have noticed how, if a circuit is presented one way, hams - with their infinite creativity - will always alter parts of it. This may be due to innate cussedness, but is more likely the result of the dictates of the junk box.

Apart from the fun of building this project there are all sorts of possibilities evident. I will leave the intrepid experimenter with his own ruminations - have fun.

@QRC

80m VFO with Varicaps

By Dave Archer VK3DVB #183
6 Jerome Court, FRANKSTON Victoria 3199

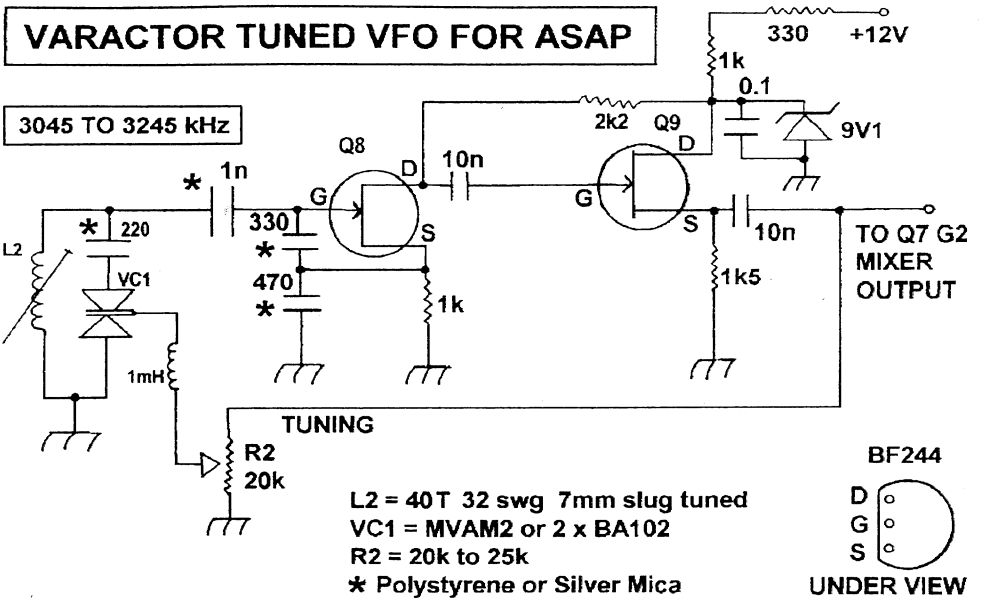
For some time now I've been investigating the possibility of using varicap tuning diodes for all my oscillators. Whilst I still have a few variable capacitors on hand, often they are the wrong value. Some are single bearing - not really suitable. I researched all my available literature and discovered that not a great deal has been written about varicaps. So I began to experiment. I first hunted around for a reliable source of these wondrous devices. A few suppliers had the BA102. These look like ordinary diodes and are less than two bucks each.

An acceptable VFO can be constructed using just one of these, but as I prefer to opt for the added stability I generally use a pair back to back. I have produced VFO's for 80 metres, intended for use with the ASAP, and set to work on a 5 MHz model. Please refer to the two circuit diagrams when reading these notes.

The circuit I ended up with was inspired by a 1975 circuit I found which used a variable capacitor. I guessed it would have a clean wave form (I was right). Stability would result from good component choice and the usual precautions, such as short leads, doped coil, p.c.b. construction and an air-cored coil.

The circuit as presented should appeal to anyone wanting to build a receiver for more than one band. The main tuning control, R2 can be a 10-turn helipot and the two 1k low and high end adjust pots can be trimmers. See 5 MHz circuit. The Lo and Hi are for calibration and are only peaked once.

The coil, L1, is a 7 mm (1/4") and the wire gauge can be between 32 swg and 26 swg. I used 28 swg. The chokes can be any value from 390 uH to 1 mH. The bypass caps are not critical and can be 0.01 to 0.05 depending on what's on hand. The frequency



determining components should not be varied a great deal. Polystyrenes are the best, but silver mica should be O.K. The zener can be anything from 6V8 to 10V. The lower the better because there will be less heating effects.

The varicap I used in the prototype was a BB212 available from Stewarts. (*Also DSE - VK5AIL*)

Almost any fets you have will suffice. I used BF244 because I had them on hand. It can be replaced by MPF102, MPF103, MPF105 or BF245.

I switched it on and waited for the drift. After an hour I was still waiting for the drift. The waveform is squeaky clean, due to all the chokes as much as anything. I didn't shield the coil as I intend putting the whole unit in an enclosure and fitting feedthroughs to the Plus rail. By changing the coil turns it can be made to work from 4 MHz to 6.5 MHz. I use a CRO and a counter to set it up.

Have fun !

Data:-

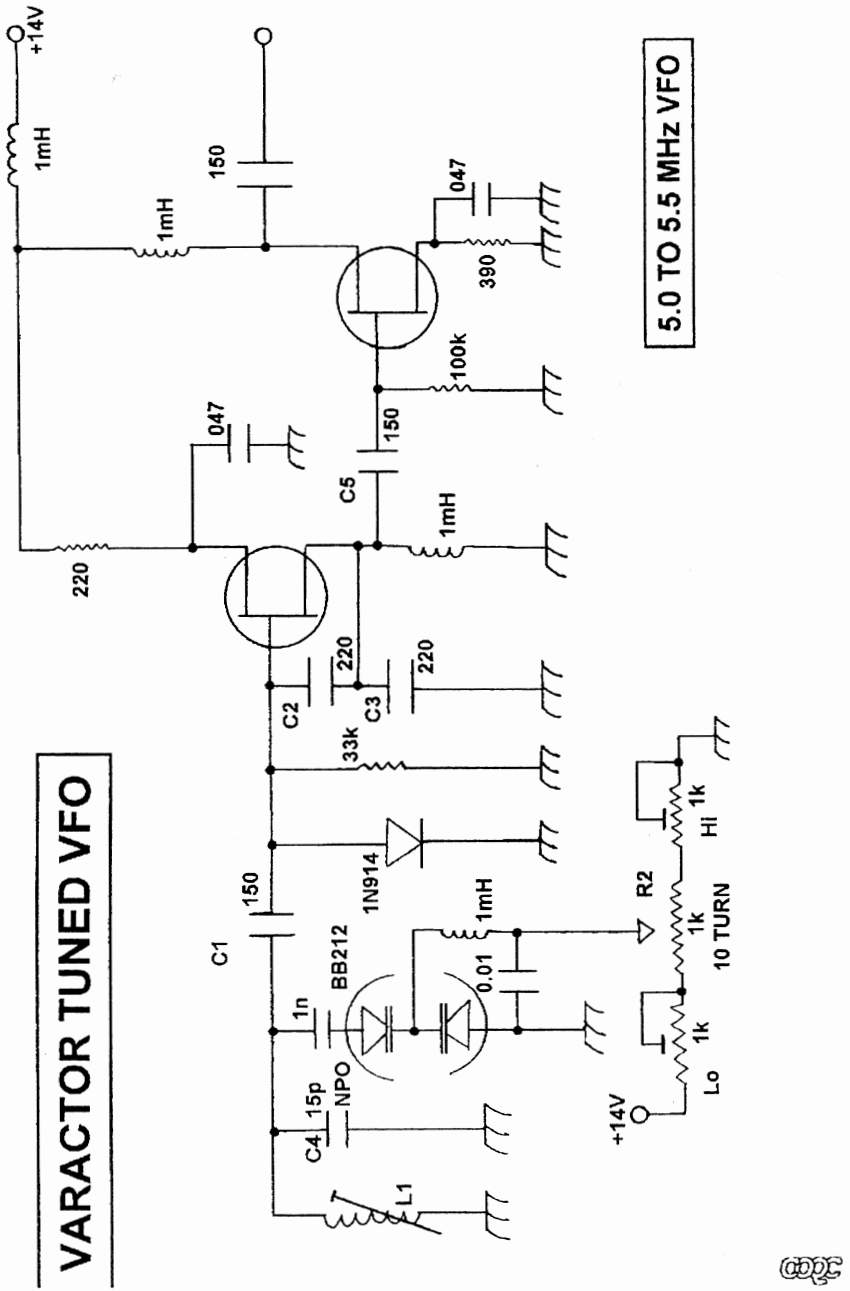
Coil 7 mm dia.
29 turns 28 swg, slug tuned
Varactor BB212
C1,C2,C3 Polystyrene or S.M.
C4 N.P.O.

Note: If you're interested in only in the CW band, run it on 12V. The reduced bandwidth will be quite adequate.

5 MHz circuit on next page ...

Corrections to circuit diagram on pages 16/17: Capacitor to ground below mic resistor is a 4n7. I.F. transistor is Q6 and Driver transistor is Q7.

VFO with Varicaps (continued) ...

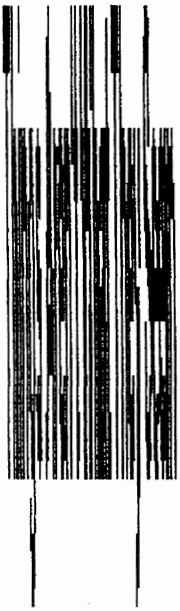


Things Aren't What They Seem

By Dave Archer VK3DVB #183
6 Jerome Court, FRANKSTON Victoria 3199

Quite possibly the concept has taken hold that I don't embrace exact values in my projects. There is some truth in this of course. It gained momentum when it dawned on me that of all the VFO's I'd constructed, not a single one had come out anywhere near the frequency stated in the article.

The hunt for an answer was on ! I began by examining the coil; Yes, the turns were correct and the gauge came up trumps on the micrometer. The coil former was as stated.



The variable capacitor had its value stamped on it, and yet the frequency coming out of it was way higher than intended. If the capacitor was lower than stated, that would account for it. I disconnected it and put it across my capacitance meter. To my astonishment it read only 75pfd. It should have come up 100pfd ! It had 100 printed on it. So I pulled out every capacitor out of the PCB and measured them. The same was true of *all* of them; they all measured different to the stamped-on value shown.

Some quick calculations revealed the oscillator should come out somewhere near 4.1 MHz. My counter showed it to be 4.152 so it was in the ballpark for the measured values, but nowhere near the 3.5 required. Adding a few NPO capacitors soon brought it on frequency.

The point I am making is that things aren't always what they appear, and independent measurements are often necessary. I now have a "cockpit drill" I go through before I begin construction:

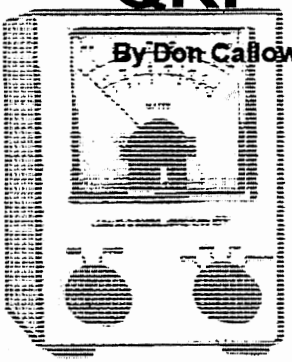
1. What frequency do I want ?
2. What values do 'they' say I need ?
3. What value do the parts measure ?
4. What frequency do I get ?

So when you see a circuit with stated values, remember: that's what the author thinks, and you may have to modify slightly to bring it all on frequency.

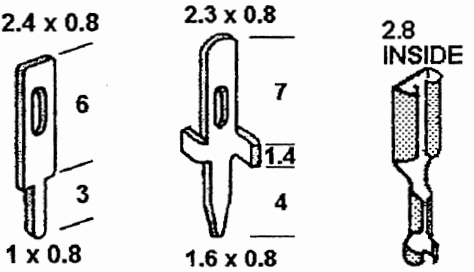
If you don't yet have a capacitance meter, get cracking and build one. They're cheap (about $A 40 all up) and are very easy to build. Once you have one you'll wonder how you managed without one. It'll take all the guesswork out of building oscillators.

Have fun !
Dave VK3DVB

QRP Kit-Set Centre



By Don Callow VK5AIL **5 Joyce St., Glengowrie S.A. 5044**
Tel. (08) 295 8112 day/night



BONUS BITS

Thanks to Peter VK3EOP and Steve VK5AIM we have had a large increase in the Bonus Bits list. There is no space to print the new items in this issue - and I haven't finished updating the catalogue - so it will have to wait. The good news is that some of these have already been sent out. See Lo-Key #39 for the 'rules' and #39 & #40 for the list.

NEW ITEMS

Murray VK4GH asked (last year) whether we knew of a cheap source of PCB pins. We have obtained several types which should be useful for projects. If you check retail prices you will find these are VERY good value.

C114 1m 2.40
Rainbow cable 24-way. For colour-coding project wiring. You can strip it to any number of wires down to one !

We have one roll at way below the normal retail price - In catalogues I found 12 core at $1.95 a metre and 16 core at $4.50 a metre.

C115 10 40 cents
PCB Matrix Pin. Flat type. Makes a good terminal and will also take a spade fitting. See sketch.
Similar to DSE H-5594 [67]

C116 10 50 cents
PCB Matrix Pin. Flat type with lugs (ears ?). Makes a strong terminal and will also take a spade fitting. See sketch. [67]

C117 10 70 cents
Push On Receptacle to suit mini tab (spade) connector and will take C115 & C116 PCB pins. You can crimp/solder a wire to the female spade fitting and use it as a line socket. See sketch.
Similar to DSE H-5036 [J54]

FULL LIST IN SEPTEMBER ?

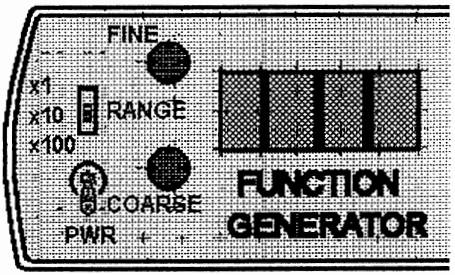
If there is room we will publish the full list in Lo-Key #43, but in the meantime we will produce separate full lists for those interested.

Circuits and Shortcuits

Contributor: Peter Grove VK3EOP #194
P.O. Box 255 CHADSTONE CENTRE Victoria 3148

1. Finishing Aluminium Panels

Top quality appearance ...
... two ways to get it.



How many times is a project spoiled simply by the appearance of its front and rear aluminium panels ? Aluminium, due to its nature, is easily marked and these marks, if not removed, can remain for the life of panels.

I have found two methods of cleaning up such panels and leaving them with a more professional appearance.

The first method is to drop the completely finished panel into a bath of Caustic Soda dissolved in water. The proportion of caustic soda to water can be varied and for a reasonably quick result 3 or 4 tablespoons of caustic soda in a litre of water is satisfactory. This proportion can be varied if more speedy results are required. Be sure to observe the safety instructions while handling the caustic soda, such as: adding the caustic soda to the water and stirring until dissolved and wearing gloves & eye protection during the etching process.
(See adjacent panel.)

Safety and Disposal

If you are not experienced in the use & disposal of chemicals seek advice from someone who is. Read carefully the instructions with chemicals and comply with them.

During the caustic soda etching process it will be found that considerable heat is generated and noxious fumes emanate from the process. It is better not to inhale these fumes. The first accidental whiff will reveal why! As to the heat generated, the bath used should be made of enamelled steel or stainless steel. Plastic trays will revert to their original shape of a flat sheet if subjected to too much heat.

The etchant may be stored between uses in a 2 litre plastic container securely stoppered and stored out of reach of the junior ops. I have some which has been stored in this fashion for a year or so and is still quite satisfactory.

Disposal of the etchant may be via the domestic drainage system. Caustic soda is recommended for clearing blocked drains and in a diluted form should not present environmental concerns.

Immerse the parts to be treated in the solution and leave them to etch for one or two hours. During this process the mixture bubbles vigorously, generates considerable heat and throws up a fine black deposit on the parts being treated.

When the degree of etch is satisfactory the parts may be removed from the bath and washed under running water to remove the deposit. If the etch is considered unsatisfactory the parts can be immersed again in the bath for a longer period. When you are finally satisfied with the etch, remove the parts from the bath, wash them as before and dry them with a soft dry cloth. Try not to handle the parts with bare hands at this stage as the cleaned metal will react with oils from your skin and quickly return you to 'square one' !

Leave the parts in a safe place to dry completely then give them a light spray from a spray can of polyurethane or clear varnish. When this coat has dried the parts may be handled safely.

I apply any lettering and markings required for panels at this stage, using Letraset or other dry transfer lettering.

When this has been completed the lettered panels are ready to receive the final protective coat of clear spray. I prefer a low gloss polyurethane spray if available. The varnishes tend to give the panels a faint brownish tinge due to the nature of the varnish.

The second method is to fabricate the panels as before, drill and finish all holes and cutouts. Now the panel may be fixed to a flat surface with double sided sellotape (adhesive tape) and brushed with an ordinary wire brush. The brush should be clean or new and set aside for this purpose only.

As the aluminium is brushed it will be seen that its appearance changes from its characteristic grey silver to a white brushed appearance. Direction of the brush strokes is unimportant. I generally apply them in the longitudinal direction of the panel. What ***is*** important is to make sure they are all in the same direction.

After the panel has been brushed and is of a uniform whitish appearance any loose dust may be removed with a soft cloth and the panel sprayed, lettered and sprayed again as before.

When finished, the panels may be fixed to the chassis ready to receive their components.

I am careful to use washers under all nuts and take extra care not to scratch the panel when attaching other components.

Is This You ?

If you have joined our club during the 1993/94 year and do not have a transmitter or transceiver, then this item may interest you.

If you are keen to get on air on 80 metres (even before you finish all those homebrewing projects), we may be able to help.

Please write to the President or to the Editor of Lo-Key (addresses on outside back cover) if "this is you" and give us some information about yourself and your equipment situation etc.

"Nothing ventured, Nothing gained !"

GDQC

2. *The Case* for Cyanoacrylate Adhesive (Superglue) in Chassis Construction

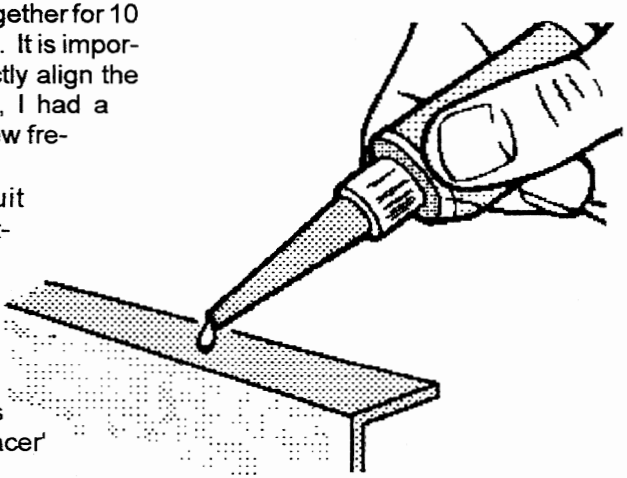
I recently acquired a number of small steel trays via the surplus market. These I thought would be an excellent chassis for small radio projects. The first such project was a frequency counter. The tray was just the right size for the circuit board but needed front and rear panels. This was made difficult by the fact that the tray had upstands of only 6 mm at front and rear for the panels to attach to.

It would have been easy to drill both the panels and the upstand and bolt or pop rivet the panels to the upstand. I discarded this solution due to my desire not to have obvious fixing methods on display. After more thought the possibility of gluing the panels in position presented itself.

I fabricated the two panels, cutting all holes, finishing, lettering and final-finishing them. This done I applied a thin film of superglue to the mating surfaces which were then introduced to each other and pressed together for 10 seconds while the glue set. It is important at this stage to correctly align the mating parts. This done, I had a suitable chassis for the new frequency counter.

Mounting the circuit board came next and I wanted this to stand on 6 mm long tubular spacers through which the 3 mm bolts to hold the circuit board would pass. All of you will know the delights of the game of 'find the spacer' during such an operation. My solution was to pass a bolt through from the bottom of the tray, slip the spacer over it and lightly secure it all with the nut. This done, I applied a couple of drops of superglue to the spacer where it sat on the tray. Removing the nuts and bolts revealed spacers in perfect alignment with the mounting holes, and securely attached to the tray.

I fabricated the cover in a shallow **U** shape which would attach to the side turn-ups, which were 20 mm high and would make attaching the cover relatively simple. Inspired by my earlier successes with the superglue I drilled the cover and turn-up to receive four 3 mm fixing bolts. Having done this I removed the cover and assembled the bolts and nuts in the holes. Then I applied a drop or two of glue to the nuts and set the chassis aside while the glue set. Returning to it an hour or so later I found the low viscosity glue had seeped



Silent Key

Luke Dodds W5HKA

of Grapevine, Texas U.S.A.
passed away in January 1994.

Luke was active in the administration of QRP-ARCI for a number of years and was also a member of the G-QRP Club. He was a dedicated QRP operator and supported and promoted QRP activities world-wide. He found time to assist other clubs and their members, including our VK club on more than one occasion. He was highly regarded by the QRP community and will be greatly missed.

The Case for Superglue (continued) ...

under the nuts onto the screw threads making removal of the bolts well nigh impossible. After removing the bolts and nuts I decided to repeat the operation but this time apply a glue resist to the threads in the form of a light smear of grease or a light spray of WD40. I reassembled the nuts & bolts and reapplied the glue as before. After the glue had set I was able to remove the bolts without difficulty, leaving the four captive nuts firmly attached to the chassis.

The last task was that of applying a window of red Polaroid over the cut-out for the readouts. After cutting and finishing the edges of this I applied thin beads of superglue to the mating surfaces and carefully attached the Polaroid to the panel against light pencil marks previous applied. This produced a readout window again with no obvious fixing displayed.

My experience showed one or two areas where great care needs be taken. Due to the runny nature of the adhesive it very quickly and easily transfers to fingers and hands. From here it transfers to finished panels and windows. After prising fingers loose from such inadvertent contact you are left with dirty fingerprints on your carefully finished panels, windows etc.

A way to avoid this eventuality is to mask the face sides of these parts with self adhesive tape, such as parcel tape, prior to assembly. The parts may then be glued into place without difficulty, with any fingerprints appearing only on the mask. Removal of the mask is a simple matter and will leave this stage of your project in pristine condition.

The A-TU-Z of Antenna Couplers ?

Well almost ! - A Two-Coil Z-Match with No Switches or Taps

By Don Callow VK5AIL

Introduction

There are some projects which you quickly come to realise will be winners. This is one of them. I have 'urgently' needed another ATU for many years and out of pity and in an attempt to inspire me, **Steve VK5AIM** loaned me one he built recently, based on articles in the W.I.A.'s *Amateur Radio* magazine. So this article is dedicated to Steve, who saw what "AIL'ed" my station and gave me a new "AIM" !

There has been much written, particularly in recent years, on the subject of 'single' coil, untapped Z-matches and similar Antenna Tuning Units. I started to read up on all this in *Amateur Radio*, but in the finish gave up and built one from a design in an article by Lloyd Butler VK5BR in the September 1993 issue. This Z match is designed for the HF bands 80 to 10 metres. The articles and other items are listed in the References section at the end of this article.

So here is a useful construction project, with plenty of detail to encourage those who may be new to this type of construction. The theory, background and evolution of this design can be found in the References. This ATU was much easier to build than I expected and has 'done the job' so far, although not scientifically tested. It is not quite finished (*almost* is - see comments at end) but it is in a case, which is a first for me.

The circuit diagram in Figure 1 is the same as VK5BR Lloyd's version and shows the values from his article. However, in practice I varied the construction details to use materials available in my junk box.

Layout

You should first decide what type of case (if any) to use. Many ATU's are built on wooden board with front and back panels and no covering. Sometimes they are in a metal case, more or less RF-proof. See Figure 2.

On this occasion I built the main

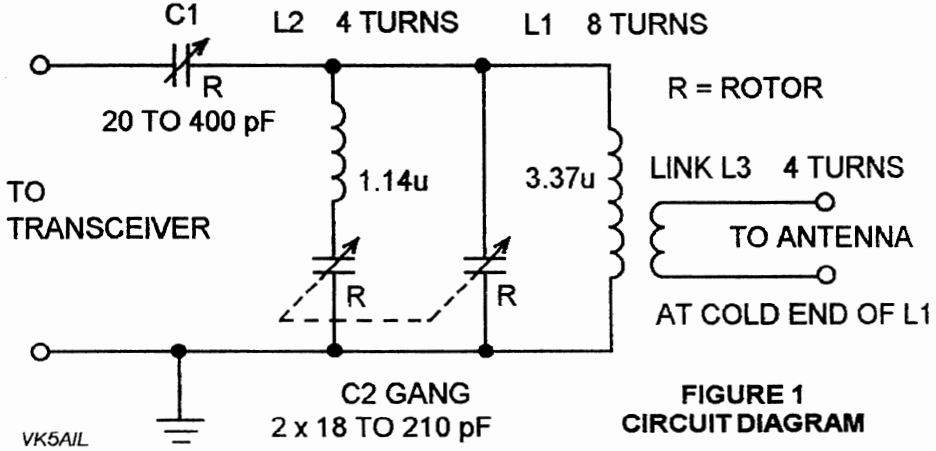


FIGURE 1
CIRCUIT DIAGRAM

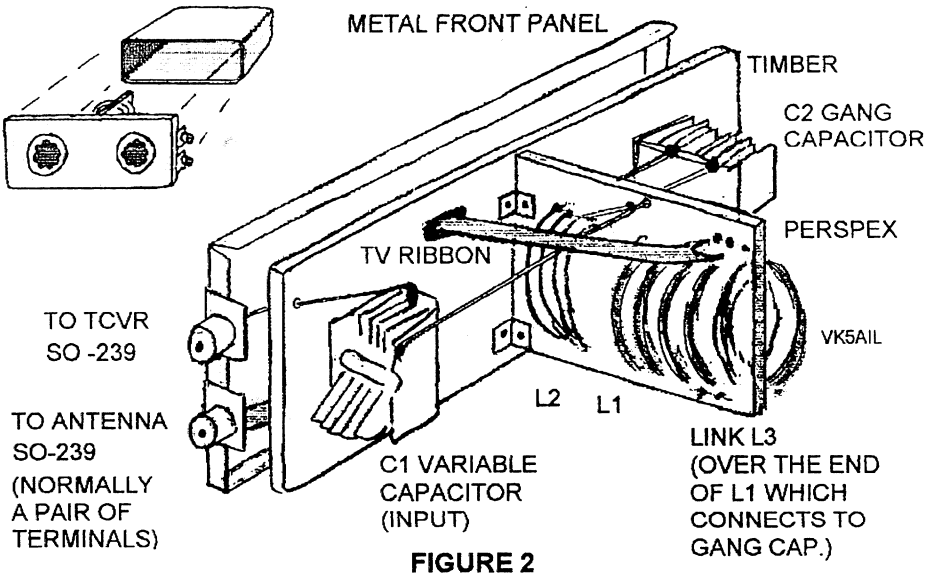


FIGURE 2
INSIDE VIEW

components onto a 'false front' mounting panel of 6 mm (1/4") Masonite board 95 mm x 235 mm. The 95 mm dimension is a bit small, but was chosen as it fitted neatly into a metal case from my junk box. Initially, I built the ATU without vernier drives and was able to test it out of the case. Then the metal front panel was added and RF connectors fitted to the side of (and at right angles to) that panel. I left enough room, just under 40 mm for simple flexible couplings to be used between the vernier drives on the metal front panel and the gang capacitor shafts sticking out from the timber mounting panel. This results in a neat front panel, whilst retaining excellent access for modifications and repairs.

In my case (excuse the pun !), no supports were needed other than screws between the front panel and the case, because the mounting panel and perspex sheet fitted snugly inside the case.

Materials

- Perspex 93 mm x 110 mm x 3 mm thick (could be thicker) to mount coils.
- Brackets to attach perspex to front panel.
- Board 95 mm x 235 mm x 6 mm thick, to be used as mounting front panel (temporary front panel).
- Gang capacitor 2 x 210 pF (I initially used 2 x 400 pF broadcast type.
- Variable capacitor 20 - 400 pF. Initially I used a 100 pF / 200 pF gang, paralleled to give about 300 pF.
- Enamelled copper wire 2.3 mm diameter, about 3 metres, for coils and leads.
- Piece of 300 ohm TV ribbon to wire between ant. terminal and output link.
- SO-239 chassis socket.
- Suitable terminals for your antenna lead. I used another SO-239.
- Pair of vernier drives with flexible couplings. I used 5:1 for C1 and 8:1 for C2.
- Case - see text.

Construction

Mark horizontal and vertical centre lines on the inside of the timber mounting panel. Then cut the perspex to size and temporarily install it on the front panel with suitable small brackets. Remove the perspex and mark out the positions of the coil-supporting holes. Figure 3 - which due to lack of space in Lo-Key will probably finish up on the cover - is a full size template you can use if you choose 4 mm centres for the windings. Lloyd VK5BR used 3 mm centres, with smaller diameter wire (18SWG = 1.25 mm) than I chose. The holes ***must*** be 0.2 mm larger than the wire diameter and my wire was 2.3 mm diameter, so I had to use 4 mm centres.

Using a coil inductance formula from Ham Radio December 1984 p.116 (effectively the same as that in the ARRL Handbook, on p.2-17 of the 1990 Edition), I calculated that to retain the same numbers of coil turns and yet obtain the required inductance figures with 4 mm winding centres, the main coils would have to be 56 mm diameter. I used a 50 mm former, to allow for the 'spring' in the wire. An empty cylinder of builder's sealant was just the right size - I knew when I picked it out of my builder's rubbish heap last year that it would come in handy !?

Note the offset of the holes. They are not exactly opposite each other and you must start winding at the holes marked A, B & C, not their opposites. If your first hole is too far from the edge you should drill an extra hole or two at the end of each line to make it easy to screw the coil onto the perspex.

When the project is complete and tested, the coils should be glued to the perspex with a suitable adhesive. I used a drop of SuperGlue at each hole where the coil passes through the perspex. Silastic would be worth trying as the joint would be less brittle and there may be better adhesives for this.

It is important to insulate the capacitors from the knobs. Never simply have a knob on the end of the gang capacitor's shaft. I used one proper flexible coupling and one short piece of shaft made of insulation material.

I have a large stock of 6-40 UNF screws for mounting gang capacitors. This seems to be the usual thread found in gang capacitor frames, but it is essential to carefully cut them to the proper length otherwise they will screw against the stators and deform them or foul the rotors with equally disastrous results.

Even though the gang capacitor is only temporary (?), I removed some excess plates to reduce the capacitance. Unfortunately this does not reduce the minimum spacing between rotor and stator plates, so doesn't prevent arcing. The technique I used may be of interest and is given in the box on the next page. If you have a better method, please let us all know !

Operation

My testing has been quite brief and has so far involved three rigs: a Kenwood TS-440S (which has an inbuilt ATU), a Heathkit HW-9 with WARC bands and a Club Communicator 80m Tx. My only antenna is a G5RV fed by a length of 300 ohm TV ribbon (no balun).

The big advantage of this design (and others like it) is it's simplicity of use, as there are only the two variable capacitor controls to adjust. Likewise, there are only two settings to record - quick and easy if you have built in a dial scale.

METHOD OF REMOVING GANG CAPACITOR BLADES

1. Pick an old capacitor with aluminium blades to practice on, if you haven't done this before.

2. Carefully plan which rotor blades are to be removed. It would be a shame to find out afterwards that you have removed too many blades or the wrong ones.

I usually remove alternate blades across the rotor, which looks nice, but it might be easier to remove them all from one side. That way might be less likely to bend the insulating plate which holds the blades.

3. Carefully examine the shape of the material which holds the rotor blades to the mounting insulation. I have only worked on aluminium blades, which are quite soft.

Remove only that material which would prevent the lug of the blade passing through the slot. Use a small Stanley knife or similar tool with a sharp blade - and a good magnifying arrangement. A delicate touch is needed or this can be dangerous to the capacitor AND TO YOU. You can also use an Arlec SuperTool or other miniature drill to grind the plate lugs where they poke through the insulation plate, using an appropriate tool. I have even succeeded with a broken 0.7 mm drill bit.

I usually go through this whole process and remove one blade at a time, as this makes it easier to get to the next lug.

4. To extract blade, first take the blades completely out of mesh. I use a two step process.

4.1 Place a thin steel rule (6") across the stator blades and use a screwdriver to lever up the blade at its bottom edge, for maximum leverage.

I do the centre blades first. DO NOT lever more than one blade at a time, as this will damage (bend) the centre of the insulator and probably loosen blades which are to stay.

4.2 Place a small flat (but not too smooth) spanner across frame of the capacitor. Use a pair of needle nosed pliers to lever out the blade. If the blade appears to be stuck in place, you may need to gently hold end plates of the capacitor's frame together in vise, or the shaft may pop out of its end bearing.

5. Check straightness of the insulator afterwards - it should never be more than a fraction of a millimetre out of line. Gently move the remaining blades and straighten the mounting insulator, if necessary.

What's left to be done ?

Firstly, some cosmetic improvements. The dials and their marking need to be upgraded, although the present arrangement is adequate for operation. The front panel should be painted and labelled properly to make settings easier to read. I used a piece of blank double-sided circuit board screwed to the metal front panel, as the junk box case had many holes for switches, terminals, meters etc.

My ATU will need another set of variable capacitors if it is to be used on higher frequency bands. At present, it won't give unit SWR on 21 MHz or higher, perhaps due to the minimum capacitances being too high. Likewise, it cannot be used for more than about 85 watts. The plate spacing is insufficient and I get arcing as power approaches 100 watts. This is low priority as the present power limit is enough for local VK ssb contacts, which are only on the Club's 80m 'Natter Net' and my CW is always at less than 5 watts. These problems are constructional ones, mainly due to my selection of variable capacitors, and are not caused by any weakness in the basic design.

Now where did I put that gang cap. - the one with the wide spacing ?!@%*

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Lo-Key: Our quarterly journal, posted mid-March, June, September & December
ARTICLES ALWAYS WELCOME
The Editor reserves the right to edit all material including letters sent for publication and to refuse acceptance of material without specifying a reason.

QRP calling frequencies:
1 815 3 530 7 030 10 106
14 060 21 060 28 060 kHz

§ 1994 SCRAMBLES §
Awards & Contents Manager
Ian Godsil VK3DID #112
25 Monaco St. Parkdale Vic. 3194
#38 80m - Thursday 23 June '94
#39 80m - Wednesday 13 July '94
#40 80m - Thursday 4 August'94
More details on page 11
Rules in Sep '93 Lo-Key #39 page 9

§ CW NET (QRP) §
Net Controller: **Ted Daniels VK2CWH**
Tuesday nights
3529 kHz (lower if QRM)
from 0930 UTC
Call: *CQ CW OPS/QRP DE VK2CWH/QRP K*
QRP power used - 5W maximum to antenna

§ SSB 'NATTER NET' §
Conttrollers: Steve VK5AIM's roster

Friday nights from 1030 UTC
3620kHz ±QRM

Photocopy or cut along this line

Please post this application to:
Kevin Zietz VK5AKZ
41 Tobruk Ave.
ST MARYS SA 5042
Australia

Please print

FIRST NAME .....

SURNAME .....

CALL SIGN .....

ADDRESS .....

.....

.....

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Enclosed is the annual membership fee of:
$A10 for VK Members, or
$A12 for ZL Members, or
$A14 for DX Members.

I agree to these details being held on the Club's data base and published.
I DO AGREE to publishing of my street name and house number. *(If not, write 'NOT' in the space provided.)*

SIGNATURE .....

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The annual fee is due on 1 January each year, at the start of our March quarter, not on your anniversary of joining.