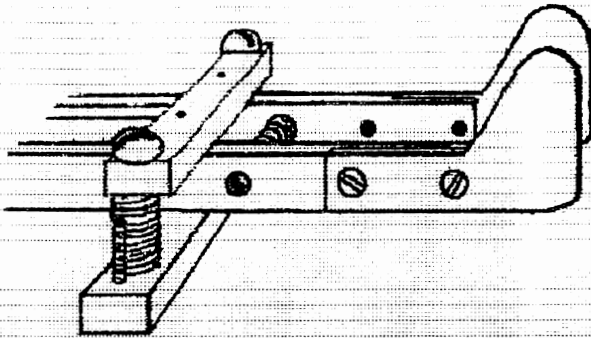


Lo-Key

THE JOURNAL OF
THE CW OPERATORS QRP CLUB

*Promoting the Use of Low Power
CW Mode Communication
and Homebrewing
in the Amateur Radio Service*

910611 E:\WINPAINT\PADDLF.PCX



VK3ADX Merv's Homebrew Paddle

See page 14 for details of main bearing

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POSITIONS

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EDITOR OF LO-KEY &

KIT-SET ACTIVITY CO-ORDINATOR

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GENERAL INFORMATION

QRP CALLING FREQUENCIES

1815kHz 3530kHz 7030kHz
10106kHz 14060kHz 21060kHz
28060kHz

CLUB MEMBERSHIP SUBSCRIPTION

Due each January - Aust. \$A10
New Zealand \$A12 DX \$A14

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The Editor reserves the right to edit all material including letters sent for publication and to refuse acceptance of material without specifying a reason.

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OTHER POSITIONS

CW NET CONTROLLER

Ted Daniels VK2CWH/QRP #89
Call is "CQ CW OPS/QRP de VK2CWH/QRP k". QRP power is used - 5W maximum to ur antenna. Ted adjusts speed to suit the slowest operator on the Net. ALL WELCOME.
TUE. NIGHTS FROM 0945 UTC
(Daylight Saving - 0830 UTC)
AT 3529KHZ or lower if QRM.

INFORMATION NET CONTROLLER

Max Brunger VK5OS #2. Call is "VK5OS" QRO SSB is used. Talk is social + technical.
CW stations pse call "BK de callsign" to have your presence acknowledged. ALL WELCOME. FRIDAY NIGHTS FROM 1030 UTC (Daylight saving - 0930 UTC) Near 3620KHZ.

CLUB STATION VK5BCW

Based at the RICHMOND SA QTH of Len O'Donnell VK5ZF #1.

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Radio projects for Lo-Key & kit-sets.

THE BOOKSHOP

& BOOMERANG CIRCUIT BOOK

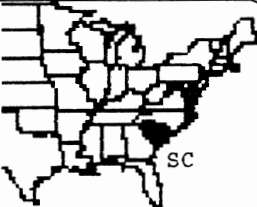


Norm Lee VK5GI #139
25 Ralston St. NORTH ADELAIDE
SA 5006

Magazine & book reviews; circulation of circuit book.

CCQ

KEVIN'S KOMMENTS

By Kevin Zietz VK5AKZ #43 Treasurer and Membership Secretary




WELCOME TO NEW MEMBERS

Welcome back to:

#149 VK3BIE Doug PEARCE POINT LONSDALE VIC

Welcome to the following new members:

#224 VK3AAM Phil	Carne	RYE	Victoria
#225 VK3CQP V.	Hearne	WODONGA	Victoria
#226 VK2COX Ray	Turner	HILLSDALE	N.S.W.
#227 SWL Ian	Jones	CUDAL	N.S.W.
#228 K4UOD Dennis	Abdalla	COLUMBIA	SC U.S.A.



Well, it seems that I am still learning on the keyboard - and still making "obvious mistakes" as mentioned in our last issue. (I think the word processor did hear me !) Those who received a final UNFINANCIAL notice will know what I mean!

At last I have made some progress with the project to transfer the club's records to IBM P.C. compatible format. Most of the data has now been transferred and I am now working

on the program files, which may prove to be a little tricky. I am sure it will be worth the effort in the end.

Perhaps it is time for a few stats. Most members who were sent their final notice have responded by the time of writing - I have received replies from all except 19 members. Currently we have 171 financial members and at least 34 additions/changes to the mailing list.

73 Kevin VK5AKZ

ccx

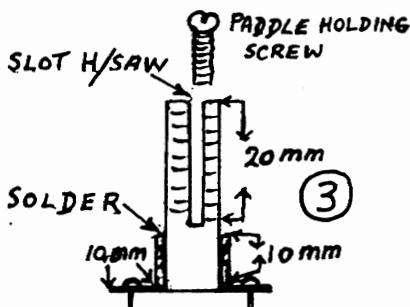
MUQ HACKSAW BLADE KEYSER PADDLE

By Bill Martin VK4MUQ #113

92 Clarke St. Garbutt TOWNSVILLE Qld 4814

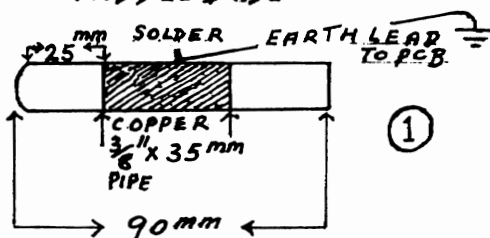
Here are particulars of a keyer paddle I made, using the hacksaw blade concept, for the 1977 EA Electronic Keyer. (Ed. - See Lo-Key #22 June 1989 p.8) This design, I feel, is just as good and

PADDLE UP RIGHT.



BOLT TO BASE
C/SINK BOTTOM
OR BOLT THROUGH
THE CASE.

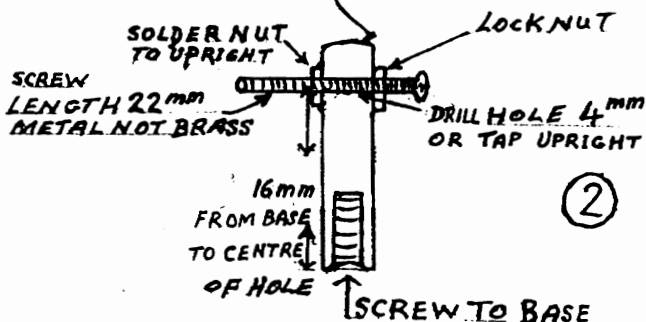
PADDLE BLADE



performs as well as the bought ones I have used.

The hacksaw blade is modified, with a copper contact on the blade and is also adjustable for tension and side clearance to suit all hand requirements. The point and paddle tension adjustments and other features of the design result in it having no key bounce and a very positive action. I have used this key for some time now on an early morning CW net and not once have I had to clean the contacts or make any adjustments

2 OFF, CONTACT UPRIGHTS
POSITIVE LEAD TO PCB.



C/SINK SCREW, NO EARTH CONTACT.

over the last twelve months.

All the components to build the base and uprights are out of the junk box.

Now, down to the details of the MUQ paddle:-

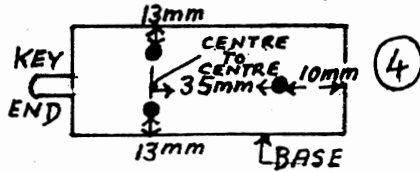
See drawings - all dimensions are in millimetres.

Take a slotted copper pipe and place over the blade. See Drawing (1). Place in smooth jaws of a vice and squeeze the copper pipe onto the blade tightly. This gives a nice tight fit and smooth surface to the copper.

The base plate is 60 x 50 x 6mm. It can be wood, plastic etc. so long as it stays put and is not a conductor.

From the junk box, find two hex. uprights 7mm x 24mm, also one of 7mm x 30mm. This one is slotted to hold the paddle blade or whatever you have on hand. See Drawings (2) and (3). The first

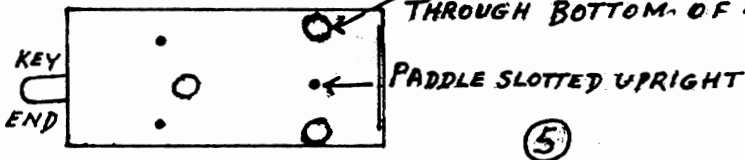
**BASE, UPRIGHT POSITIONS
3 OFF**



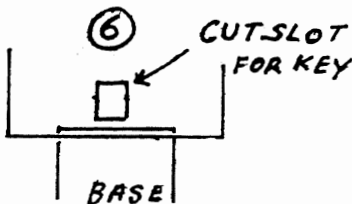
advice I can give here is on Drawing (2) - drill the 4mm hole square with upright. This will have the contact screw in a horizontal position. Drawing (3) - keep the slot in line with the upright. This will then hold the paddle blade in a vertical position. No need to explain Drawing (4) - it's all there; same with (5) and (6).

For the working end of the paddle, use a slotted piece of plastic to suit your own particular need or use three or four wrappings of insulation tape, as on mine. This works well and leaves a nice thin end.

**3 HOLD DOWN BOLTS
THROUGH BOTTOM OF CASE**



**BASE, HOLD BOLTS -
POSITIONS**



**HARD UP AGAINST
INSIDE FRONT OF CASE**

I don't think I've missed anything, but if I have I would be only too happy to answer any queries.

Bill VK4MUQ

ccc

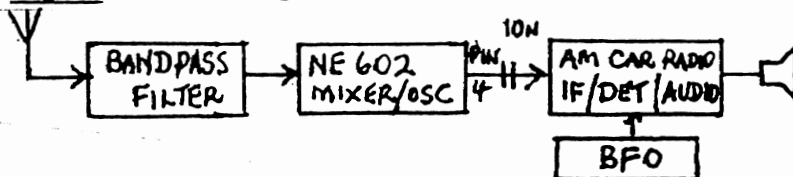
CW/SSB RECEIVER USING A CAR RADIO

By Basil Dale VK2AW #180

A converter can be combined with an AM car radio to form a satisfactory CW/SSB receiver for the amateur bands. The writer has used a crystal locked converter, MPF 102 mixer and untuned crystal oscillator (BC548) with switched mixer coils, one for 3.5 and 7 mhz and the other for 10, 14, 18 and 21 mhz. Crystals plug in at the front of the unit, making for easy band changing. A small BFO using a transistor radio IF transformer is wired into the AM car radio and adjusted for a beat note for CW and to resolve SSB (see Fig. 2). The crystal oscillator gives excellent stability but there are some disadvantages which could be overcome with a tunable oscillator.

The advent of the Sudden and Flexi-Sudden receivers featured in LO-KEY offered the idea of a suitable tunable converter. See Fig. 1 for the block diagram.

Fig. 1 Block diagram of converter/AM radio combination.



A Sudden front end using a NE602 as mixer/oscillator was wired on perf board for 7 mhz without the band pass filter,* using a coil and capacitor and a three turn coil to couple to

* THE FINAL VERSION WOULD OF COURSE INCLUDE THE B.P.F. WHICH GIVES BETTER RESULTS THAN A SINGLE COIL AND VARIABLE CAPACITOR.

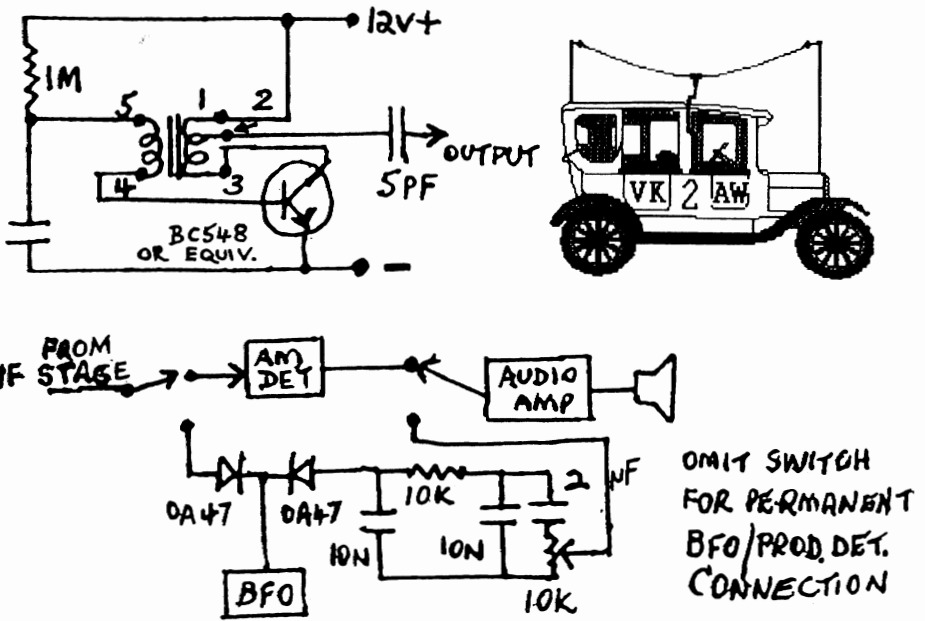
CW/SSB Receiver Using a Car Radio (continued)

the antenna. The car radio was set at 1.6 mhz to act as the slug in the IF and audio stages. The NE602 oscillator coil (L3 in the Flexi-Sudden) was turned further into the coil until a SSB signal was received. A GDO check showed the frequency to be 5.5 mhz for the station on 7.1 mhz. Band limits were set by adjustment of the slug in L3 and VC1 tuning capacitor. The car radio input trimmer was peaked on noise. There was plenty of IF and audio gain and sensitivity was good on both CW and SSB.

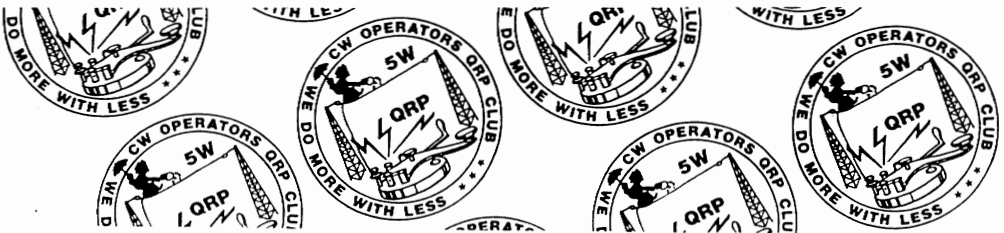
The 5.3-5.7 oscillator coil was replaced with one for 14 mhz, with suitable changes to C4/C5 etc. Again, results were satisfactory compared with the NE602 operating in a DC receiver. To determine the point in the car radio circuit for connection to the BFO output, identify the diode detector and inject the BFO into this point. Some car radios may have an IC performing all the functions, i.e., no separate diode detector. Find a point by using the BFO output lead as a probe where the BFO gives a beat note with AM broadcast stations. If desired, the diode detector can become a product detector by the addition of a few components, but the existing arrangement is quite satisfactory.

Preferably build the BFO into a small screening can small enough to fit inside the case of the AM car radio. Use a shielded output lead from the BFO, grounded at both ends. Don't forget to provide connections for 12 volts and negative.

Fig. 2 BFO circuit and optional product detector.



Reception on the 14 mhz and higher HF amateur bands may benefit from the addition of an untuned RF stage, but the suggested simple arrangement gives better gain and selectivity from the Flexi-Sudden front end than that obtained from its use in a DC receiver. It should be easy to obtain an AM car radio, probably at no cost, as these are being replaced with AM/FM/cassette units by car radio specialists.



.....
FROM THE EDITOR'S DESK

By Don Callow VK5AIL #75
5 Joyce St. Glengowrie, SA 5044
Phone [08] 295 8112 (H)



.....
Nick VK2AOH #210 wrote (ages ago) about the *Sudden* Rx and a Tx for portable work -

Rex VK2YA #131 recommends that visitors to Adelaide call in to the Telecommunications Museum in Electra House, next to the GPO in King William St. near Victoria Square. Rex did just that during his visit to Adelaide some time ago and says it was a most interesting and nostalgic 'trip' into the past of communications, with plenty of Morse gear and background history in the display. The hours are 10.30am to 3.30pm Sunday to Friday, admission is free (unless you consider your 'phone bills have paid for it in advance !) and the museum contains displays of telegraph, telephone and radio apparatus. Not all is historical - some of the display points to future technology. And if you have a harmonic or two it may even keep them quiet for a while (?)

MAYBE OTHER CITIES HAVE SIMILAR MUSEUMS OR DISPLAYS ?

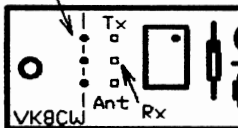
.....

CORRECTION - DC SWITCH/ANTENNA C/O RELAY

(Lo-Key #29 p.27) SHIELD

RLA D3

There is an E.E. (Editors's Error !) in the parts layout diagram. The Rx and Ant.



terminals are incorrectly marked. The centre terminal is Rx and the lower is Antenna, as shown here.

.....

"Although not 100% complete mine has been built into a small box together with a 2 transistor Tx to be used as a bush portable unit. (I do a lot of bushwalking !)

The *Sudden* is arranged as a 80/40m version, the various BFO and BPF being switched by a wafer switch. Tuning is done via a Sato vernier dial.

Some bugs still to be sorted are:

1. Rx mute while Tx-ing.
2. Active audio filter.
3. Bandspreading
(Tuning is very cramped)

When all of the above are sorted out - then to redesign the Tx which uses a U31 oscillator driving a 2N5589. Output is about 5W on 80m, 3W on 40m. I would prefer to redesign at least the PA to use a 2SC1306 which is a more commonly available CB HF transistor.'

Nick plans to let us know the outcome of all this later - Sounds a good project.

The news is that it is now finished and in operation.

.....

Well, 73 for now (or perhaps 73/72 ?) *Don* VK5AIL *COX*

.....

Wes Plus Six Gives One !

By Wes Tyler VK2WES #162

How to build all those boxes into one case

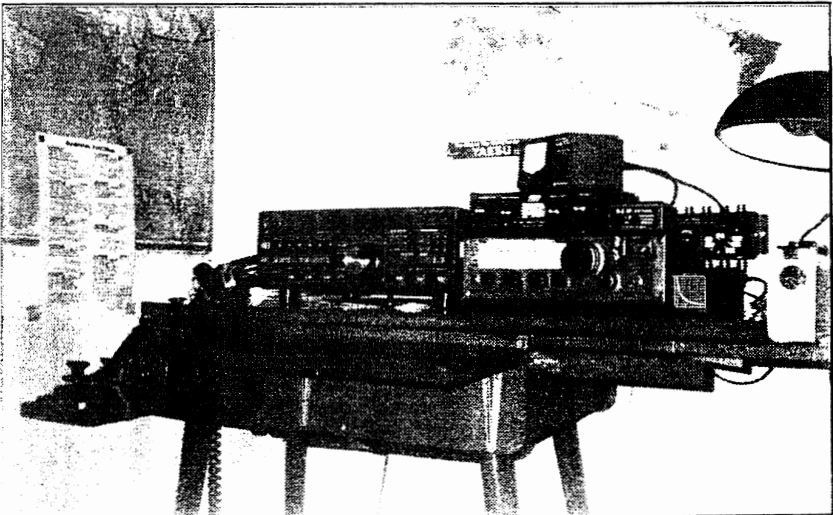
Wes VK2WES (ex VK2MIR) recently completed a rig with an arrangement of a type that many Amateurs think about but only few ever achieve. In response to a request from the Editor Wes has provided some notes, which will be of practical value to anyone planning a similar project and, in any case (pun !), are well worth reading:

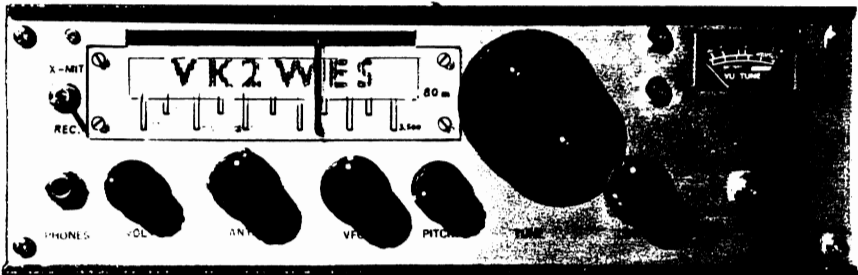
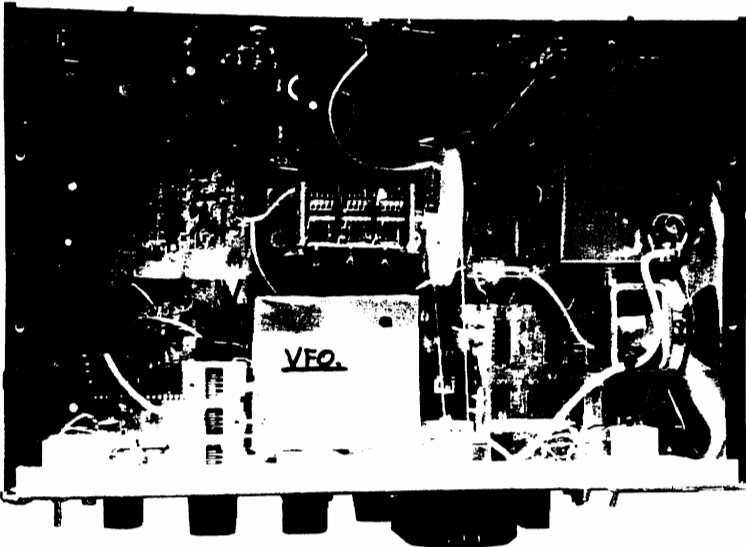
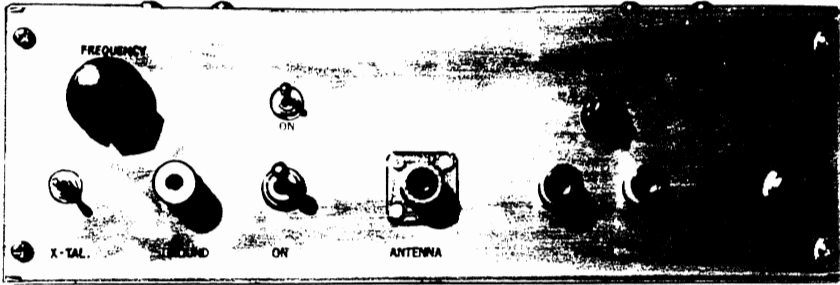
Included are some photos - one of the station and others of my home brew rig which may interest you. It is mainly composed of Howes kits, each constructed as a separate module: Rx, Tx, VFO, Side tone, Xtal marker and the QRP Club's Sensitive SWR meter - a total of six individual 'boxes'. I became very tired of looking at the mass of co-ax this produced. Decided to combine the lot in one case and fit a relay and driver board for "break-in".

After much soul searching (after all, everything works OK, why change ? syndrome), I bit the bullet, purchased a Horwood case and unsoldered my first joint.

Having decided that the best way to obtain a good tuning dial spread for the 80m CW section was by the old nylon cord drive system, I scrounged up several old radios and tape recorders with the required parts: Meter, fuse holder, relay, rotary and main switch etc. Speaker from a TV set, shields for VFO and SWR meter from a flattened instant coffee tin. Quantities of small diameter flexible shielded cable came from the same sources. All R.F. leads are in 50 ohm mini-coax.

All boards were removed, taped into the new case with masking tape to set their position and





Continued over ...

to ensure that front and rear panel controls would be clear and accessible. They were then bolted down into their locations.

The rear panel with all connectors and switches was completed and wired in. The speaker was fitted to the side panel. Shields made and fitted as required.

Having had a problem with the Driver board, I decided to leave it out for fitting later. Relay wired to front panel with a Tx/Rx switch.

With all parts fitted and wiring complete, the case was closed up and I made some blank dial graduation cards for frequency setting.

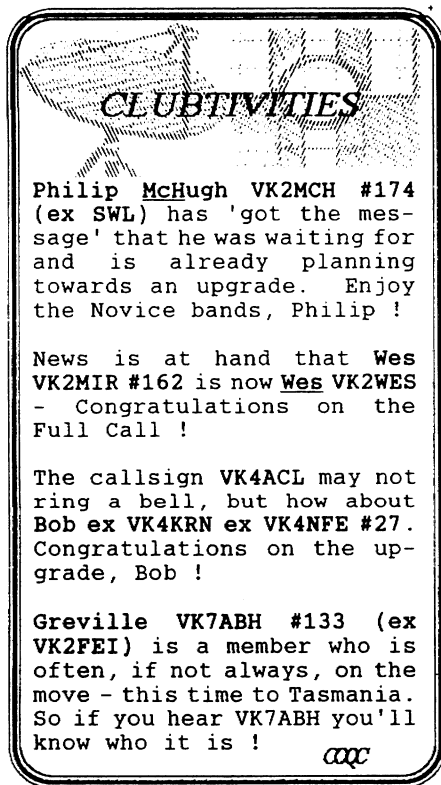
Power applied - all O.K. - set VFO frequency range using the main receiver's digital read-out. Range is 3500 to 3600kHz. (3600 gets me up to the ZL CW net). Set Xtal marker on WVVH from main rig. Then used Xtal marker to set dial graduations.

On receive, audio from the speaker was distorted by the acoustics of the flat panels in the case, so a styrofoam panel was fitted to the top to eliminate this.

Using the 50 ohm dummy load that came with the SWR meter kit-set, power out was set at 3.5 Watts. Set meter to full scale at this reading. (Incidentally, the Side tone is RF driven which also confirms power out while monitoring SWR.)

Connected the antenna - first contact was a fellow Club member in VK3 who was on 1 Watt !

So there you have it. I enjoyed the project immensely ! Looking forward to installing the break-in and will now be using our Club's Lo-Key circuit (#29 March 1991 p. 26).



CLUB ACTIVITIES

Philip McHugh VK2MCH #174 (ex SWL) has 'got the message' that he was waiting for and is already planning towards an upgrade. Enjoy the Novice bands, Philip !

News is at hand that Wes VK2MIR #162 is now Wes VK2WES - Congratulations on the Full Call !

The callsign VK4ACL may not ring a bell, but how about Bob ex VK4KRN ex VK4NFE #27. Congratulations on the upgrade, Bob !

Greville VK7ABH #133 (ex VK2FEI) is a member who is often, if not always, on the move - this time to Tasmania. So if you hear VK7ABH you'll know who it is !

ccc

Best feeling - you've put it together and you get an answer to your CQ !

With the exception of a drill press, only hand tools were used - including construction of the shielding cans.

Case size was chosen and all modules are mounted, to allow replacement and experimentation.

I hope this of interest to you as an indication of one beginner's approach.

Best 73, Wes

So: Wes + 6 boxes = 1 case !

ccc

Any Comments on 72 = "Good QRPing" ?

By Max Brunger VK50S #2 3 Durham Ave. Lockleys SA 5032

I recently received a letter (part reproduced below) from Gus Taylor G6PG, Communications Manager of the G-QRP Club - and Member #50 of the CW Ops QRP Club. The same letter went to several other QRP clubs around the world.

The Executive Committee would appreciate receiving any comment you may have on the proposal, or on any pre-existing use of "72". We will then prepare and send our response.

Please let us have your comments by
Monday 22nd July 1991

so that we can reply reasonably promptly.

England.

CCQ

27 May 1991

Dear Max,

72 From Russia ?

The following suggestion has been received from Oleg Borodin, RV3GM, Secretary of the U QRP Club.

"I would like to suggest the U QRP Club code 72 as an international code for use by all QRP operators. 72 means " good QRPing" ".

The idea of a special code to convey the above message seems to be a very good one, but before adopting it I feel it is necessary to obtain agreement with other QRP Clubs, and to ensure that the actual numbers 72 are not used with the different meaning anywhere else in amateur radio. I would therefore be obliged if you, on behalf of your Club, would let me know fairly quickly if

- (1) You agree that we need a special code for "good QRPing" and
- (2) if you are happy for 72 to be used as this code. If you do not agree with 72 please suggest an alternative.

I shall look forward to hearing from you.

73 es 72,

Gus.

Gus Taylor, G6PG.

Communications Manager, G QRP Club.

CCQ #050

CW NET NEWS

By Ted Daniels VK2CWH #89

The news on the Net is better this time ! It is good to report several contacts with Matt ZL1ATN #188. Other regulars to check in since the change to Tuesday nights are Neil VK7FN #26, Wes VK2WES #162 and Nick VK2AOH #210.

One highlight of the year so far was working Nick /P/QRP when he was camped on the banks of the Cole River in Wallemi National Park during a bush walk ! That's really keen QRP'ing !

New calls for the Net were Harvey VK3AHU #169 and Roy VK4RE #15 and one new member to

report, Reg VK2COX #226.

It has been a pleasant change since the end of summer conditions.

Next summer I intend to try the Net on 40 metres. For the last two summers 80 metres has been virtually a write-off. I know there is a feeling that this would deprive Novices of the opportunity of joining in, but my records show only one Novice member on the Net in the last year, and none in the period of daylight saving, so I think it is worth a try.

Look in your September *Lo-Key* for final details.

Regards,

Ted VK2CWH

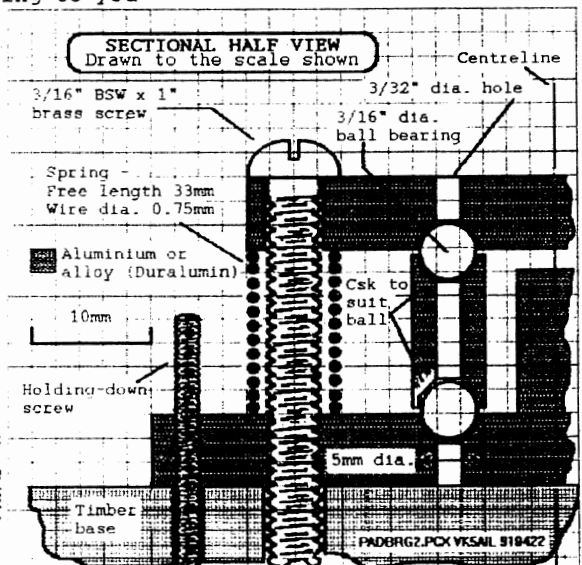
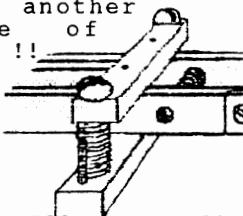
☺☺☺

Merv VK3ADX #85 PADDLE BEARING DETAIL

has kindly loaned us his homebrew twin paddle key so that we could bring to you the details of its neat and effective main paddle bearing arrangement.

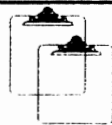
The paddle design looks very impressive and its construction is most workmanlike.

p.s. The Editor has had the key for more than six months - at this rate we could publish the complete design if the loan is extended for another coupe of years !!



AWARDS AND CONTESTS

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



Greetings to all Club members.

At the time of writing I must confess that I have lost the last Lo-Key in my move to the new address, so I don't know the date of the next Scramble. I am sure our dear Editor will fill it in for me. (Ed. - How could I refuse? See panel below.)

I was hoping the Club would organise a series of Scrambles/Sprints to commemorate the bicentennial of the birth of Samuel Morse, but as yet there has been no decision. All that I can do at this time, then, is to urge you to keep practising, to prepare for the RD Contest in August and to take part in the next Scramble.

73 and good CW'ing,

Ian Godsil VK3DID



SCRAMBLE

The mid-year 1991 Scramble is on 40m on a MONDAY:

SCRAMBLE	DATE
#15	1st July 1991

BAND	SUGGESTED FREQUENCY RANGE	TIMES (UTC)
40m	7.001 to 7.040 MHz	1000 to 1200

Full details can be found on page 8 of the March issue of Lo-Key (#29).

§§§ Coming Contests for CW'ers §§§

... Australasian Sprints - CW Section - Rules are in *Amateur Radio* June 1991 p.29/30.

A joint activity of the Adelaide Hills Amateur Radio Society and the S.A./N.T. Division of the W.I.A.

CW contest dates/times/freq.:
6 July 1991 1200 to 1300 UTC
3500 to 3700kHz.

... VK Novice Contest 1991 - CW Section - Rules are in *Amateur Radio* June 1991 p.30/31.

From 0800UTC 22 June 1991 until 0800UTC 23 June 1991. 10, 15 and 80m bands, Novice allocations.

AT LEAST TWO MEMBERS WERE ACTIVE IN THE ROSS HULL MEMORIAL VHF-UHF CONTEST 1990-1991 WHICH WAS HELD IN DECEMBER/JANUARY:- WELL DONE DAVID VK3ANP #125 (FINE SCORE ON 6M) & PETER VK6BWI #66 (ON 2M AND 6M) !

BENTLEY SIX CW QRP TRANSMITTER FOR 6m

By Peter Parker VK6BWI #66

INTRODUCTION

Here is a 1 Watt transmitter which, when teamed up with a converter⁽¹⁾ and an HF communications receiver, will get you activated on the very interesting 6 metre band. This provides not only good DX opportunities when conditions are favourable but also gives good local coverage.

CIRCUIT OUTLINE

The circuit is very conventional, being a mixture of circuits references (2) and (3), modified to suit available components. The crystal oscillator is very reliable, the keying is good and the PA has resisted all attempts to damage the final transistor. These included increasing voltage to 25V at 'infinite' SWR ! (But don't try reversing the power supply polarity !) With a reasonable junk box, this rig should set you back by no more than \$15 - 20 (excluding crystal).

CIRCUIT DESCRIPTION

The 2N2222 crystal oscillator was lifted from reference (2) and has proved to be a reliable circuit. It operates continuously when the rig is in Transmit mode and is switched off on Receive. A few mW are fed to a keyed buffer which delivers 40mW to the PA. This buffer is keyed by a general purpose PNP transistor such as the BC558. Both the oscillator and the buffer are collector tuned to

reduce spurious signals. Remember: 50 x 2 is in the FM broadcast band and 50 x 4 falls in the TV broadcasting allocation.

The PA transistor, a 2N4427 available from Dick Smith Electronics, amplifies the signal from the buffer by approximately 14dB. The signal then goes via a pi network, which reduces harmonics, to the antenna.

CONSTRUCTION

This unit was constructed on a piece of 5 x 9cm perforated matrix board and enclosed in a commercial metal box, size 13 x 8 x 5cm. Although double-sided printed circuit board is usually suggested for VHF projects, the prototype showed no sign of instability.

All coils were wound on 5mm formers; L1, L2 with the slug removed. Tuning is done by the appropriate trimmer. It may be possible to substitute fixed capacitors for the trimmers and to tune the oscillator and buffer with their respective slugs, in order to reduce the cost of the project. Liberal decoupling is used in the circuit.

To ascertain wire diameter, wind ten turns onto a pencil, measure the length of the coil, then divide by ten to get the diameter. Wire diameters are not critical.

It is recommended that the builder has receiving ability on 50MHz to monitor keying quality. An RF power meter⁽⁴⁾ and a multimeter are very useful tools for testing and alignment.

Build the rig stage by stage and test as you go. Start with the 50MHz overtone crystal oscillator. Apply voltage and verify operation with your RF probe or receiver. Adjust trimmer for maximum RF out. Switch off, then on, to check reliability of oscillation.

Now proceed to the buffer. Again there should be no real problem, so apply power and check operation. If all is working there should be 12V on the collector of the BC558 when the key is depressed. Check the output from this stage when the collector coil/capacitor is resonant on 50MHz. Output power should be about 40mW, dropping to zero when the key is released.

Now construction of the 1W final amplifier can commence. I have used a 2N4427 because they are readily available from Dick Smith Electronics, although a 2N3866 should perform satisfactorily. Depress the key, measure the power on a wattmeter and peak all trimmers for maximum output. The PA transistor case should warm up only slightly. On key up the current consumption should be about 20mA, increasing to 200mA when the key is pressed.

With an attenuator on the front end of the receiver, monitor the signal, which should be clean and click-free. When testing the prototype, a very slight

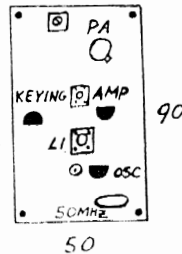
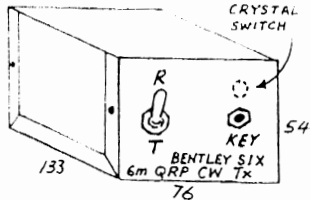
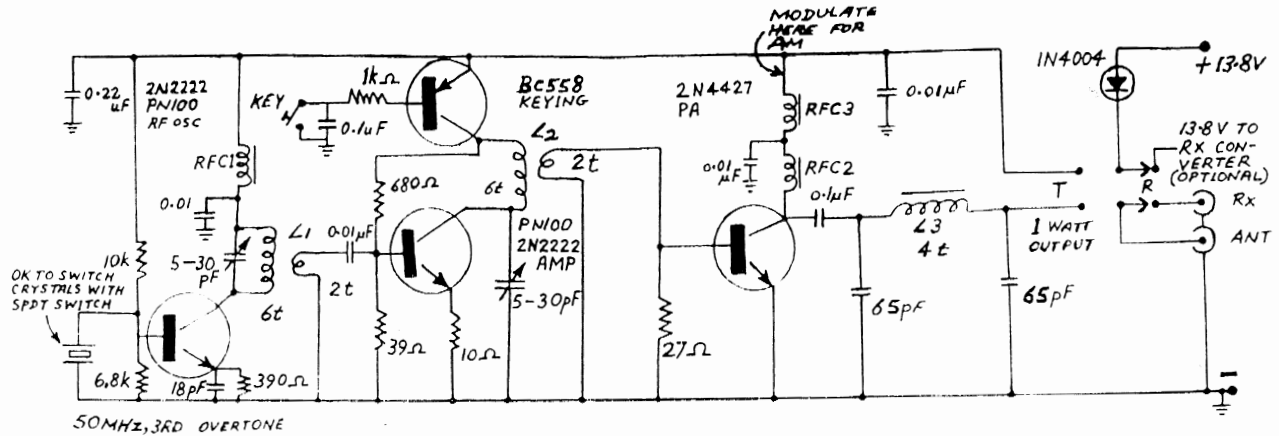
chirp was detected by a critical listener, but signal readability was not affected. It was not considered worth the effort to cure this small imperfection.

Now, a note about crystals: If you have to buy a 6m crystal, talk to active 6m operators to find an appropriate frequency for your situation; some areas have restricted access to 6m. Generally, the best frequency is in the lower 150kHz of the band. Look at the beacon list to ensure that your chosen frequency isn't used by an overseas or local beacon. (p.s. my junk box crystal happened to be on the JA7 beacon frequency. My automatic CW CQ sender fooled all the Z-Calls until I turned it off. Moral - *Choose your frequency wisely.*)

TRANSMITTING

Ideally you should have a yagi or quad on 6 metres, but if you lack the room consider using a tuned open wire feeder HF antenna. This is perfectly adequate for local contacts. It is suggested that, initially, you ask a local Amateur to monitor your signals on 50MHz to report on signal quality and strength. In Perth, 6m operators congregate on a 2m simplex channel; and perhaps thos in other areas have a similar facility. A call on this frequency to initiate a QSO is generally more successful than one on 50MHz during normal band conditions. Local SSB/CW activity is generally very low (at least in Perth) so be prepared to work hard for QSO's; an automatic CQ caller is a useful aid.

BENTLEY SIX CW QRP Transmitter for 6m



BOARD LAYOUT -
MAJOR COMPONENTS
SHOWN ONLY.

L1, L2:

5mm former, no slug, 5 turns through
Primary 6 turns,
Secondary 2 turns.
0.5mm wire.

L3:

5mm former, slug.
4 turns.
0.5mm wire.

RFC1, RFC2:

5mm former, no slug, 5 turns through
ferrite bead
0.5mm wire.

RFC3:

Ferrite bead threaded
onto hookup wire.

Note:

Wire diameters
are not critical.

As most 6m CW/SSB operation is horizontally polarised, it is recommended that you conform to make the most out of your QRP.

MY EXPERIENCES

Being in a hurry to get on 6, I connected my G5RV (half of which had blown down in a recent storm) to the rig and called on the 144MHz 6m liaison channel for a 6m operator. The first call provided a response from a station 10km away, so it was then time to try 6. *Yes, he could hear me!* The next evening brought in a station 16km away and QRP 6 metres was again successful (559).

An improved antenna system would increase range considerably, with possible DX available during band openings. So I later used a G5RV. A CQ call from VK6BWI was heard in JA land, corresponding to 5000 miles/Watt. No QSO, as the signal from JAV was very weak. But it was definitely a JA - a fellow VK6 was monitoring my frequency.

REFERENCES

- (1) Cratt, G. -
Silicon Chip, October 1990 p.82-84
(Info. on NE602 converters - See note below)
- (2) DeMaw, Hayward -
Solid State Design, 1986 p.30
- (3) Harrison, J. -
EA, June 1990 p.122
- (4) DeMaw, Hayward -
Solid State Design, 1986 p.147

Note: My NE602 6m converter⁽¹⁾ uses a 36MHz crystal (available from Rod Irving Electronics \$3) with a 14MHz Rx as a tunable IF. The RF preamp was changed to incorporate a BF981 (available from C.O.Q.Club). The preamp circuit came from WIA book, Vol.1 p148. During a recent opening to JA, DX was 5/9 with 1.5m wire stuck in the converter's antenna socket. Connecting the normal antenna for 6m brings the S-meter up 5 S-points with no signal present, so sensitivity is good.

Reliable range of the Bentley Six is 15km or more, as confirmed by a number of VK6 stations around Perth.

So there we have it - an interesting project and a QRP challenge.

See you on six !

Peter VK6BWI

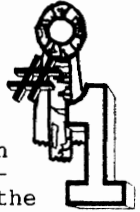
ccc

No More Heathkits ?

The April 1991 issue of *Amateur Radio* magazine included the item opposite. Owners of Heathkit gear such as the great HW-7 HW-8 and HW-9 series of QRP transceivers will be interested to find out whether all is finished - maybe that part of the business has been sold to another company ?

The End of Heathkit
A recent ARRL Letter reports that the Heath company has left the kit business and will now concentrate on home-study courses, home automation equipment and assembled units.
The end of an era.

AWARD FOR BEST TECHNICAL ARTICLE



As foreshadowed in the March issue, we intend to make another award for Best Technical Article this year. There will be some minor changes to the rules, which become:

1. The Award will comprise a certificate, free Club Membership for one year and a voucher to the value of \$25.00 for items from the Kit-Set Activity Centre, to be used during 1992.

2. All members of the Club are included, except Executive Committee members.

3. All members' articles published in *Lo-Key* from December 1990 issue to September 1991 issue (inclusive) will be considered, regardless of dates submitted.

4. The winning article will be chosen using the following criteria, plus any others found necessary -

** Relevance to the spirit and aims of the Club. See the Club logo, motto and statements published from time to time above the membership application form in the item *Interested in Joining Us ?* and in our Club's promotional brochure.

** Likely usefulness to Club members.

** Originality of content.

** Layout and degree of completeness. Is it attractive as submitted and can it be published with little extra effort ?

Note that articles submitted as rough notes could still win provided they are assessed highly under the other criteria.

All you have to do is submit articles - there is no need for special application.

We will arrange for independent judging, as before, and our aim is to announce the winner in the December 1991 issue of *Lo-Key*.

GO TO IT !!

ooc

Extract from *Amateur Radio April 1991*

More Morse

As stated last month, the WIA supports the Morse code training sessions supplied by the Divisions, and appreciates the dedication and expertise of those who provide other regular training schemes.

One of these is the service provided by Len VK3COD, who conducts a Morse code school of the air every evening, Monday to Friday, from 8.30 pm, on 147.425 MHz and 28.340 MHz. Len provides slow Morse for the first half hour, then a half hour of faster Morse. Many amateurs have found this cost free service a relatively painless and effective method of learning Morse, or of raising their speed to the examination standard.

REPORT ON MEMBERS' QRP/HOME-BREW EQUIPMENT

Here are some of the many notes included with your responses to the December questionnaire. They showed a healthy diversity of opinions and interests. All the suggestions will be considered. And the many favourable comments received about our club and about Lo-Key and the kit-set/parts service are much appreciated by us all. Well, here goes:

"Don't forget about ants: (They are more important than Tx power). Mine are phased 1/8 wave tee's for 160m - 80m inv. vee up 65' - 40m inv. vee up 65' - A3 tribander up 52' - 8 band double off center fed dipole (windom) up 30'."

"Enjoy Home Brewing."

"Enjoy Homebrew sections in Magazines - more VHF stuff please."

"As most operators use phone, more AM & DSB projects may encourage home building."

"Hope to Homebrew Tx for 20m band when kit available."

"I wish I had more time to operate, However love using the soldering iron and will build the Suden Rx shortly."

"Have an interest in QRP AM."

"Construction articles are always a delight to see and also would like to see more in the way of hints and kinks of QRP gear - construction techniques i.e. how to make your own cabinet is just one idea !"

"I have always been interested in Tx equipment rather than any Rx rig..."

"QRP CW only - it's great."

"Kits and components sales very helpful."

"New Year resolution - Build a QRP Tx."

"Have fun home brewing, but none have worked yet; big project should finish in 3 months, have been working on for 12 months. May get (it) on air then."

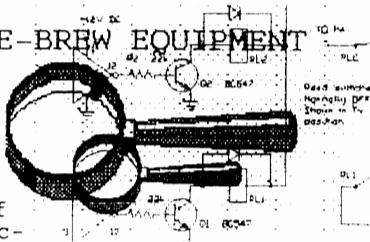
"Enjoy the construction projects and the newsy content of Lo-Key."

"Have been interested in valves over the years but may break into transistors soon."

"Should be licenced Novice by next newsletter. Only Regs to go. Passed Send and Receive well over 10 wpm also."

"Very little time for radio but enjoy Lo-Key immensely."

"Always building something even after



all these years (first licenced 1935)."

"I am in the process of scrounging parts for a QRP rig. The mwg. is very good value indeed as are all the Club activities - library, kits, parts etc."

"More QRP Tx circuits in Lo-Key plus plenty home brew"

"H.F. SWAN transceiver with external 2nd VFO. (it's a bit old & deaf!, and always breaks down, with a new problem each time)"

"I've never designed anything other than digital stuff so far, but hope that the exposure from the newsletter will help me with my first attempts."

"Excellent instructions for Club Com. A credit to the Club members. Lo-Key is equally excellent."

"I have no tower, no beams, no Jap. black boxes! I try forever to stride for the true spirit of amateur radio, in my view !"

ccc

LOOK, MA, NO VARIABLE CAPACITOR

By Norm Lee VK5GI #139

The idea of a VFO using no air-variable capacitor is neither my idea nor is it new. I offer this article as a possible design for inclusion into some rig which you may be building, and acknowledgement to original authors is given in footnotes. Besides which, the cost of air variable capacitors is now fairly high even if you can find a retail outlet which sells them!

The original concept seems to have come from Wes Hayward¹, although it has been copied with some variations by others, notably Oman² in his series 'Goot-Proof RF Projects'. In this series, he utilises essentially the same idea for a stand alone VFO and he incorporates the design into a receiver.

The basis of the design is that the capacitance from two back-to-back diodes (Variacs) is varied by a potentiometer and then fed into the mixer of a receiver, or into the crystal socket (or where the crystal would go) of a small cw transmitter. The designs of both the VFO's mentioned above give a determined range of about 70 kHz, although in practice the design by Hayward and White is much more stable and gives in the region of 120 kHz. The difference is that the Hayward and White design uses transistors 2N3053 with the emitters cut off and not connected, whereas the Oman design uses Radio Shack 1N914s the quality of which vary greatly. The construction of the Oman design is hampered further by the inclusion in the parts list of Radio Shack inductors, none of which are stocked in Australia. However, I offer the circuit diagram for both designs as an aid to experimentation and discussion!

Both designs have been tried by myself over the last eighteen months. They were both built on the prescribed pcb and precautions taken against stray RF or any other factor which may have induced instability. Tuning ranges of the VFO's were measured against my faithful R1000 Kenwood Communications receiver. The Oman design showed little stability, even after an hour of 'warm-up' and would tune only 25 kHz or so across the band. This I put down to the difference in quality between

¹Hayward & White

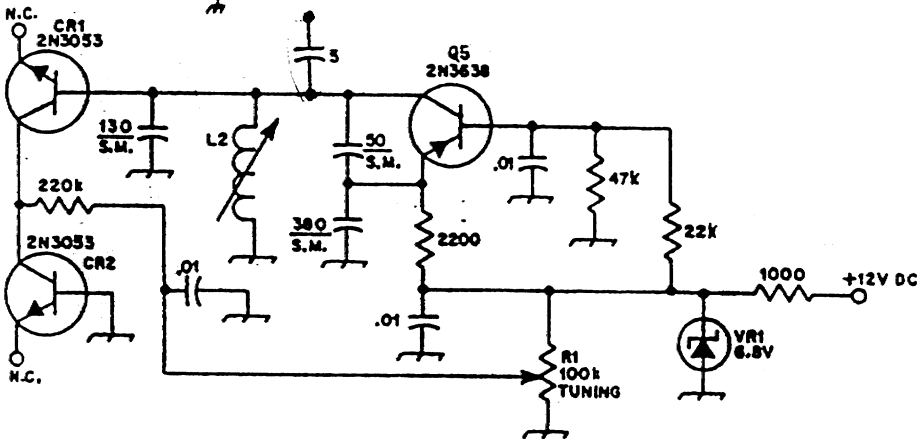
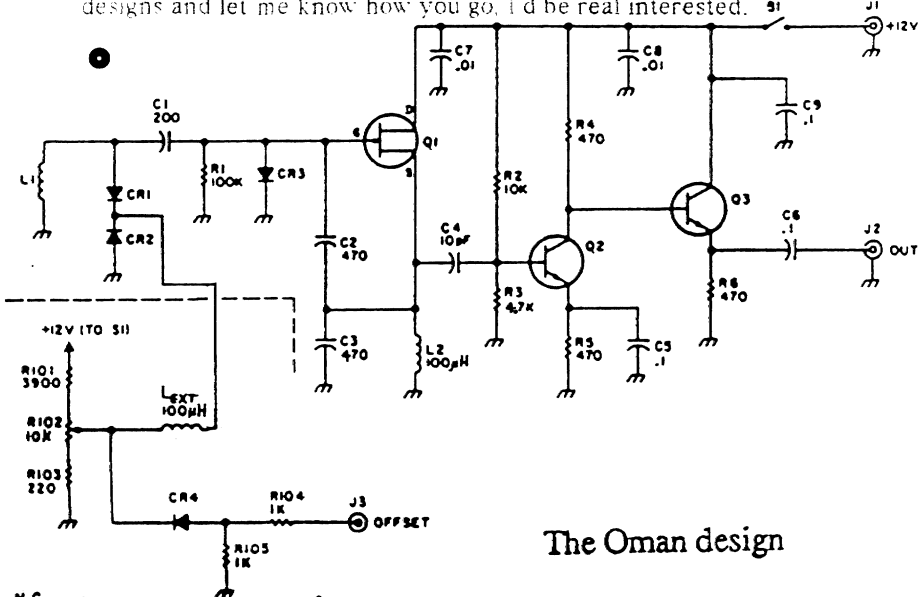
The Mountaineer-An Ultraportable CW station
QST, August 1972

²Oman Mark

The Fun-Ceiver
73 Magazine, July 1981
The Fun Oscillator,
73 Magazine, February 1982

the 1N914s that I used and the ones which had been used by Oman in the original design. The design by Hayward stabilised after a couple of minutes and remained rock solid for an eight hour period test run. It tuned over about 120 kHz.

If you are looking for a novel design for a VFO, try one of these designs and let me know how you go. I'd be real interested.



KIT-SET ACTIVITY CENTRE

By Don Callow VK5AIL #75 5 Joyce St. Glengowrie SA 5044

WE ARE NOW
STOCKING
NYLONS!

To save space I propose to print a 'full' price list only once a year, so this list is quite long. Next Lo-Key will only have additions and changes to the list items or prices (to be reviewed before Sep.).

Supply of Kits & Components

See previous issues of *Lo-Key* for details of kits and components available. We try to include on the component list some which may be hard to get from normal sources. There are many other items in addition to those listed - so it's worth asking. If you are having difficulty finding specific parts we may be able to help, so please come up on the Club Info. Net or send us a note.

The items are brand new except where stated otherwise. We cannot guarantee availability and may have to limit quantities sold to individuals.

The responsibility for all results of using replacement/substitute transistors, diodes etc. are yours. Also, we can give no more than the equivalent of the normal commercial warranty for items sold.

Ordering Kits and Components

Orders and payment should be sent to Don VK5AIL #75 - or to Treasurer Kevin VK5AKZ #43 (address on page 2) if you are applying for membership or paying subs. at the same time.

Please make out the cheque to the CW OPERATORS QRP CLUB and cross it 'Not Negotiable'.

For small money amounts up to \$A 15.00 it is alright to send the equivalent value of Australian postage stamps. \$1 stamps or any lesser values are fine. The receipt will be enclosed with your next issue of *Lo-Key*.

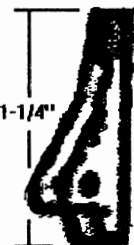
If you don't receive a packet within what you think is a reasonable time please contact me on the Club Info. Net or write, in case things have gone astray.

(You can have any colour you like, as long as it's WHITE.)

These are great for many homebrewing applications, as they have high resistance (not just to laddering), can stand heat, are lightweight, easy to work - softer than brass - and do not rust or jam, but do not shake loose either. Long screws are easily shortened to suit your needs and of course it is sometimes appropriate to use nylon screws with metal nuts or vice versa.

We have set up a *Bonus Bargain Bag* of Nylon Hardware (C046 price \$12.70), which contains 127 pieces. Note: there is only enough stock for a limited number.

- 10 M3 x 8 cheese head screws
- 10 M3 x 12 cheese head screws
- 20 M3 nuts
- 10 M4 x 10 cheese head screws
- 10 M4 nuts
- 5 M5 x 40 cheese head screws
- 5 M5 nuts
- 5 1/8"BSW x 5/8" cheese head screws
- 5 1/8"BSW nuts
- 15 1/8" (3.2mm) flat washers
- 5 1/4"BSW x 1/2" cheese head screws
- 5 1/4"BSW nuts (reworked)
- 5 1/4" washers
- 5 3/8" coil formers. 7/16" overall length, 1/4" bore. Really a shouldered bush intended as a shaft bearing). See sketch.
- 10 PCB supports, snap-in
- 2 'Mystery' PCB brackets, with pins. Probably PCB ejectors. See sketch.



A check against normal retail prices in catalogues 'which shall remain nameless' came up with an estimated total of about \$27, although some of the items listed seem to be unobtainable from these sources.

CLUB SALES - PRICE LIST

15 June 1991

We give more for less

The prices listed below are per pack and apply to members within Australia. The 'Nbr in pack' column tells you how many units are in each pack. Prices may change at any time without notice. PLEASE ADD \$3.00 TO THE TOTAL VALUE OF YOUR ORDER, TO COVER POSTAGE, PACKAGING & LOSSES ETC. If outside Australia additional postage costs will be added.

The items are for the personal use of Club Members ONLY and you are responsible for all outcomes of their use.

'K' in number indicates a kit-set, usually short-form.
'N' means it is a new item on the list.
'D' means that a simple data sheet will be provided with each order.
'H' means that a set of insulated mounting hardware is included.



Code No.	Nbr in a pack	\$A Price per pack	Code No.	Nbr in a pack	\$A Price per pack
K001	1	79.00	K014	1 pair	18.00
Club Communicator 3.5MHz CW QRP Tx. Complete with 52 page manual. Full kit-set, except cases. See Lo-Key #14 Jun '87 and #25 Mar '90 p. 16.			BPF and VBFO modules for the Flexi-Sudden Rx. You nominate band. Instructions in Lo-Key #25 Mar '90.		
K006	1	25.00	K015	1	25.00
Sensitive SWR meter. Plus 5W dummy load. Manual included. Short-form kit. See Lo-Key #19 Sep '88 & #25 Mar '90 p. 16. and Amateur Radio Apl '83.			DVR DriVeR board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #26 Jun '90.		
K007	1	28.00	K016	1	26.00
VFO Variable Frequency Oscillator board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #22 Jun '89.			PA Power Amplifier board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #27 Sep '90.		
K010	1	20.00	K017	1	19.00
VCO Voltage Controlled Oscillator board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #23 Sep '89.			RLA ReLAy board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #28 Dec '90.		
K011	1	42.00	C001	1	5.00
Flexi-Sudden multi-band Rx. 80m supplied. Based on design by George G3RJV #96. Short-form kit with manual. See Lo-Key #25 Mar '90. Extra modules available for other bands - see K014.			Ammeter edge type 500uA f.s.d. (DC) Kyoritsu EW-40. Needs a 14mm x 42mm cut-out in the panel.		
K012	1	31.00	C002	2	4.20 DH
PLL Phase-Locked Loop board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #24 Dec '89.			IRF510 transistor N-channel MOSFET (Replaces IRF511). Used in some of VK5XU #49 Drew's projects.		
K013	1	18.00	C003	10	1.50
KDB Key Delay, Buffer board for Forrestfield 21MHz CW QRP Tx. Instructions in Lo-Key #24 Dec '89.			0.1uF (104) capacitor monolithic (blue colour)		
			C004	4	2.30
			BAT85 Schottky (hot carrier) diode. Voltage drop is 0.2 - 0.3V. High sensitivity - can replace germanium types.		

Code No.	Nbr in a pack	\$A Price per pack	
C007	2	3.00	D
BS170 transistor VMOS N-channel FET.			
C008	2	5.00	DH
VN88AF transistor. Can use to replace VN46AF & VN66AF.			
C011	2	6.00	DH
IRFZ32 transistor $V_{DS} = 50V$ $P_{DS} = 75W$ I_D cont. = 25A TO-220AB case.			
C013	2	1.10	
Toroidal core 9mm od x 6mm id x 3mm ht. Philips 4322 020 97170 material 4C6 ferrite (violet)			
C014	2	1.50	
Toroidal core 14mm od x 9mm id x 5mm ht. Philips 4322 020 97180 material 4C6 ferrite (violet)			
C015	4	1.70	
BA102 equivalent: 1S2688 varicap (varactor) diode.			
C018	2	0.60	
Toroidal core 6mm od x 3mm id x 2mm ht. Philips 4322 020 97160 material 4C6 ferrite (violet)			
C021	10m	0.10	
Enamelled copper wire 0.112mm diam. approx. 37B&S 40SWG			
C022	10m	0.20	
Enamelled copper wire 0.17mm diam. approx. 34B&S 37SWG			
C024	1m	0.15	
Enamelled copper wire 0.40mm diam. approx. 26B&S 27SWG			
C025	1m	0.70	
Enamelled copper wire 1.25mm diam. approx. 16B&S 18SWG			
C026	5	7.50	
TIP31C transistor $V_{CE} = 100V$ (TIP31, 31A, 31B = 40, 60, 80V)			
C031	1	Free	
Crystal (for experimenting) Y3 10X W (large) type ex RAAF. You nominate frequency 6561.111, 7810 or 8036.25kHz. Postage and Packaging charge only.			



Code No.	Nbr in a pack	\$A Price per pack	
C032	1	3.50	D
NE602 double balanced mixer & HF oscillator for Rx.			
C034	2	3.20	D
IRFD1Z0 FET (Can replace IRFD1Z3) For Gemal transceiver (Lo-Key #21 Mar '89) etc.			
C035	2	2.40	
Toroidal core Neosid 4327R2/F25 ferrite, as in K006 Sensitive SWR meter.			
C036	2	3.00	D
BF981 Si N-channel dual gate MOSFET SOT103 case. (Similar to 40673, MPF121 and MFE131, but case is different).			
C037	2	4.10	D
LM386 audio power amplifier. N3 version 4-12V power supply.			
C038	2	5.50	D
LM4250 programmable amp. See Lo-Key #26 Jun '90.			
C039	1m	0.70	
RG-174 mini coaxial cable 50 Ohms 2.5mm outside diam.			
C040	1	7.80	D
MC4044 phase frequency detector for use in PLL e.g. Forrestfield Tx.			
C041	10	1.00	
Screening beads. Ferrite FX1115 or similar.			
C043	1	1.50	
Toroidal core Amidon T-50-2 (red) iron powder. 2 - 10MHz tuned circuits; 0.5 - 30MHz broadband.			
C044	1	1.50	
Toroidal core Amidon T-50-6 (yellow) iron powder. 10 - 20MHz tuned circuits; 2 - 50MHz broadband.			
C045	1	11.00	D
SBL-1 double balanced mixer 0 - 500MHz. TNX to Barry VK5BLS #209 for data.			

910522

Code No.	Nbr in a pack	\$A Price per pack
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C046 1 12.70 N
Nylon hardware, bargain bag of 127 pieces. See Lo-Key #30 Jun '91.

C095 1000 177.00 *
500 137.00 *

Club QSL cards. You nominate exact wording of name and address etc.

See Lo-Key #28 Dec '90 p.25.

* Price subject to re-check with Printer.

C096 1 sheet 0.60
Club logo stickers. 38mm diam. Each sheet contains 20 stickers. Black print on white. See Lo-Key #28 Dec '90 p.25.

Code No.	Nbr in a pack	\$A Price per pack
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C097 1 0.50
Latest quarterly updates of Membership List, Index of Technical Articles and Club Sales Price List, plus two copies of the Club's promotional brochure. Some data available on diskette if you send one with details of desired formats (IBM compat.).

C098 1 10.00
G-QRP Club Circuit Handbook. Copied with permission.

C099 1 1.80
Past issues of Lo-Key. You nominate month/year or issue number. #1 and #2 count as one.

E. & E.O.

CCQ

910522

BOOMERANG CIRCUIT BOOK



BCB #3 CIRCULATION LIST

Basil	VK2AW	#180	(1)
Ted	VK2CWH	#89	(1)
Alan	VK2FIZ	#182	(1)
Jim	VK2FNF	#128	(1)
Wes	VK2MIR	#162	(1)

Col	VK2EXD	#35
Warren	VK2FKU	#216
David	VK3ANP	#125
Reg	VK3BPG	#7
Roy	VK4RE	#15
Steve	VK5AIM	#184
Don	VK5AIL	#75
John	VK5JO	#223
Martin	VK6BER	#211

(1) = On list for first flight.

Do you wish to go onto the list for BCB #3 ?

It's an opportunity for VK members to have access to many circuits and homebrewing tips relevant to QRP and to the general field of amateur radio.

You pay the postage to the next person on the list. Postage is currently \$2.80 (Australia Post raised charges on 1 April).

The list of members is in the packet with the sheets, along with the 'rules' e.g. Sign the list to show that you have seen the BCB. Be quick so that others don't have to wait too long. Rather than adding new papers to the packet (which we need to keep just below 500g to save postage charges), send your suggestions to me or a member of the Executive (list on p.2).

We have sent BCB #3 out on its first flight (to the members indicated). This process will be repeated while there are still members who wish to see it - but remember that those last on the list will probably have longer to wait !

**Norm Lee VK5GI 25 Ralston St.
North Adelaide SA 5006**

CCQ

INTERESTED IN JOINING US ?

**IF YOU ARE A NON-MEMBER,
THEN THIS PAGE IS FOR YOU !**



THIS COMPLIMENTARY COPY OF OUR CLUB JOURNAL has been sent (or loaned) to give you an appreciation of the scope of activities of the CW OPERATORS QRP CLUB.

In each issue of *Lo-Key* we include many technical items on all types of QRP equipment and we encourage members to make their own gear. Many articles are written with the inexperienced builder in mind - as are the instructions with the Club's kit-sets.

We promote the use of the CW mode to show support for a skill that has been part of Amateur Radio since its inception - and we are proud of it. Our Club is possibly the only Radio Club in Australia that actively supports CW exclusively.

Using low power and homebrewing our own equipment gives QRP'ers a great feeling of achievement and satisfaction. And it gives us a direction and purpose in holding an Amateur Licence and enjoying our hobby. We are saying to Amateurs that you can enjoy your hobby just as much as at present - in fact more - without having to spend thousands of dollars.

Would you like to join us in putting the AMATEUR back into Amateur Radio ?
Would you like to use more of the Amateur skills you have acquired ?
Would you like to become enthusiastic about your hobby again ?

If so, fill in the application form (or a copy of it) and post it to our Treasurer at the address shown on the form.

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Photocopy or cut along this line

CW OPERATORS QRP CLUB Please post this application to:



Promoting the Use of Low Power
CW Mode Communication
and Homebrewing
in the Amateur Radio Service

Kevin Zietz VK5AKZ
41 Tobruk Ave.
ST MARYS SA 5042
Australia

I would like to apply for membership of the CW Operators QRP Club.

With this application I enclose \$A10 for VK Amateurs or \$A12 for ZL Amateurs or \$A14 for DX Amateurs, which is the annual membership fee.

(please print)

FIRST NAME & CALL SIGN

INITIALS & SURNAME

ADDRESS



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

SIGNATURE

June 1991 910525

A receipt and your membership number will be sent with your next *Lo-Key*.