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ISSUE No.25

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

Len VK5ZF (1)

Don VK5AIL (75)

Rai VK7VV (3)

EDITORS OF LO-KEY

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900328 A5COV Z68A/B3

**** March 1984 to March 1990 **** 25th Issue ****

POSITIONS

EXECUTIVE COMMITTEE

- Administers Club policy for the benefit of members.

ORGANISER
Max Brunger VK5OS (2) 3 Durham Ave. LOCKLEYS SA 5032 Australia
Please send to Max membership enquiries, suggestions and comments and other mail concerning club business, except as specified otherwise on this page.

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Please send to Kevin membership applications and subscriptions, other payments (except for kit-sets), requests for Club logo stickers, past issues of Lo-Key, other financial correspondence, changes of details such as address or call-sign.

EDITOR OF LO-KEY
Don Callow VK5AIL (75) 5 Joyce St. GLENGOWRIE SA 5044 Australia
Please send to Don contributions for Lo-Key and suggestions about this journal.

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PUBLIC RELATIONS OFFICER
AWARDS AND CONTESTS MANAGER
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Ian handles the promotion of the Club, general liaison and communications with other Clubs and with editors of radio/electronics magazines.
Also, please send award claims, scoreboard entries and Scramble logs to Ian.

STATE CO-ORDINATORS
VK7: Rai Taylor VK7VV (3) Lot 2 Daniels Rd. MAGRA Tasmania 7140
VK2: Garry Cottle VK2AGC (121) 22 Johnston Rd. BASS HILL NSW 2197

INFORMATION NET CONTROLLER
Max Brunger VK5OS (2). Identification is VK5OS. QRO SSB is used.
CW stations may call BK de (call-sign) to have their presence acknowledged.
You hear information about the Club and can take part in technical discussions.
MEMBERS AND VISITORS WILL BE WARMLY WELCOMED.
FRIDAY NIGHTS FROM 1030Z NEAR 3620KHZ.

CW NET CONTROLLER
Ted Daniels VK2CWH/QRP (89). Call is **CQ CW OPS/QRP de VK2CWH/QRP k**
QRP power is used i.e. no more than 5 Watts to ur antenna. Ted adjusts speed to suit the slowest operator in the Net and uses only simple abbreviations.
ALL WELCOME, PARTICULARLY THE INEXPERIENCED AND NOVICES.
WEDNESDAY NIGHTS FROM 0900Z AT 3529KHZ or lower if QRM.

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Don Callow VK5AIL (75) 5 Joyce St. GLENGOWRIE SA 5044 Australia
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THE BOOKSHOP
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Magazine and book reviews, circulation of circuits and useful information about home-brewing.

GENERAL INFORMATION

QRP CALLING FREQUENCIES
1815kHz.....3530kHz.....7030kHz.....10106kHz.....14060kHz.....21060kHz.....28060kHz

CLUB MEMBERSHIP SUBSCRIPTION
Due each January.....Australia $A10.....New Zealand $A12.....DX $A14

LO-KEY - THE CLUB JOURNAL
Published quarterly - March.....June.....September.....December.
QRP & CW home-brewing, operating, SWLing etc. **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.

900304 P2 268A/C3

ORGANISER'S OFFERINGS

By Max VK5OS (2)

This 25th issue is by way of being a little bit special, and I do not intend to write a homily on QRP activity or any of the other subjects which I have touched on in the past.

Instead I wish to pay personal tribute to a small group who since the Club's inception have been responsible for the fine little journal which is Lo-Key.

It is only since being a member of the Committee that my eyes have been opened to the tremendous effort which is necessary to compile and print Lo-Key, and on this occasion, or should I say in this issue, say congratulations on a job well done to our three editors:

to Len VK5ZF, founder and editor
to Rai VK7VV, editor and also secretary for some time
to Don VK5AIL, present editor and kit-set guru.

I am sure that all members of the Club will join me in this.

Thank you ladies and gentlemen.

Max VK5OS

INDEXES OR INDICES ?

By Don VK5AIL (75)

It doesn't matter which way you spell it - they are very useful !

So Max VK5OS (2) has produced an **index of *Lo-Key* technical articles**, which is in this issue. We will progressively update this and broaden its scope. Also, for the benefit of Members we have a copy of the recently available index to the last 20 years of the **Wireless Institue of Australia journal *Amateur Radio.***

An index of a slightly different type is the All Electronic Components list of PCBs. In response to the advert. in *Electronics Australia* (March 1990 p.97) we contacted A.E.C. and now hold their comprehensive catalogue of kit-set PCBs from the electronics magazines. It includes details on PCB ID number, date of issue of magazine, title of project and price of PCB. If my arithmetic is correct there are 818 PCBs on the list. Back-issues of magazines are available (and if not, photocopies of articles).

One interesting aspect of this is that the list goes back 25 years, to 1965 for *EA* and 1971 for *Electronics Today International*. Other magazines listed are *Australian Electronics Monthly*, *Elektor* in *AEM* and *Hobby Electronics*.

A.E.C. are currently updating their kit-set catalogue and have me on the mailing list for this.

All Electronic Components are located at 118-122 Lonsdale St., Melbourne, Vic. 3000; telephone (03) 662 3506.

Last, but not least, we will update the **List of Articles on Homebrew and/or Low Power by Drew VK3XU (49)**, which first appeared in *Lo-Key* #22 June 1989 (with additions in the following issue). By the way, I have all of these articles, which is quite a collection.

CLUBTIVITIES

By Don VK5AIL (75)

900314 BODY Z68A/C6

WELCOME TO NEW MEMBERS !

We are happy to report a continuing high level of new Members joining (*quality* as well as quantity, of course !!). And it's nice to have another DX Member: Peter ZL2BGO (194). *Welcome to all who have joined us recently !*

Anything you can do to tell others about the Club will be appreciated by all of us. Come up on the Club Info. Net and ask Max VK5OS (2) to send out a complimentary copy of *Lo-Key* to a prospective member. It will be in the envelope by your next over ! We also have a promotional brochure and will send you a supply on request, for posting out or for handing out at places where Amateurs gather.

179	SWL	Wayne Hays	Ulverstone	Tasmania
180	VK2AW	Basil Dale	Gorokan	New South Wales
181	VK5APO	Dale Cavies	Mt. Barker	South Australia
182	VK2FIZ	Alan James	Lavington	New South Wales
183	VK3DVB	Dave Archer	Huntingdale	Victoria
184	VK5AIM	Steve Mahony	Elizabeth Downs	South Australia
185	VK5BJE	John Dawes	Somerton Park	South Australia
186	VK2KNK	Alan Pearce	Wollstonecraft	New South Wales
187		Doug Raper	Ballaarat	Victoria
188	VK3PGL	Gilbert Long	Yackandandah	Victoria
189	VK3AIQ	James Glenn	Horsham	Victoria
190	VK4GOR	Dick Keeshan	Sherwood	Queensland
191	VK6LT	Bill Toussaint	Shelley	Western Australia
192	K2DN	John Harper	Vineyard	New South Wales
193	VK4CRS	Chris Roy-Smith	Biloela	Queensland
194	ZL2BGO	Peter Grove	Lower Hutt	New Zealand
195	VK7AAZ	Andy French	Smithton	Tasmania
196		G. Lock	Mt. Waverley	Victoria

KEVIN'S KOMMENTS

By Kevin VK5AKZ (43), Treasurer

Subs are Surfacing ! Thanks to all those Members who have paid promptly - if your subs are still outstanding you will get a reminder with this *Lo-Key*, to help you avoid a break in membership. We know its not the sort of BRK you want !

Please do NOT send *CASH* in letters. Occasionally letters go astray and it is much easier to resolve any such problems if cheques are used.

Receipts are often held back until they can be enclosed with your next issue of *Lo-Key*. This way we save postage costs, so we hope you don't mind waiting.

Membership Number on Letters Pse, as this gives me more time to update the records, rather than searching around in them.

Copies of Past Issues of Lo-Key are proving quite popular. They can be obtained for $2.00 each or, if it is cheaper for you, use the price shown in the Club Sales Price List: $1.80 each plus $2.00 per order for postage.

To order, write to Kevin VK5AKZ (43) or Don VK5AIL (75) - addresses on page 2. DX Members may send $US using the same figures as $A.

Addressum Errata: Neil VK7FN (26) advises that his address in the list on p.15 *Lo-Key* #24 is incorrect. The P.O. Box number is 246, not 7316. Quoting Neil: "Penguin is a fair size village, but 7316 PO boxes would just about cover it !". *We get the message !*

Neil VK3CGE (19) wrote to say he keeps a computer (IBM PC/XT compatible) file of Members, based on the lists we publish from time to time. Our official file is on a Z80 computer. We are thinking about more frequent updating in *Lo-Key* or perhaps producing a list with just names, call signs and Membership numbers. I am eager to hear *YOUR* views on this.

73 Kevin VK5AKZ

THE 25th. ISSUE OF LO-KEY

....by Len VK5ZF (1)

The current Editor of Lo-Key Don VK5AIL, has asked me to write a short article on the founding of the CW Operators QRP Club, to mark the publishing of the 25th. issue of Lo-Key. While 25 issues of a Club Journal in its self, is no big deal, it has meant a lot to your Committee, who has had to steer your club through six years of club operation, to achieve the twenty five issues. That has taken a lot of effort, and I heartily congradulate the committee, on a job well done.

On the 12th Dec. 1983, the CW Operators Club was formed by myself, and for about a month I was the only member. The VK QRP Club was in operation for a few years prior to this date, but ceased operations completely in 1983. Jack VK6JS who ran the VK QRP Club, had heavy commitments, and could not find anybody willing to take over from him, so he closed the club down. For a short time there was no QRP Club at all in Australia, and it was then that I decided to do something about forming a new club. I guess I must have written some fifty or sixty letters to ex-members of the VK QRP Club, and I also started a publicity drive, through the state WIA broadcasts. Many of our first members were ex-VK QRP club members, as I was, before the club shut down.

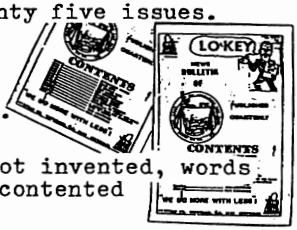
If I may I would like to mention the strong support I received from some of the first members of our Club, many of them are still with us. To mention just a few, Rai VK7VV (3), Leith VK5LG (18 / 154), VK5OS Max (2), Jim VK2AKE (5), Reg VK3BPG (7) Ted VK4BML (11), Neil VK3CGE (19), Malcolm VK5BA (8), Jack VK4SF (14), Roy VK4RE (15), Matt ZL1ATW (34), and of course there were many others, but I can not list them all here.

Some of our newer members may wonder how we named our Journal Lo-Key. The name was suggested by one of our early members Rob VK5VD. The Lo is an abbreviation of the word low, and is symbolic of the QRP activity of the club. Key of course is symbolic of the CW mode that the club promotes. Actually Lo-Key is a very apt title for the Journal of the CW Operators QRP Club. During the twenty five issues of Lo-Key, there have been three Editors. Len VK5ZF was the first, then came Rai VK7VV, next was Len VK5ZF again, and now our present Editor Don VK5AIL. I think that you will agree with me, that the standard of our Journal, has risen from a very mediocre first couple of issues, to a progresively high standard, which we enjoy today. I think that Lo-Key is in great shape, and that it is in very capable hands at present.

Looking through the first few issues of Lo-Key, is very nostalgic, and I well remember the first technical article that appeared in issue no.1. It was called the "Donnybrook Special", because the author lived in Donnybrook a small town in the southwest corner of W.A. It was a great little rig, using two BC108 transistors, with VFO and 100 Milli-watts output. What more could you ask for. Even with its real simplicity, it was a goer. The author of this article was Peter VK6YW, and unfortuneately Peter is now a Silent Key. I would like to see our Committee introduce a QRP Technical article award to perpetuate the memory of our first technical article contributor Peter VK6YW. I would like to hear the Committee's reaction to this suggestion.

In conclusion I thank everyone in the CW Operators QRP Club, for keeping the club spirit flying high. I am proud to be a member of this club, and I am looking forward to the next twenty five issues.

GOOD LUCK LO-KEY



An extract from issue no. 6 page 10 LO-KEY reads....

ODE TO A MODE

In days of old, when Hams were bold, and sideband not invented, words were passed, by pounding brass, and all were quite contented (I like it.)

The *Flexi*-Sudden Receiver

By Don Callow VK5AIL (75)

1 INTRODUCTION

The 'Sudden' receiver was introduced by its designer Rev. George Dobbs G3RJV (96) in an article in SPRAT, the journal of the G-QRP Club (No.58 Spring 1989). The article was reproduced in *Lo-Key* with George's permission, which is much appreciated. See *Lo-Key* #23 p.18 and #24 p.23.

The Flexi-Sudden is a version which the CW Operators QRP Club now provides in kit-set form. It varies from the original design in that it has two small plug-in boards for the Band-Pass Filter (BPF) and Variable Beat Frequency Oscillator (VBFO). Builders can make additional pairs of plug-in boards for each other band required. This avoids the need to build complete receivers for each band. The idea arose because we could not obtain from VK sources the Toko inductors specified, or a satisfactory alternative which would fit on the PCB. The original PCB layout can be used, with some links inserted. A board specially designed for the Flexi-Sudden would make construction simpler.

Both the BPF and VBFO could be used with other circuits. Values of the components are given in the Band Table. On request, values for virtually any other band spreads and tuning capacitor ranges can be provided e.g. to obtain finer tuning between 3.5 and 3.6MHz only. These are calculated values, but those I have tested have proven satisfactory. See *Solid State Design for the Radio Amateur* by Wes Hayward W7ZOI and Doug DeMaw W1FB (1977) pages 239 (BPF) and 34 (VBFO). The Circuit Diagram is based on the original by George G3RJV, with dashed lines to show which parts are on the two extra boards. The original Colpitts circuit is retained for the VBFO, but the BPF is now a doubly terminated double-tuned 2-pole filter with capacitive coupling.

There is plenty of scope to experiment with any of these values. Whilst it is possible to operate the Rx on all bands the performance will not be adequate in every case, without additional circuitry. It has been suggested that the *15dB Amplifier for Receiver Front Ends* article by Ian Smith VK8CW (91) is worth a try. See *Lo-Key* #23 page 8.

In fact the arrangement makes the original design even easier to experiment with, using substitute and additional modules.

2 CONSTRUCTION HINTS

See Parts List, Band Table and Parts Layout. Please refer to the *Lo-Key* articles.

Check parts against the Parts List, noting that several values for the BPF and VBFO will be found in the Band Table.

Check position of VC1 early, but leave actual installation until late.

The small boards (BPF and VBFO) sit above the main board. Clean and roughen with emery paper the flat faces of the 3-pin plugs and sockets. Glue the sockets to the main board using Super Glue (cyanoacrylate) or other suitable adhesive, after cleaning and roughening the surfaces. Push the plug into the socket and hold the small board, copper side down, in correct position ready for glueing. Then apply glue and press the PCB onto the plug.

Next, glue the Neosid former to its base. Now wind the Neosid coil and the two toroids. You will get a neat job by soldering a piece of stiff wire into the Neosid base pin which is at ground. This provides a good terminal for the upper end of the winding wire. Make sure it doesn't touch the side of the can. See sketch. The aim is to wind the coil to achieve about 2/3 of the target inductance *before* the slug is screwed in.

The toroids can be installed on the underside of the band-pass filter board or you can sit them under the trimmers on the component side. The latter is very neat, but the toroids are hard to get to once they are installed. See notes on Parts Layout.

Now install and solder the other large components e.g. IC sockets. Then install other parts which cannot easily be varied in position e.g. electrolytic capacitors.

Each solder lug on the 3-pin sockets should be connected with hook-up wire so it remains loose, as it is in one piece with the actual socket conductor.

PCB pins are recommended, particularly as they make troubleshooting and parts substitution easier and are therefore less likely to damage the PCB.

Case - Use conductive material e.g. aluminium, for best VBFO stability, but the Rx will also work O.K. in a plastic case.

3 NOTES ON TESTING AND TUNING

Please refer to original article for procedure.

Use 8 Ohm headphones for best results.

VBFO: Set VC1 tuning capacitor at maximum capacitance and leave the slug of the Neosid coil L3 out. Monitor the signal from the VBFO with your station receiver or a digital frequency meter - see note two paragraphs below. Tune your station receiver to the bottom limit of the band e.g. 3.500MHz. Then gradually screw IN the slug of L3. You will hear a quick 'blip' when the frequency is found.

Put the case (grounded) over the Neosid coil of the VBFO when adjusting the Sudden Rx. Also, the screw slug may move if shaken, causing a jump in frequency, so use a fine 'thread' of rubber or a spot of glue (after tuning is complete) to hold it in place. For the higher frequencies a slight increase in tuning range can be obtained by carefully pushing the VC1 rotor blades towards the stator blades.

To set the tuning range of the VBFO it is best to use a receiver, because the capacitance added to the circuit when a digital frequency meter (DFM) is coupled will lower the frequency. The receiver antenna can be positioned close to the NE602 or lead to VC1.

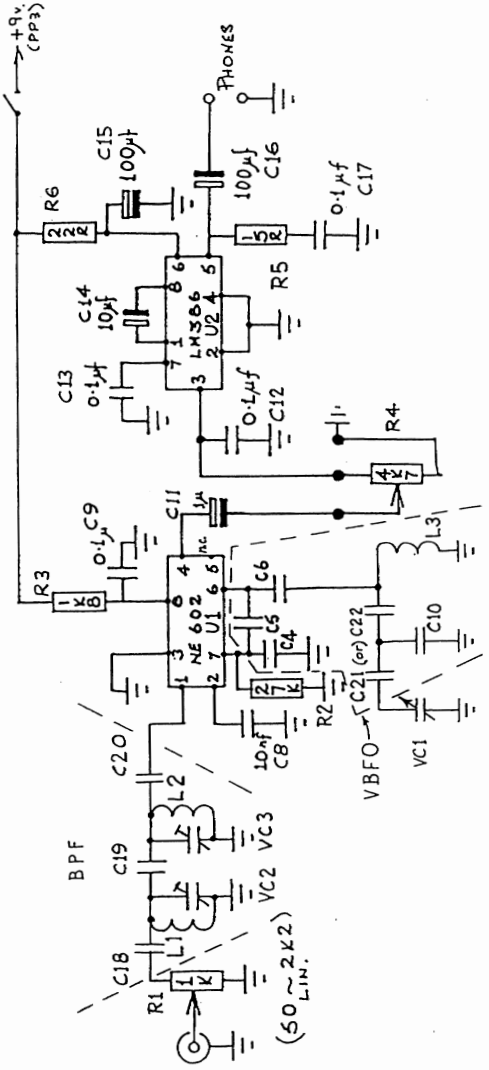
If you wish to change the tuning range of the oscillator (and hence the Rx), temporarily install trimmer capacitors in place of the polystyrenes. When adjustments are satisfactory measure one capacitance at a time and install appropriate values of polystyrene.

BPF: When you tune the BPF don't forget that a GDO is a very useful signal source, which can be set quite accurately by listening also with your station Rx.

Tuning consists of peaking the trimmer capacitors VC2 and VC3 for maximum signal at the ends and centre of the band - trial and error.

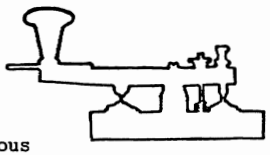
Note that the filter passband is much wider than certain Amateur bands e.g. 10MHz and even 14MHz. You may wish to simply set the Rx onto the frequency of greatest interest e.g. 14.060MHz and tune the BPF for strongest signal there.

4 CIRCUIT DIAGRAM



5 PARTS LIST

This list does not show all the parts provided in the short-form kit-set. It mainly shows those which vary according to the band for which the Rx is being set up. See Band Table for values. Those marked # are provided with K014 'Pair of BPF and VBFO Modules'.



Capacitors

#	C4 C5 C6 & C10 C21 C22	polystyrene
#	C18 C19 C20	NPO ceramic
	VC1	20-40 / 20-220pF 2-gang air dielectric varible
#	VC2 VC3	trimmer capacitor

Miscellaneous

#	2nbr	PC boards, single sided, for band-pass filter and VBFO
#	L1 L2	Philips 6mm od toroid 4C6 (violet)
#	L3	Neosid coil former, base, can and screw core
#	2nbr	3-pin plug
#	1nbr	2-pin miniature header
#	1nbr	Enamelled wire 0.17mm diam. (approx. 34B&S 37SWG)

6 BAND TABLE

Band-pass Filter BPF

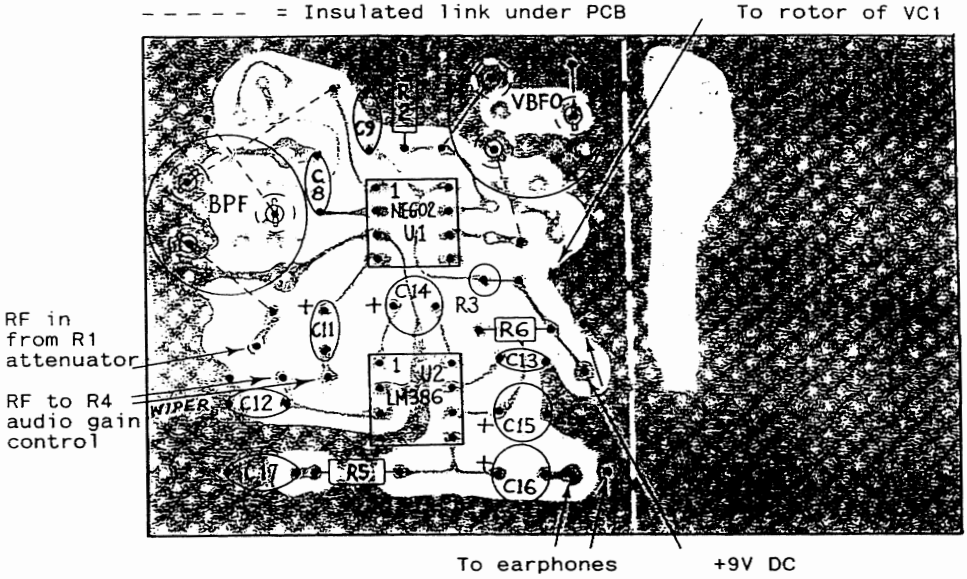
BAND MHz	C18/C20 pF	C19 pF	VC2/VC3 Theory pF	Chosen Max. pF	L1/L2 uH	Toroid - 6mm o.d. Philips 4C6 (violet) Turns
1.8 - 1.875	82	4.7	48	65	55	47 (On 9mm toroid)
3.5 - 3.7	68	5.6	49	65	16	30
3.5 - 3.8	82	8.2	28	65	16	30
7.0 - 7.3	33	2.7	33	65	7	20
10.1 - 10.15	22	1.8	42	65	4	15
14.0 - 14.35	18	1.8	46	65	2	10
18.068 - 18.168	15	1.5	37	65	1.4	9 (Use 0.125mm wire)
21.0 - 21.45	10	1.0	56	65	0.8	7 (" " ")
24.89 - 24.99	12	1.5	57	65	0.6	6 (" " ")
28.0 - 29.7	18	3.3	50	65	0.43	4 (" " ")
or	15	2.2	16	22	1	7 (" " ")

Variable BFO VBFO

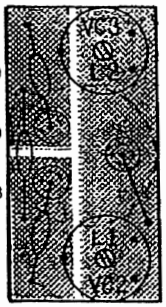
BAND SPREAD MHz	VC1 pF	C4/C5 pF	C6 pF	C10 pF	C21 pF	C22 pF	L3 Neosid former - 5mm o.d. uH	Turns	Screw core
1.8 - 1.875	20-220	1000	820	270	100	-	12.1	68	F16
3.5 - 3.7	20-220	1000	560	-	-	68	6.6	40	"
3.5 - 3.8	20-220	1000	560	-	-	120	6.1	38	"
7.0 - 7.3	20-40	470	220	-	-	150	3.6	25	"
10.1 - 10.15	20-40	330	150	100	-	47	2.2	17	"
14.0 - 14.35	20-40	220	82	39	-	68	1.6	13	" or F25
18.068 - 18.168	20-40	150	82	82	-	33	1.2	11	F25 or F29
21.0 - 21.45	20-40	150	68	33	-	39	0.9	10	" or "
24.89 - 24.99	20-40	150	68	120	-	33	0.7	8	" or "
28.0 - 29.7	20-40	120	56	-	-	39	0.7	8	" or "

NOTE: Not all of these have been tested, however those tried have given satisfactory results. Please let me know about <u>your</u> results.

6 PARTS LAYOUT AND SKETCH

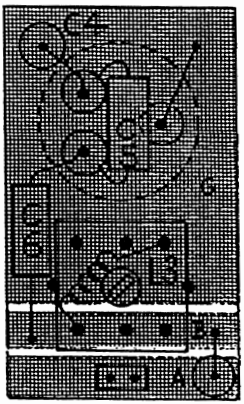


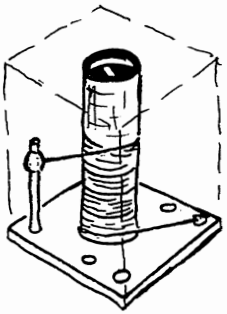
BPF



Inductors L1 and L2 are installed in parallel with trimmer capacitors VC1 and VC2. They can be soldered to the pins of the trimmers under PCB. Or they can sit under the trimmers if these are raised higher. Or they can be installed on edge at the sides of the trimmers.

VBFO





VBFO - There are other layouts besides that shown:

If C10 is used alone (no C21 or C22) install it between B and G, with a link between A and B.

If C10 is used with C21 (no C22) install it between B and G, with C21 between A and B.

If C10 is used with C22 (no C21) install it between A and G, with C22 between A and B as shown above.

FROM THE EDITOR'S DESK

By Don VK5AIL (75)

25th Issue of Lo-Key

The Lo-Key25 issue is a milestone for the CW Operators QRP Club so I have made it a 'special'. Len VK5ZF (1) has kindly provided some details about the formation of the Club, leading to the printing of *Lo-Key #1*. This is much appreciated. On this note - *the Club thanks all contributors, past and present, for your input.* It has made *Lo-Key* what it is today - and we're proud of it.

For the record, *Lo-Key* has had three editors to date:

Len VK5ZF (1)
edited 8 issues from #1 March 1984 to #5 March 1985 and #17 March 1988 to #19 September 1988;

Rai VK7VV (3)
edited 11 issues from #6 June 1985 to #16 December 1987;

Don VK5AIL (75)
has edited 6 issues from #20 December 1988 to the present.

The front cover of this issue displays the Club logo in its original form, which first appeared in *Lo-Key #2*. *Lo-Key25* contains some extracts from past issues, along with the usual features. I hope you find these interesting.

Award for Best Technical Article

I am pleased to announce this award, which is a suggestion of Len VK5ZF (1). We are arranging for independent judging of technical articles submitted between now and the end of September 1990. All you have to do is submit articles - there is no need for any special application. If all goes well we may repeat this award in the future.

The award will comprise a certificate, free Club Membership for one year and a voucher to the value $25.00 for items from the Kit-Set Activity Centre.

Executive Committee Members and the Editor of *Lo-Key* are excluded.

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 Club logo, motto and statements in the *Interested in Joining Us ?* item.

* Likely usefulness to Club Members.

* Originality of content.

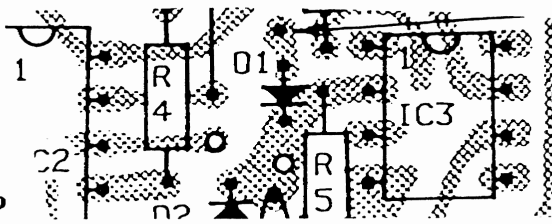
* Layout and degree of completeness. Is it attractive as submitted and can it be reproduced with little extra work, if any? Note that articles provided as rough notes could still win if they perform well under the other criteria.

Our aim is to announce the winner and print the article in December 1990 *Lo-Key*. *GO TO IT !*

THEN AND NOW GROUP

The Members on this list were in the Club at or soon after its formation and would have received *Lo-Key #1*. We are proud to have them and hope they continue to enjoy *Lo-Key* and the other Club activities.

1	VK5ZF	Len O'Donnell
2	VK5OS	Max Brunger
3	VK7VV	Rai Taylor
5	VK2AKE	Jim Edwards
7	VK3BPG	Reg Bedford
8	VK5BA	Malcolm Haskard
12	VK3CVF	John Elliott
13	VK3BXA	Eric Irvine
14	VK4SF	Jack Ford
15	VK4RE	Roy Hildred
19	VK3CGE	Neil Emeny
22	VK2BVH	Brian Halpin
28	VK6KRG	Rod Green
31	W5QJM	Fred Bonavita, Houston, Texas, U.S.A.
34	ZL1ATW	Matt Meenagh, Te Awamuta, New Zealand
37	VK7NRE	Bob Edwards
38	VK7KBA	Arthur Blackwell
40	VK7JK	John Rogers
41	VK2QB	Leo Pinkevitch
43	VK5AKZ	Kevin Zietz
154/18	VK5LG	Leith Cotton

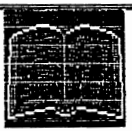


A message to letter writers and kit-set buyers

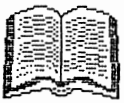
At the present time it is impossible for me to reply to all letters about *Lo-Key* or kit-sets. I am confident things will improve later this year. In the meantime, I try to include notes in the *Lo-Key* envelopes for Members who have recently sent articles or orders for components and kits.

The kind comments received about *Lo-Key* and the kit-set activity are very much appreciated and I thank those who have made them.

Next Issue - Back to normal for June. The series on the Forrestfield Tx (great for experimenting & learning) is past halfway and there are still many items from Members, so we'll have to think hard about what goes in ! CQDC



THE BOOKSHOP
BY
NORM LEE VK5GI



The traditional way of building a QRP rig is by putting a Direct Conversion receiver into it. While this is simple for the constructor, it leaves much to be desired in performance. My own version of the "Mountaineer" for example - the famous rig designed by Wes Haywood - gives me wall to wall Radio Australia after about eight o'clock at night on forty metres!

However, a few articles all within the last couple of months are starting to talk in terms of simple superhets, using chips to do most of the dirty work. Silicon Chip for December 1989 has just such a receiver for forty. I'm in the process of building it - at least I will when RCS (the crowd who make the printed circuit boards for S.C, Electronics Aust, ETI and so on) and the publishers agree on a code number for this particular rigs PCB! The chip is easy to obtain and I'm building my own filters from surplus 4 meg crystals. The plan is to run this with the Mountaineer transmitter and the combination should be one almighty little rig.

QST for December has an article by Wes for a QRP SSB/ CW transceiver for the twenty metre band. As usual it uses Wes' Ugly Construction method, but Wes points out that this really is an experimenters rig, to use as a vehicle for "trying out" circuits rather than as a cut and dried project. None the less, it is worth a read and worth pinching some of his ideas to use in your next rig. CQ for November and December also has QRP superhet articles, but this time for building a rig for thirty metres. This also uses the Ugly Construction, but uses the little Tandy All Purpose circuit boards which cost about three bucks. Thirty metres is in good shape day and night right now and has power restrictions so that QRPers can "compete" without getting unduely swamped by the California Kilowatters. The Rev George Dobbs (one of our members, incidentally) has an article in Jan/Feb Practical Wireless for the construction of a 40 metre CW rig which looks like a good project. I like Georges' articles, he writes as though he knows exactly what damn fool mistake I'm about to make next and anticipates it! Well, I'm running out of space here, but look for me on 40 metres (7.000 - 7.100 Mhz) CW or RTTY. QRP RTTY, why not?

73 Norm VK5GI 25 Ralston St. NORTH ADELAIDE 5006

Editor's Note:

JOY OF QRP - *AT LAST* we have obtained a few copies of this excellent little book by Ade Weiss WØRSP. As soon as the price is known I will write to the Members who expressed interest earlier - yes, I'll add a 2 cent stamp to those S.A.S.E. from last year !

BOOMERANG CIRCUIT BOOK - *Is in full flight - and out of sight.* That is, we're not sure exactly who has it at the moment. Don't forget: Please keep it moving, so that others do not have to wait too long.

3.5MHz CW QRP Transmitter

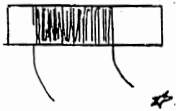
By Peter VK6BWI (66)

3.5 MHz CW QRP TRANSMITTER — VK6BWI 66

COIL DETAILS

L1 VFO COIL:-

35 TURNS, 0·6MM DIAM. WIRE, CLOSE WOUND, ON 8MM HARD PLASTIC OR GLASS FORMER.*



SEE REF 5.

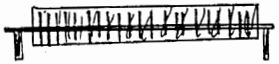
L2,3 PA INPUT COIL:-

30-40 TURNS, 0·6MM WIRE ON PLASTIC OR CARD FORMER, CLOSE WOUND. L3 ON TOP OF L2. 10MM DIA FORMER.

OLD IF TRANSFORMER.

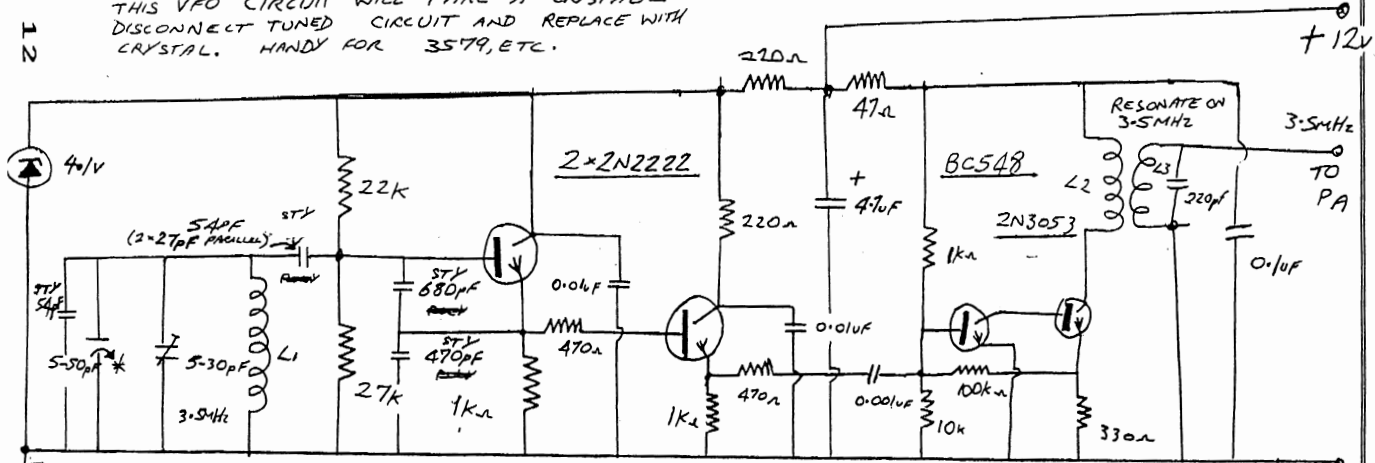
L4 OUTPUT COIL:-

AT LEAST 50 TURNS, 1MM WIRE, AIR SPACED TURNS. 1MM SPACING.



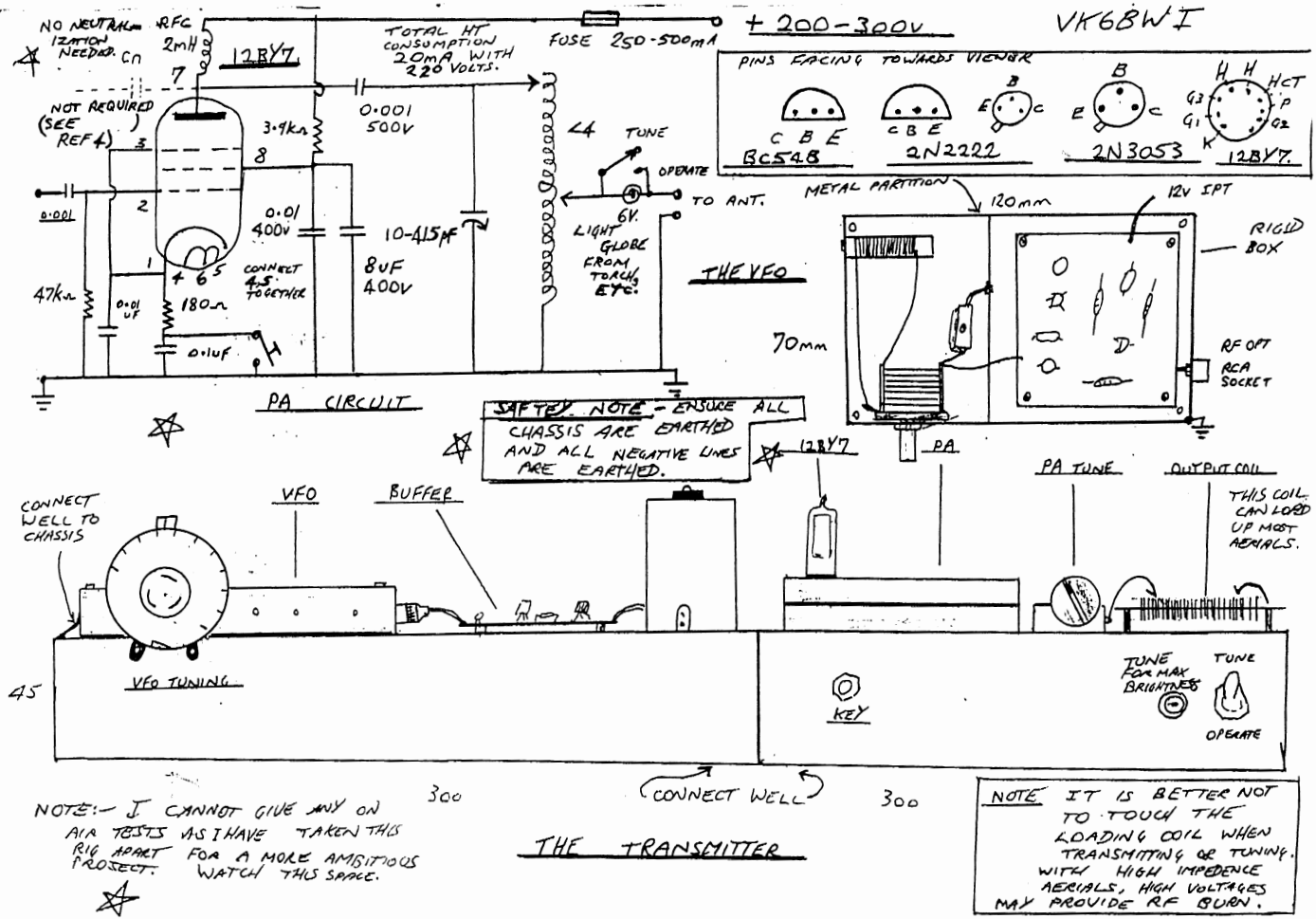
REFERENCES 1. LO-KEY, JUNE 1987. 2. LO-KEY, SEPTEMBER 1987. 3. ELECTRONICS AUSTRALIA, MARCH 1972. 4. G-QRP CLUB HANDBOOK 5. AR JAN 1988 - TIPS ON VFO CONSTRUCTION

THIS VFO CIRCUIT WILL TAKE A CRYSTAL — DISCONNECT TUNED CIRCUIT AND REPLACE WITH CRYSTAL. HANDY FOR 3579, ETC.



* YOU COULD TRY VARICAP DIODE TUNING INSTEAD.

VFO, BUFFER CIRCUIT.


NO NEUTRALIZATION NEEDED. C1
RFC 2mH
12BY7
NOT REQUIRED (SEE REF 4)
TOTAL HT CONSUMPTION 20mA WITH 220 VOLTS.
FUSE 250-500mA
+200-300v
VK6BWI
PINS FACING TOWARDS VIEWER
C B E
BC548
C B E
2N2222
2N3053
12BY7
0.001
500V
3.9kΩ
0.001
400V
10-415pF
8uF
400V
47kΩ
0.01 uF
180Ω
0.1uF
CONNECT 4,5 TOGETHER
TUNE
OPERATE
TO ANT.
6V. LIGHT GLOBE FROM TORCH, ETC.
PA CIRCUIT
THE VFO
METAL PARTITION
120mm
12v IPT
RIGID BOX
70mm
RF OPT
RCA Socket
SAFETY NOTE - ENSURE ALL CHASSIS ARE EARTHED AND ALL NEGATIVE LINES ARE EARTHED.
12BY7
PA
PA TUNE
OUTPUT COIL
THIS COIL CAN LOAD UP MOST AERIALS.
CONNECT WELL TO CHASSIS
VFO
BUFFER
VFO TUNING
45
KEY
TUNE FOR MAX BRIGHTNESS
TUNE
OPERATE
300
CONNECT WELL
300
NOTE:- I CANNOT GIVE ANY ON AIR TESTS AS I HAVE TAKEN THIS RIG APART FOR A MORE AMBITIOUS PROJECT. WATCH THIS SPACE.
THE TRANSMITTER
NOTE IT IS BETTER NOT TO TOUCH THE LOADING COIL WHEN TRANSMITTING OR TUNING. WITH HIGH IMPEDENCE AERIALS, HIGH VOLTAGES MAY PROVIDE RF BURN.

The FORRESTFIELD 21MHz Tx - Part 4

By Rod VK6KRG (28) and Don VK5AIL (75)

TESTING THE OVERALL PLL

See Fig. 15 PLL Testing - Initial Wiring & Fig. 1 Block Diagram (*Lo-Key* #22 p.4)

1. Once you are happy that the VFO, VCO, PLL and KDB boards ALL work correctly, they may be tested in combination. You will need a receiver or, better still, a digital frequency meter for monitoring.

2. Connect these boards by wiring as listed in Fig. 15 i.e. without the 1 Watt Driver, Power Amplifier (5 Watts) or Relay Boards. Do not use coaxial cable at this stage, if you are following nbr1 on p.7 of *Lo-Key* #24.

Don't expect everything to work perfectly during this prototype testing e.g. the rig may lose lock before covering the complete 300kHz range. The aim is to make sure that phase lock can be achieved and that the four boards made so far will work together. What you will get is good experience and confidence that the rig will perform well when built into a case and permanently wired.

Be very careful that you do not have the power supply polarity reversed. The acceptable voltage range is +12 to 14V DC. Note that on diagrams this may also be referred to as `12V' or `13.8V' nominal voltages. Set VFO on its lowest frequency, probably at 1.000MHz.

3. After connecting up, apply the +12 to 14 Volts, which should be present at the T/R Switch and VFO, VCO & KDB boards. Check that the VFO and VCO boards have +9V DC at the correct places. Check that +5V DC is present at the correct places on the KDB and PLL. Both have TTL 7400 series ICs which must not be subjected to voltage outside the range 4.5 to 5.5V (4.75 to 5.25V is preferred).

4. Measure all RF and DC voltages as you previously did when testing each board. However we are only interested in the 21MHz Output (continuous) from the KDB board going to the PLL board, so there is no need to use the KDB's Key Input lead yet. Disconnect VCO control voltage line between PLL and VCO. Find out how much the VCO drops in frequency for a 5V increase in voltage (from 0V ground to 5V DC, obtained from the regulator output on the KDB) at its VCO Control Voltage terminal. Re-connect VCO control line.

5. To check that the PLL works, open the main tuning capacitor about half way. Place your DC voltmeter on the VCO control voltage line. Adjust your VCO oscillator (L1) tuning slug until you see your meter read around 2 to 2-1/2 Volts DC. Now re-adjust TR1 (VCO) for a peak in RF Output at the 47R load.

Then vary the main tuning capacitor back and forth and your DC voltage should gradually rise and fall along with the tuning motion. Fully close the tuning capacitor and then adjust the coil slug (L1 on VCO) for about 4.2 Volts on the control line.

6. Tune your receiver to exactly 21.000MHz and adjust the slug of the VFO coil for a zero beat. Or adjust for 21.000MHz on a counter connected to the DELAYED KEYED OUTPUT of the KDB. This should be done with key down i.e. Key Input terminal of KDB earthed. Check that the voltage on the VCO control pin (pin 8 of the MC4044 or junction of R3 and R4) is still around 4.2V.

7. Listen on the receiver for a nice smooth sounding CW note, free from hum. Check for any large spurious outputs by tuning the Rx across the HF spectrum, but especially around the 21MHz band. You will probably notice several LOW level signals when compared to the required output. These will be VFO harmonics and mixer output harmonics which will NOT find their way to the final.

However, if you find STRONG signals, separated from the desired signal by the frequency of the VFO - and multiples thereof - DO NOT PUT YOUR UNIT ON AIR, as these would be FM sidebands which WILL get past the final and filter.

For example, if you are tuned to 21.000MHz your VFO will be on 1.000MHz (assuming the crystal is on frequency, which is not all that critical). Then you should not find very strong signals on 22.000 or 23.000MHz, or 20.000 or 19.000MHz etc. These signals should

be at least 7 or 8 `S' points down to be acceptable.

These side bands will be present in small amounts because the error correction voltage contains minute amounts of the reference frequency to operate correctly. This FM modulates the PLL at that rate thus generating small sidebands - necessary, although not wanted.

8. Finally, check that the KDB board tuning is O.K. and readjust the VFO such that the transmitter tunes from 21.000 to 21.300MHz exactly. What counts is that the output frequency is correct.

If, for example, your crystal is on 4.001MHz and its harmonic is at 20.005MHz, the VFO will need to be tuned at 0.995MHz to give 21.000MHz output, because 21.000 - 20.005 = 0.995MHz.

Don't forget that the VFO relay must be operated when you adjust frequency for the transmit mode.

9. You are now ready to set up the remaining boards and later build the rig into a case. Let us know if you have any technical problems (advising measured results and what test equipment you have) and we will help you.

·=··· until next issue.

FIG. 15 - PLL TESTING - INITIAL WIRING

Titles of connections are those shown on Parts Layouts Figs. 3, 6, 9 & 13.

FROM	TO
VFO, VCO, KDB & PLL - GND Ground	Power supply common (negative)
VFO, VCO & KDB - +12V (input)	To 12 to 14V power supply through a switch
VFO - TO C1	Main tuning capacitor C1 - Stator
" - GND TO C1	" " " " - Rotor
" - TO T/R SWITCH +12V Tx	Temporary switch wired to the 12V supply
" - RF OUTPUT	PLL - RF INPUT FROM VFO
	Not VCO as shown in error on Figs. 13 & 1
VCO - VCO CONTROL VOLTAGE	PLL - CONTROL VOLTAGE OUTPUT TO VCO
" - RF OUTPUT	KDB - 21MHZ VCO INPUT
KDB - DELAYED KEY OUTPUT TO DRIVER	Temporary load: 50 or 47R 1/4W resistor
	(See point 3 *Lo-Key* #24 p.7)
" - TO KEY INPUT OF FINAL	Not connected yet
" - KEY INPUT	" " "
" - +5V TO OTHER BOARDS (One unused)	PLL - +5V INPUT
" - 21MHZ OUTPUT TO PLL (CONTINUOUS OUTPUT) Do NOT use coax for this	" - 21MHZ INPUT FROM KDB (CONTINUOUS OUTPUT OF VCO BUFFER)

Note: As shown in Fig. 10 the buffer for the VCO is located on the KDB board.

U CAN HELP !

whizkids at work

By Don VK5AIL (75) 5 Joyce St. Glengowrie SA 5044

900319 U CAN.HELP 268A/D2

Not much space available this time, but just enough to say

*****Thanks*** to Amanda and Melanie** (harmonics of Kevin VK5AKZ) who are VHF helpers at collating *Lo-Key*, which helps make up for the Editor's LF progress !

Ian VK8CW (91) has provided some useful notes on audio filters and on the cheaper type of solid dielectric variable capacitors, in response to the requests in *Lo-Key* #24. No room to print them this time but look out for Ian's thoughts in the June issue. The subject is still open for your opinions, which we value.

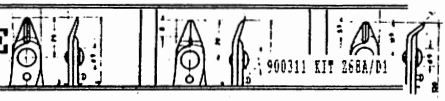
HERE IS ANOTHER REQUEST.

Perhaps U CAN HELP, so if you have the answer contact the person direct or, where the answer may be of use to other Members, let the the Editor know and it may appear in *Lo-Key*. See the centre `lift out' section of December *Lo-Key* for addresses current at that time.

Bill VK2BWW (161) (P.O. Box 263, Nambucca Heads, NSW 2448) is looking for suggestions and articles about building a 20m QRP rig and electronic keyer. Which are your favourite/most successful circuits ?

KIT-SET ACTIVITY CENTRE

By Don VK5AIL (75)



KIT-SETS The Club has a number of kit-sets available to Members:

The *Club Communicator* CW QRP 3.5MHz (80m) VFO tuned transmitter by Rod VK6KRG (28). Kits are also available for individual modules of the *Club Communicator*.

The *Forrestfield* CW QRP 21MHz (15m) transmitter by Rod VK6KRG (28). Kits for individual modules of the VFO, VCO, PLL (phase-locked loop) and KDB (buffer) are available so far, from the current series of *Lo-Key* articles.

A Sensitive SWR Meter by Drew VK3XU (49). Includes a 5W dummy load.

The *Sudden* direct conversion receiverC by George G3RJV (91), from G-QRP Club's journal *SPRAT*.

Prices are as shown in the ***Club Sales - Price List*** section.

CLUB COMMUNICATOR KIT-SET The Club Communicator is an 80m band QRP CW transmitter, power output up to 4W, according to skill of builder. More than thirty have been sold to our Members in two years. The strengths of this kit are its simplicity and the good quality of the kit-set - including a manual which has been the subject of much favourable comment. The rig works well too !

The Full Kit-Set comprises four modules and a set of parts for assembly into your own case. The modules are -

VFO Variable Frequency Oscillator 7.0 - 7.4MHz range, adjustable by you. It runs continuously and does not interfere with your receiver.
BDT Buffer,Divide-by-two,Timer Output is 3.5 - 3.7MHz.
PA Power Amplifier Recommended target output is 4W.
QSK Keying Board Does T/R switching between transmit and receive modes.

The original concept and design was by Rod Green VK6KRG (28). Information about the *early* version appeared in *Lo-Key* #14 June 1987 (p. 21) and *Amateur Radio* March 1988. Development in kit-set form was by Don VK5AIL (75). Our kit-set includes some new PCBs and a new, comprehensive instruction manual, *suitable for beginners.*

This kit-set will suit those who wish to learn more about radio AND it will suit the more experienced who wish to experiment with the modules, develop them or use them in other rigs.

Each module is supplied as a PCB plus the parts to be mounted on that board or which are part of that circuit.

PCB size is about 52 x 52mm (2"), except the PA which is about 78 x 78 (3").

No cases are supplied as this would increase both the cost of the kit and the postage, so you can choose your own or use the sizes recommended in the manual.

The kits are set up in small batches, so if you just miss a batch delivery will take several months. If you have queries, please contact me on the Club Info. Net (SSB), telephone or write. I will also try to help with technical queries you may have when building the rig.

SENSITIVE SWR METER & QRP DUMMY LOAD To assist Members who are setting up stations for QRP operation we offer a short-form kit-set for building a sensitive SWR meter, which can also be calibrated to give QRP power readings, plus the parts for a very compact 5W dummy load.

The design and construction of this SWR meter was the subject of an article in *Lo-Key* No. 19 September 1988. The original article by Drew Diamond VK3XU (49) appeared in the Wireless Institute of Australia journal *AMATEUR RADIO* in April 1983, having originally appeared in the *VK CW QRP$_P$ Club Bulletin*.

The meter is particularly sensitive, unlike many meters designed for higher power, which hardly move the needle when QRP powers are used. It can be left in-line during QSO's - normally set so that the reverse reading can be monitored. It has a sensitivity control for use when higher power causes the needle to exceed full scale deflection.

Parts are also supplied for building a 5W dummy load in a PL259 coaxial plug, similar to that described in the *ARRL HANDBOOK* (chapter on Test Equipment).

An instruction manual is included. The only significant items not supplied in this short-form kit-set are the main case and the 50uA meter.

This is an ideal first project for a beginner.

SUDDEN RECEIVER

This is a design by the Reverend George Dobbs G3RJV (96), featured in SPRAT, the journal of the G-QRP Club. See *Lo-Key* #23 & 24. Reports from builders have been very good.

We are now producing kits locally for a version called the Flexi-Sudden, as it uses plug-in boards which can be made for any of the Amateur MF and HF bands. See article in *Lo-Key* #25. This arrangement has many advantages over building complete receivers for each band of interest.

SUPPLY OF COMPONENTS

We also have available for purchase by Club Members a range of components, particularly items hard to get from normal sources. If you are having difficulty finding parts we may be able to help, so please come up on the Club Info. Net or write to me.

The items are brand new except where stated otherwise. We cannot guarantee availability and may have to limit quantities sold to individuals. The items listed are only a small fraction of those available.

You must take the responsibility for any results of using replacement transistors, diodes etc. suggested in the list. We can give no more than the normal commercial warranty applicable to each item.

ORDERING OF KITS AND COMPONENTS

Orders and payment should be sent to Don VK5AIL (75), or to Treasurer Kevin VK5AKZ (43) if you apply for membership at same time. Addresses are shown on page 2.

Please make out the cheque to CW OPERATORS QRP CLUB. For small money amounts up to $A 10.00 it is alright to send the equivalent value of postage stamps (as long as they are unused Australian stamps valued at $1 or less !). The receipt will be enclosed with your next copy of *Lo-Key*. If you don't receive a packet within a reasonable time please contact me on the Club Info. Net or write - things may have gone astray.

CLUB SALES - PRICE LIST

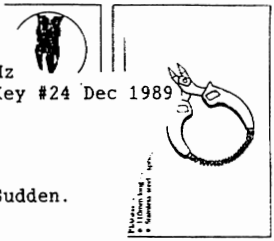
We give more for less

900311 MASTER.LIST 2644/AC

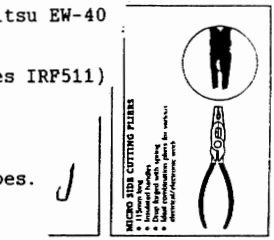
The PRICES of the items listed below are PER PACK. The list shows how many of each you get in one pack. Prices may change at any time without notice. PLEASE ADD $A 2.00 TO THE TOTAL VALUE OF YOUR ORDER, TO COVER POSTAGE & PACKAGING ETC.

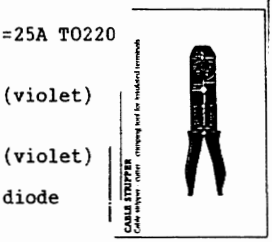
'K' in number indicates a kit-set, usually short-form.
'N' means it is a new item on the list.
'D' means that a simple data sheet will be provided with each order.
'H' means that a set of insulated mounting hardware is included.
You must take the responsibility for any results of using replacements suggested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

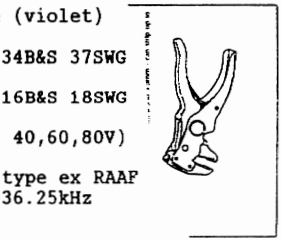
Code No.	Nbr in a pack	$A Price per pack	Description	PRICE LIST From 15 March 1990
K001	1	79.00	Club Communicator Full Kit-Set 3.5MHz CW QRP Tx complete with 52 page manual C010. See Lo-Key #14 June 1987.	
K006	1	25.00	Sensitive SWR meter. Short-form kit. Plus 5W dummy load. Manual included. See Lo-Key #19 Sep 1988 & AR Apl 1983.	
K007	1	28.00	VFO for Forrestfield 21MHz CW QRP Tx. Short-form kit. Instructions in Lo-Key #22 June 1989.	
K010	1	20.00	VCO Voltage Controlled Oscillator for Forrestfield 21 MHz CW QRP Tx Short-form kit Inst'ns in Lo-Key #23 & 24.	
K011	1	40.00	*Flexi*-Sudden receiver. Any band - choose one. George G3RJV (96) design. Short-form kit with manual. Additional modules available for other bands. See K014.	



K012	1	31.00		PLL Phase-Locked Loop for Forrestfield 21 MHz CW QRP Tx. Short-form kit. Inst'ns in Lo-Key #24 Dec 1989
K013	1	18.00		KDB Key Delay, Buffer for Forrestfield. Instructions in *Lo-Key* #24.
K014	1	18.00	N	Pair of BPF and VBFO modules for the Flexi-Sudden. You nominate band. See *Lo-Key* #25.
C001	1	5.00		Ammeter edge type 500uA f.s.d. (DC) Kyoritsu EW-40 Needs a 14mm x 42mm cut-out in your panel.
C002	2	4.00	DH	IRF510 transistor N-channel MOSFET (Replaces IRF511) Used in some of VK3XU (49) Drew's projects.
C004	4	2.30		BAT85 Schottky (hot carrier) diode Voltage drop is 0.2 - 0.3V. High sensitivity - can replace germanium types.
C007	2	3.00	D	BS170 transistor VMOS N-channel FET.
C008	2	5.00	DH	VN88AF transistor.
C010	1	6.00		Manual, as supplied with Club Communicator Tx (K001). Comprehensive coverage; 52 pages.
C011	2	6.00	DH	IRFZ32 transistor V_{DS}=50V P_{DS}=75W I_D cont.=25A TO220
C013	2	1.10		Toroidal core 9mm od x 6mm id x 3mm ht Philips 4322 020 97170 material 4C6 ferrite (violet)
C014	2	1.40		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)
C022	10m	0.20		Enamelled copper wire 0.17mm diam. approx. 34B&S 37SWG
C025	1m	0.70		Enamelled copper wire 1.25mm diam. approx. 16B&S 18SWG
C026	5	7.50		TIP31C trans'r V_{CEO} = 100V (TIP31,31A,31B = 40,60,80V)
C031	1	Free		Crystal (for experimenting) Large Y3 10X W type ex RAAF You nominate frequency 6561.111, 7810 or 8036.25kHz Postage and Packaging charge only.
C032	1	3.50	D	NE602 double balanced mixer & HF oscillator for Sudden Rx
C033	2	3.60		Reed switches, miniature, as in Club Communicator QSK & C028
C034	2	3.00	D	IRFD1Z0 FET (Replaces IRFD1Z3) For GEMAL transceiver.
C035	2	2.40		Toroidal core Neosid 4327R/2/F25 ferrite, as in K006 SWR meter.
C036	2	2.00	D	BF981 Si N-channel dual gate MOSFET SOT103 case (Replaces 40673, MPF121 and MFE131, but case different)
C037	2	4.10	D	LM386 audio power amplifier. N3 version 4-12V (Replaces N1).
C099	1	1.80		Past issue of *Lo-Key*. You nominate month/year or issue number. #1 and #2 count as one.







AWARDS AND CONTESTS

By Ian VK3DID (112)

900312 AWARDS.9003 Z68A/B2

CLUB CW SCRAMBLE #11 FEBRUARY 1990

Greetings Fellow Contesters !

Well, Scramble 11 has come and gone. Even though there were only nine logs received, I was delighted to hear so many stations taking part, obviously enjoying themselves and doing their best to make contacts. Also many thanks to Len VK5ZF/VK5BCW (1) for activating the Club Station.

Thanks to those who sent encouraging comments with their logs. Yes, the Scrambles are fun, but not if your antenna system is in the trees, like mine !

Congratulations again to Ron Bannerman VK2DQR (127) for clear, steady calling, good use of the time and obviously a good QTH. Ron also won Scramble #10 !

Certificates have been issued and you should have received them by the time you read this.

By the way -- how come nobody called KB5ENR ??? I heard him quite clearly in Melbourne, but didn't have the herbs to get back; but I sure tried !!

So thanks everyone and would you note that I've changed my address, please ?

RESULTS of CW Scramble 11
held on 80m band on Thursday 1 February 1990:

*****	*1st Place*	*Ron Bannerman*	*VK2DQR*	*(127)*	*71 points*	*****
	2nd "	Vince Roberts	VK2CVR	(36)	67 "	
	3rd "	Don Callow	VK5AIL	(75)	36 "	

73, Ian VK3DID (112)
I. Godsil Awards and Contests Manager 9/492 Barkers Rd. East Hawthorn, Vic 3123

COMING CONTESTS FOR CW'ERS

Neil VK7FN (26) writes:

> Just a thought re Contests etc....: I see that Ted VK2CWH refers to another Club's QRP contest, and wonder whether some of our members would like to hear of these in advance (if they are not 'in house' contests,) I realise that the time delay with a quarterly publication is a drawback, amd where the information comes from.....just a thought, hi.

Well Neil, we'll do what we can ...

A check of the March 1990 issue of *Amateur Radio* (page 39) shows that the Associazione Radioamatori Italiani *1990 ARI International DX Contest* takes place on April 20/21. There is a class for 'Single Operator - CW' and the rules are printed in *AR*.

If *YOU* know of a CW contest between the end of June and end of September 1990, let *US* have the details for June *Lo-Key*.

KEYGRATULATIONS to Wes Tyler VK2MIR (162) who has a new Novice call and is keen to QSO/CW/QRP with Club Members. Wes is obviously proficient with key and ear + brain as he now only needs the Theory to get a Full Call.

SNIPPETS FROM 25 LO-KEYS

By Don VK5AIL (75)

900322 SNIPS 26BAUD5

It is good sometimes to look back at where we have been and what we have done - this is what these notes are all about. Snippets from some (no space for all) of the most significant articles are reproduced, mixed with some tit-bits gathered during a scan of the 25 Lo-Keys, especially the first half dozen. The focus is on technical articles, rather than on the many other aspects of the Club, and there has been no attempt at a complete review !

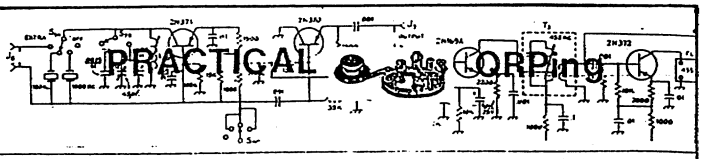
Apart from one or two suggestions from others, especially Len Vk5ZF (1), the choices are very much personal and done on the spur of the moment.

Some of the reproductions are not too good , partly because they are smaller than the originals, but we've done our best !

By the way, the page size of Lo-Keys #1 & #2 was A4. It was then changed to A5, which we have stayed with ever since. Input is prepared at A4 size and the masters are produced by joining two sheets together. 71% photocopier reduction gives the final A5 page size.

Well, let's get down to business .....

Lo-Key #1 March 1984 - Len O'Donnell VK5ZF (1) had started the Club in December 1983 and produced #1 as a 12 page issue. The 'Donnybrook Special' Tx was our first technical article. It was supported by a reprint of a QRP power meter and dummy load circuit provided by Drew Diamond VK3XU, who later joined the Club; also some info. on putting the Yaesu FT7 onto QRP power levels. Membership totalled 48.



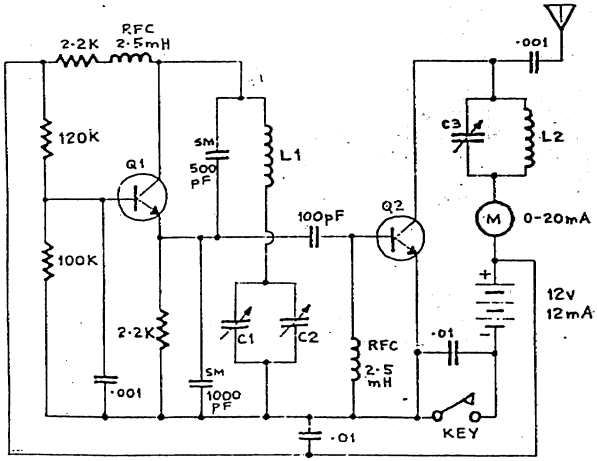
YOUR FIRST QRP RIG

GET INTO "HOME BREWING" WITH THE
"DONNYBROOK SPECIAL"

VK6YW

2 TRANSISTOR QRP RIG

100 MW — 3·5 MHZ — VFO



QRPp CW VFO Tx FOR 80M

C1	15pF BANDSPREAD (small trimmer)
C2	5-55pF BANDSET (transistor radio variable)
C3	6-80pF FINAL TUNING (old B.C. variable)
L1	57 TURNS 1" DIA. MINI-DUCTOR
L2	35 TURNS 1" DIA @ 32T/INCH (P.V.C. pipe former)
Q1/Q2	BC108 OR 2N2711

THE DONNYBROOK SPECIAL VK6YW 2 Transistor QRP Rig

From Peter VK6YW ... I am happy to let you know that I have managed to put together a small QRP rig, that uses 2 BC108 transistors. It appears to be a very stable little Tx, so I am enclosing the circuit. Most of the parts were found in an old TV set, and the cost was less than $5.

****

This appears to be quite a fun rig, and I am hoping that many of our members will have a go at building it. If all the members who do build it, keep me posted on their results, we will see who gets out the greatest distance, by the time the next Bulletin is printed.

****

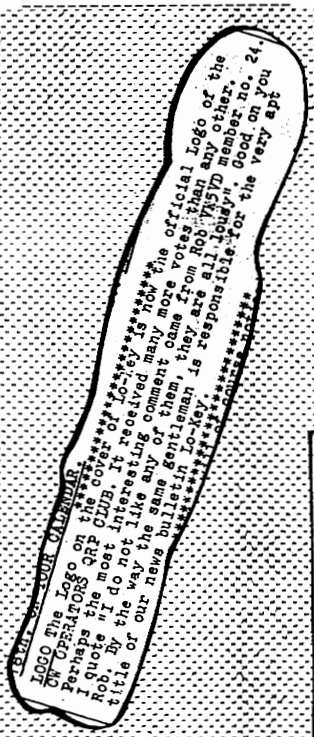
Here is something to check out the little QRP rig, when you finish it. From the Bulletin of the VK CW QRP CLUB ...

QRP OPERATORS POWER METER AND DUMMY LOAD by Drew VK3XU

Here are details of a handy little weekend project, which has sufficient accuracy for QRP purposes.

Lo-Key #2 June 1984 -
A 14 page issue. The fees were increased from $A 4.00 (VK), which was inadequate, to $8. Len carried on with simple circuits and tips for experimenters.

Lo-Key #3 Sept. 1984 -
The first of many 24 page issues.
A significant event was the appearance of the first of a number of articles by Rod Green VK6KRG (28). The subject was the 21MHz QRP "MAXI" 5Watt RF Power Amp.



PRACTICAL QRPING

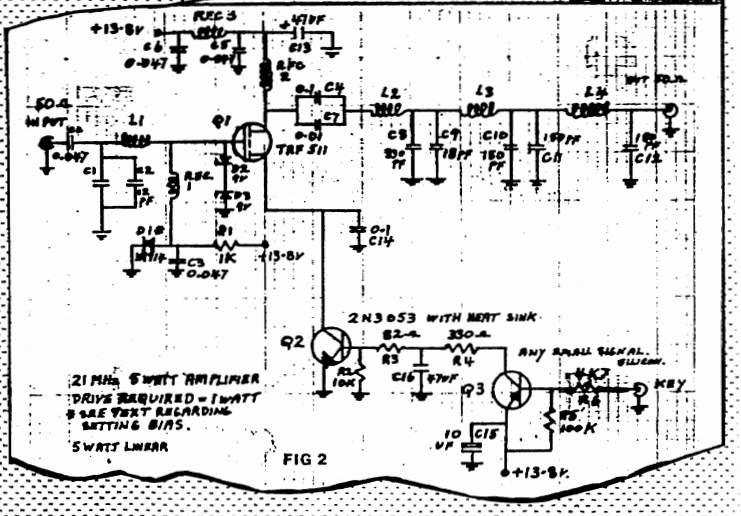
21mhz QRP "MAXI" 5watt RF Power Amp

BY

ROD VK6KRG (member no28)

This amplifier is designed to be driven with the 21 mhz 1 watt QRP Mizuho "Club Special", that is described in this issue of Lo-Key. Output power is 5 watts.
The input impedance is very close to 50 ohms, and the input signal is amplified by a high powered FET known as a VMOS power FET. The one chosen is readilly available from Tandy Electronics, and is the type IRF511 catalogue no. 2762072. Diode D1 and resistor R1 put a small forward bias on to the gate of Q1. This is necessary as the 1 watt of input is only just enough drive to get around 4 watts of output with no bias. This may surprise some, as at low frequencies the input impedance is very high indeed. However at 21 mhz the input impedance is approximately 15 ohms in series with a low capacitive reactance. This is why the input network L1, C1, C2 is needed. Diodes D2 and D3 are to prevent overdrive from destroying the FET. The output is taken from the drain, and is transformed from the drain impedance of 19 ohms up to 50 ohms with L2 and part of C3 and C9. Then follows a standard low pass filter (part of C8 C9), L3, C10, C11, and C12. Q2 is the keying transistor, and Q3 in conjunction with R4, R3, R2 and C16 provide key filtering to give the correct keying envelope shape. Keying the final stage is a good idea (also the driver), as a class C amplifier can cause key clicks, even when a good keying envelope is fed to it. The driver stage keying is not actually needed, but if used the envelope shape is not important.

I have only built one of these units, and it is feasible that some transistors used as Q1 may require input network adjustment. Next issue I will show how this is done, but as it requires a sound knowledge of amplifiers, it may be diffi for some to do. If yo your transistor it along



THE "SCD"

PART 1

A LOW COST, LOW TECHNOLOGY, AMATEUR BAND QRP TRANSCEIVER PROJECT

BY REV. G.C. DOBBS G3RJV — SUBMITTED BY PAUL NEWMAN VK4APN

It is something of an irony, that at a time when technology is leaping ahead, at a pace that leaves most of us gasping for breath, groups have arisen in most sientific fields which emphasise simplicity. Most of us have read about the Appropriate Technology groups, and in America the slogan K.I.S.S. (Keep it Simple Stupid) has appeared. Certainly in the late '50s when I first became interested in Amateur Radio, all our Technology seemed appropriate, relying on the easily available and cheap Government surplus of the time and individual cunning. Since that time readily available commercial equipment, and some of the complex methods of modern communication have diverted the hobby away from the home constuction of amateur communication equipment.

The question remains, "Is it possible to enjoy communication on today's amateur bands with simple equipment?". Well at least several hundred members of the G QRP Club do so all the time, as do many others. There is still a satisfaction in communicating with fellow radio amateurs, using simple equipment built with one's own hands. Naturally QRP fans have their own axe to grind and like to win converts, but even if you are still going to run your QRO rig or 2 metre "grey box", I can promise you a lot of fun, at little expense from this project.

The S.C.D. is a complete simple amateur radio station, that can be built on a kitchen table with simple handtools, requiring no other test equipment than the average station multimeter. It can be built stage by stage, each stage representing a complete unit, so all or just part of the project can be made. The stages are.....

PART 1.... VXO Transmitter, Side Tone Generator.

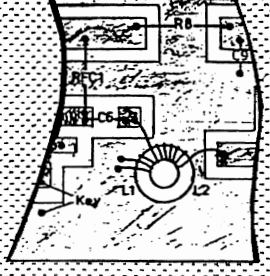
PART 2.... Receiver Section, VFO Facility, Transmit/Receive Arrangement.

PART 3.... Receive Filter, Incremental Tuning, SWR Bridge, ATU.

The simple design reduces constructional working problems, component types and values are reasonably open to variation, low cost and easy construction has been the aim throughout.

THE TRANSMITTER

In a simple transceiver, the transmitter forms the heart, and as such is most likely to give the most trouble for the constructor. The circuit shown in Fig. 1, is one of the most reliable simple circuits I have tried, and its basis has been passing around QRP circles for some years. This particular version is my modification of the W6YRP "Knobless Wonder". At a stage when building simple QRP rigs was almost an obsession with me, variations on this simple theme almost always seemed to produce good results. Apart from the ease with which this circ-



worked 30 countries in about as many days on 20 meters.

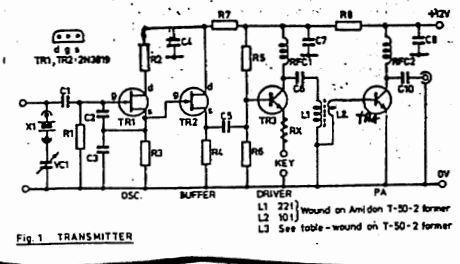


Fig. 1 TRANSMITTER

...use the cheap 2N3819 FET. ...using this and

Lo-Key #4 Dec. 1984 - *Member numbers had increased to 80 and Kevin VK5AKZ (43) started as Treasurer, a task he still performs today ! What can we say except FB OM ?*

Lo-Key #5 March 1985 - The first in a series of three articles appeared on the SCD transceiver, a simple, modular design by the Reverend George Dobbs G3RJV (96). Quite an inspiration.

A full list of Members' names and addresses was published for the first time.

THE SCD (cont.)

board, But the process ... very easy. The acid resis... of the "Fablon" variety. T... of unetched printed circuit ... sketched the circuit directl... is convenient because the com... bing out with a normal pencil a... then are sketched in, and tidied ...

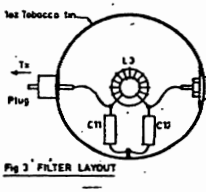


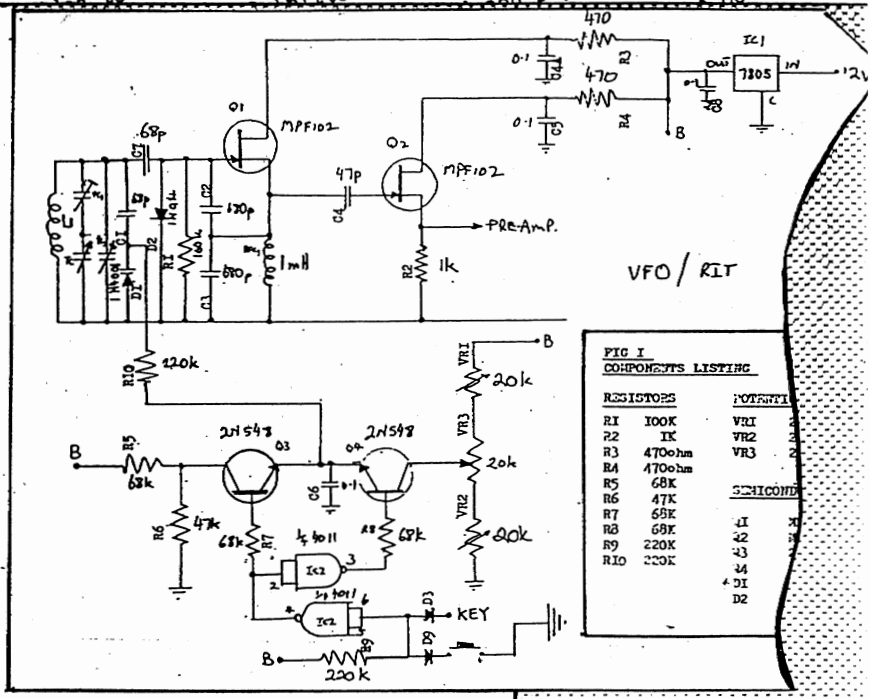
Fig 3 FILTER LAYOUT

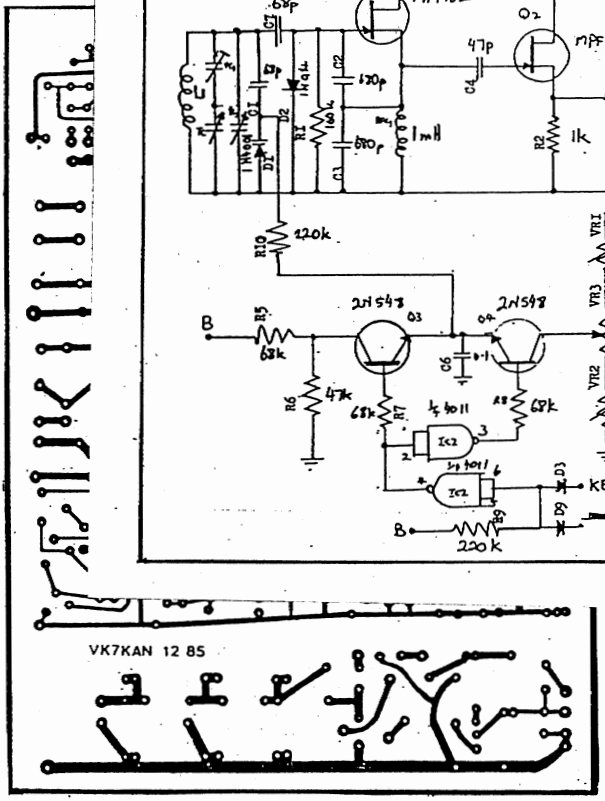
For ... can ... show. The ... the ... is i... and ... on t... ions ... only ... also ... poin... sho...

To duplicate this ... cover a suitable piece of sing... sheeting. The layout of Fig. ... plastic. The actual li... aid of a ruler. The ... carefully cutting ... the plasti...

THE "TAS-DEVIL" 80M CW QRP TRANSCEIVER

...the pleasure of working "QRP" for nearly 12 months using a Drew Diamond ...d to build the SCD CW transceiver . However , whilst SCD in ...mitis VFO and a home brew transmit section! ...d reports gained from the ...60 MHz so I





"TAS DEVIL"

FULL SCALE.

THE CLUTCHER

Lo-Key #6 June 1985 - The first of a string of 11 Lo-Keys edited by Rai VK7VV (3).

Lo-Key #8 Dec. 1985 - Tassie Devil transceiver, a major effort from Ian VK7KAN (91) later VK7IJ, now VK8CW. It could be built to operate on one of several bands. The basic 80m kit-set was available from the Tasmanian Divn. of the WIA through Rai VK7VV (3).

Lo-Key #11 Sept. 1986 - Fees up to $A 10 (VK), the present level.

THE CLUB COMMUNICATOR

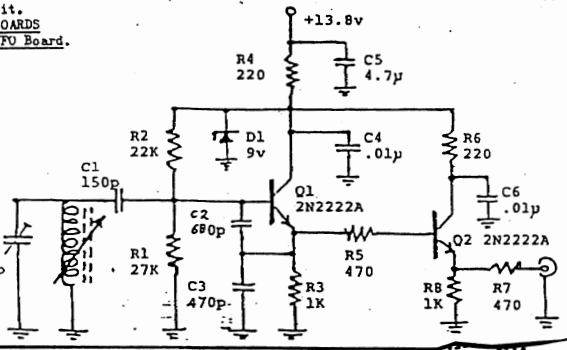
A REVIEW OF A 3.5MHZ CLUB PROJECT TRANSKITTER

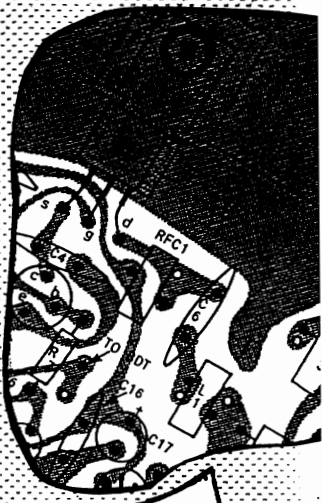
This little transmitter should have wide appeal because of its many features. These have been incorporated whilst keeping costs to a minimum, and include.....

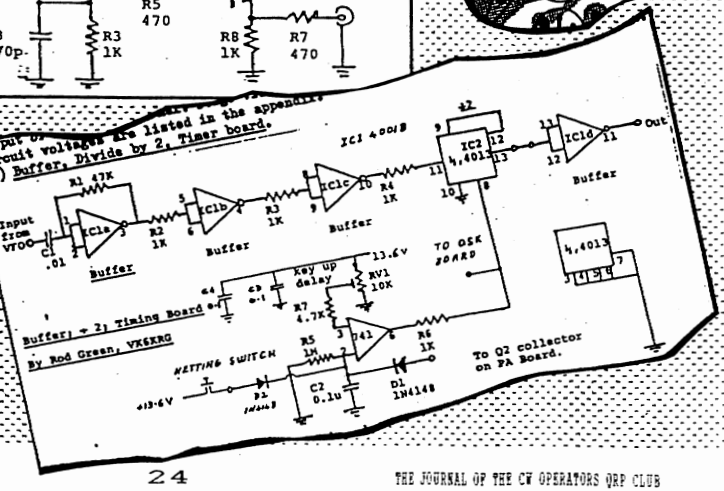
(1) Full 3.5mhz coverage....Using a very stable VFO.
(2) VFO tuning can be restricted to any one portion of the band.
(3) Full maximum output for QRP....5 WATTS.
(4) Only two presets need to be adjusted. This ensures good reliability, and should suit novice constructors.
(5) Four small, and easily constructed boards. This brings versatility in, that some boards will be common to all the rigs Rod designs, so that "Standard Boards" will become popular.
(6) Full break-in is incorporated. That is, the receiver operates as the key is lifted.
(7) As a cost saving measure, no frequency readout is provided. You must NET the transmitter to your receiver, with the netting button. This puts an S1 signal into your receiver, thus tuning the transmitter to the frequency, at which you can hear the signal. Therefore you will need either a calibrated receiver, or a crystal calibrator. A frequency counter readout would raise the cost too much initially. To use a receiver is only a minor inconvenience. A frequency counter option will be made available soon.
(8) If you are using an ATU, you might notice a vvery small frequency shift, whilst tuning your antenna to resonance. This is due to the enormous impedance changes while tuning. This shift in frequency is in the order of 200hz, and does not prove to be a problem. The on-air stability after this tuning is excellent. The extra cost and the complexity, to prevent this was not considered necessary.
(9) Much care has been taken to eliminate spurious transmitter products, such as key clicks and TVI, by the careful use of envelope shaping and output filtering. There is no compromise here, as our very reputation as Amateurs is at stake. Signal reports have never been anything but a 9, for the last digit of an RST report, and that is how it always should be.
(10) Very fast reed relays are used for antenna switching, because Rod found that diode switching caused TVI on his own nearby TV receiver. This could cause real problems for a novice to track down, so it was found best to steer clear of that type of circuit.

CIRCUIT BOARDS

(1) The VFO Board.







Lo-Key #13 March 1987 - Rod VK6KRG (28) signalled that an 80m Tx with VFO was on the way and sought support from any Members interested in kit-sets.

Lo-Key #14 June 1987 - Review of Rod's Club Communicator by Len VK5ZF (1), with a favourable recommendation (plus an opinion about what should be put in cake tins !).

Lo-Key #15 Sept. 1987 - Kit-Set Activity Centre started its operation, following on from Rod's efforts.

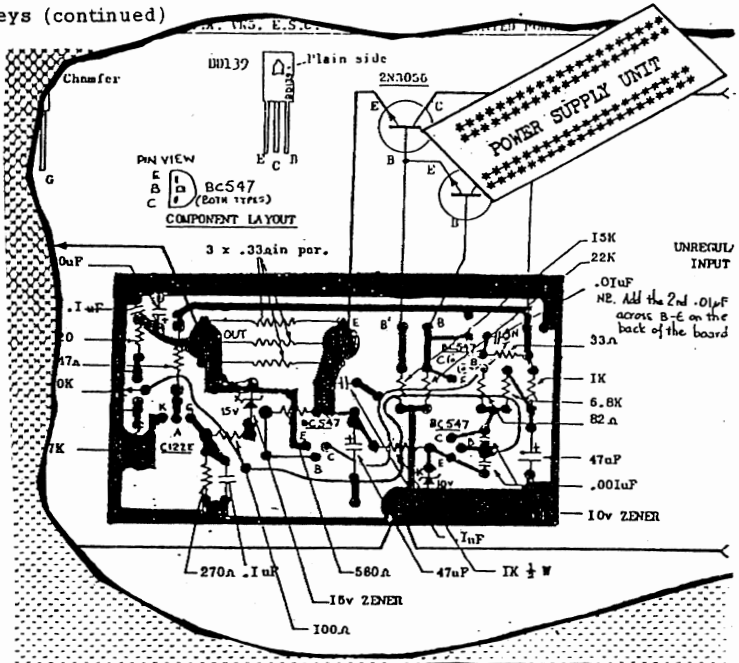
Lo-Key #17 March 1988 - Len VK5ZF (1), back as Editor, started a series of articles on the main items of gear required for a station, to support a Tx such as the Club Communicator - Article on the WIA South Australian Division kit-set PSU.

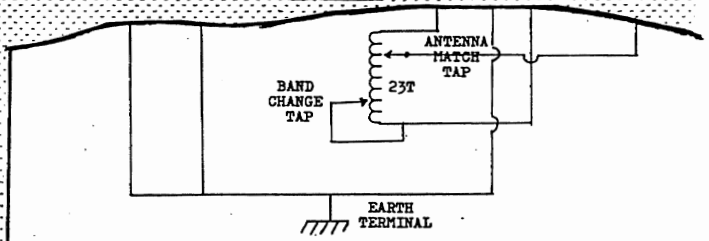
Lo-Key #18 June 1988 - Construction/review article on a link coupled ATU from the Orr W6SAI & Cowan W2LX book 'Wire Antennas'.

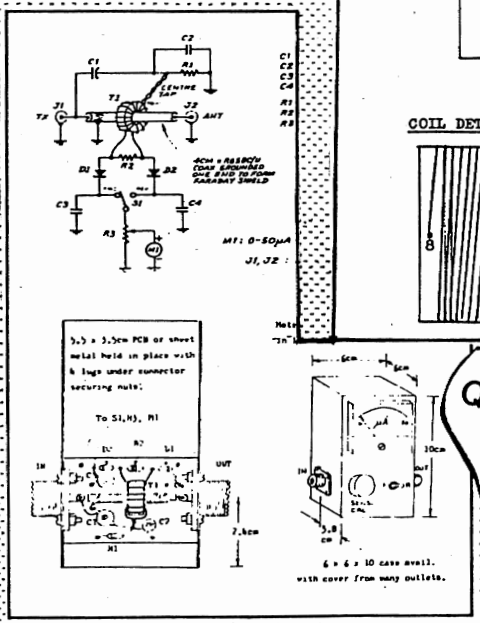
Len's Homebrewer's Corner featured a wavemeter.

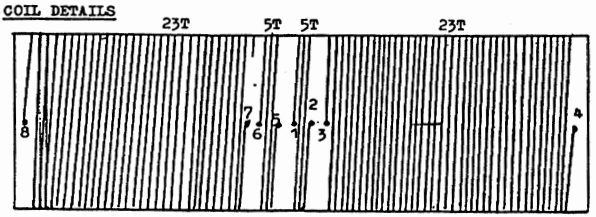
This was a 32 page issue, the largest so far.

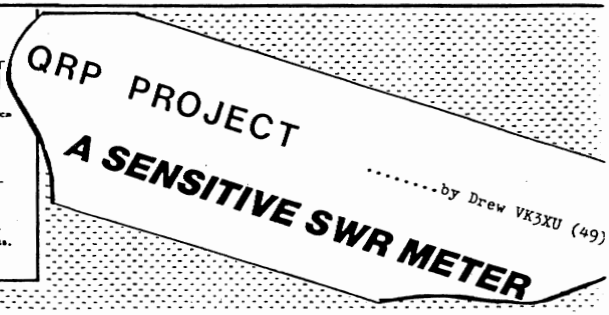
Lo-Key #19 Sept. 1988 - The third project in the series was a classic: the Sensitive SWR Meter by Drew Diamond VK3XU (49).





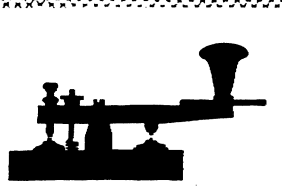






Lo-Key #20 Dec. 1988 - First Lo-Key edited by Don Callow VK5AIL (75).

Lo-Key #21 March 1989 - Incredible and if it was any smaller it would be invisible ! This is the Gemal transceiver by Malcolm Haskard VK5BA (8). Several Members are known to have worked on this - please let us know how you went.



GEMAL: VK5BA MINI QRP TCVR By Malcolm VK5BA (8)

MALcolm's GEM !

Editor's Note: Malcolm VK5BA has sent some very interesting information on a QRP transceiver he designed and built last year. It puts out about 400mW and is called the GEMAL.
A circuit diagram, sketches, photograph and notes were provided. All except the photo. are reproduced in this article.
When you compare the size of the rig with its 9V battery power source, it makes you wonder what Malcolm would do if 9V batteries were AAA size ! Malcolm says:

"Twelve months ago I suggested a Bi-Centenary competition to build a minimum QRP rig. Len didn't get a positive response so nothing happened. I had a go anyway.

The unit fits into a leather case for travel. I have taken the transceiver with me on many trips this year including to UK. With a centre loaded quarter wave [illegible]tels etc.

[illegible]tp it. My idea was a minimum

[illegible]e capacitor in series with the

[illegible]ets are on circuit diagram)

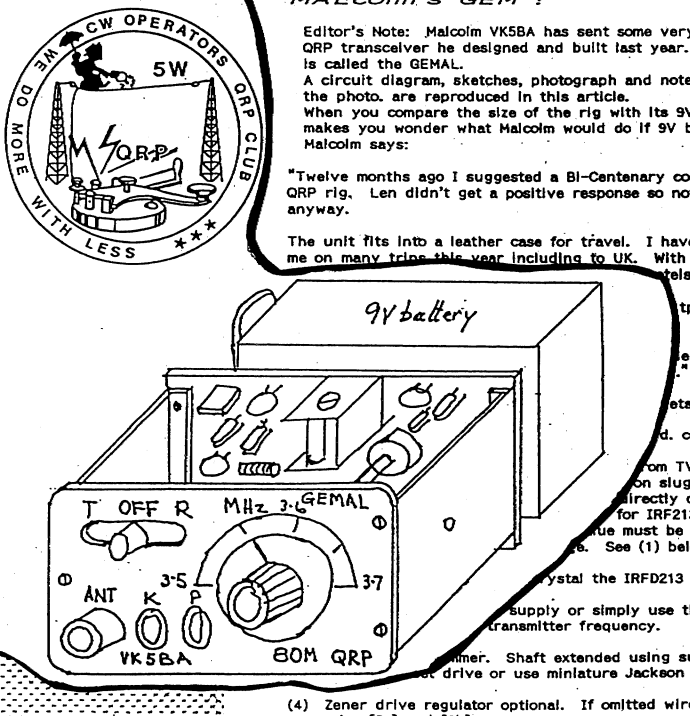
[illegible]d. colour code violet (material

[illegible]om TV set) 47 turns.
[illegible]on slug F16 material; 36 turns.
[illegible]irectly onto slug.
for IRF213. The upper bias resistor is
[illegible]ue must be selected because of the large
[illegible]6. See (1) below.

[illegible]ystal the IRFD213 Ia is in the 1 to 5mA range.

[illegible]supply or simply use the key. The latter allows
transmitter frequency.

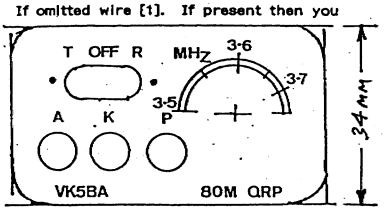
[illegible]mmer. Shaft extended using superglue to join.
[illegible]t drive or use miniature Jackson reduction drive.



(4) Zener drive regulator optional. If omitted wire [1]. If present then you wire [2a] and [2b].

FRONT PANEL ARTWORK:

Full size (Yes, full size !)



The FORRESTFIELD 21MHz Tx - Part 1

By Rod VK6KRG (28) and Don VK5AIL (75)

INTRODUCTION

This article is the first of a series which will describe the FORRESTFIELD 21MHz CW QRP transmitter designed by Rod Green VK6KRG. The design is modular, with a number of separate PCB's, and a circuit has been devised that should be able to be used on all bands by simply changing a few components. This avoids the need for new designs of PCB's for each band and also makes it easier to build the rig in stages and to produce kit-sets. A prototype transmitter has been built by Rod and tested successfully on the 15 metre band.

We hope that publication of this series of articles, based on the prototype, will encourage more Amateurs to try out their homebrewing skills and obtain much satisfaction in the process. The articles cover description, construction, testing & adjustment of the rig, tuning & operation. Each board is dealt with in turn, so you can build each module as you read the series.

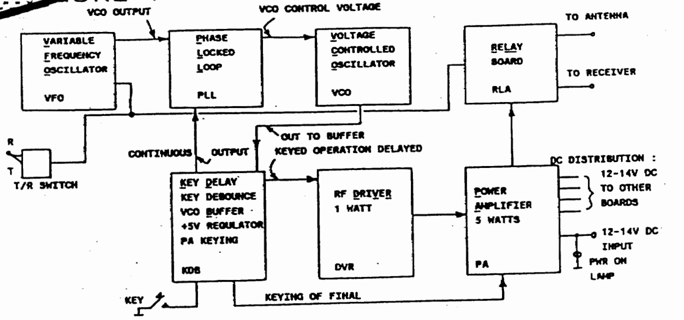
SPECIFICATIONS

FREQUENCY COV... tuning.

RF OU...

... construct, using 7 PCB's.

...RE 1 — BLOCK DIAGRAM



Lo-Key June 1989 4. JOURNAL OF THE CW OPERATORS QRP CLUB 890606 FF1 252A/A4

Lo-Key #22 June 1989 - This contained the first article in a series on the Forrestfield 21MHz Tx, which uses a phase-locked loop to provide frequency stability. Quite an ambitious project and a great learning opportunity.

'In response to popular demand' the issue also featured a reprint from Electronics Australia of the EA78 electronic keyer.

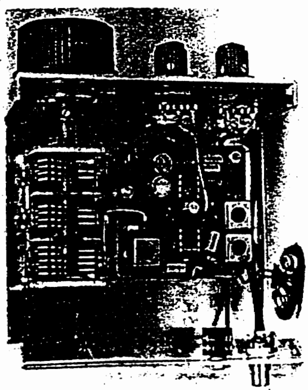
Lo-Key #23 Sept. 1989 - Another requested subject was featured - in this instance it was a receiver. We chose the 'Sudden' direct conversion Rx by the Reverend George Dobbs G3RJV (91). This is a simple and enjoyable project.

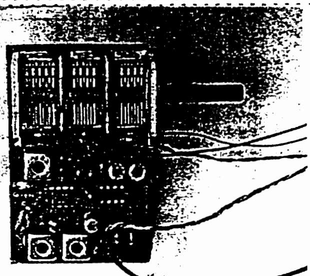
Lo-Key #24 Dec. 1989 - Membership List showed 155 Members' names.

THE "SUDDEN" RECEIVER By George Dobbs G3RJV (Extra

A Simple Direct Conversion Receiver For Any Single Band from 160 - 20M

PROTOTYPE SUDDEN RECEIVER BUILT FOR 80 METRES.





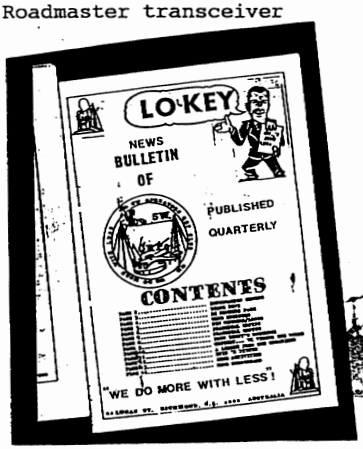
THE SUDDEN RECEIVER BOARD KANGA KIT VERSION

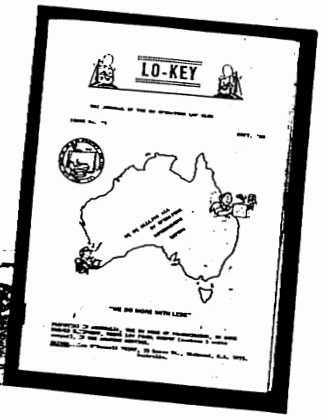
Connect an antenna or a signal generator and peak T1/2 for max... str... several "nodes" in the order: ...

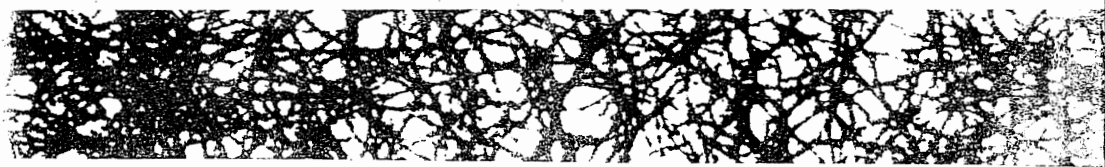
LO-KEY #1 TO #25 INCLUSIVE - INDEX OF TECHNICAL ARTICLES

By Max VK5OS (2)

QINDEX (WS2)







ADVERTISEMENT

HOMEBREWERS QRP GROUP

Len O'Donnell VK5ZF (1), 33 Lucas St., Richmond,
S.A. 5033, Australia.
Phone 08 - 439194

INFORMATION SHEET

THE AIMS OF THE GROUP

1. To bring together those Amateur Radio Operators, who have a common interest in homebrewing and experimenting with, their station equipment, and a desire to transmit in the Amateur Service, with QRP power output (CW 5watts SSB 10watts).
2. To encourage the group to exchange ideas, information and circuits etc., on the building of such equipment. To this end, the group will publish a quarterly journal, to be known as the "Experimenter".
3. The group's activities will cover ALL legal modes of transmission in the Amateur Service.
4. To become involved with junior and beginners clubs, novices etc., with regard to their teaching programes.
5. To supply members with up to four travelling circuit books each year.

SOME NOTES ON HOW THE GROUP IS OPERATED

1. There are no fees to pay, and membership is for life.
2. The only contact person for all group matters is given above.
3. Believing that a hobby group such as ours, does not need over regulating or administration, we have no secretaries, treasurers, organisers, editors etc. The group is operated with the very minimum of rules regulations, fuss and administration. One rule that is used is the principle of the user pays. For instance if you require an answer to a letter you may write, then you will need to enclose a stamped and addressed envelope for the reply. This includes enquiries about membership to the group.
4. The technical journal "The Experimenter" is published quarterly, in March, June, September and December, and it is optional. That is members do not have to subscribe to it. However if a member requires a copy of a particular issue, then the cost of an issue is $2 per issue, plus the current rate of postage. At present in Australia that postage rate is 41 cents. Only members who have sent the costs of an issue before it is published, will receive that issue.
5. With regard to the technical articles written for the "Experimenter", there will be emphasis placed on experimenting with the circuits supplied and in many cases alternative circuits will be included. In this way members are encouraged to compare and try alternatives, before accepting what they have built, as the best result.
6. There is an on air chat of our members at 1030Z on Monday evenings, using a frequency of 3583khz approx. It is not conducted as a net, more like an informal discussion group. All aspects of homebrewing, experimenting and QRPing are discussed. The mode of transmission used for these on air chats is SSB and QRO power level.
7. SWLs are welcomed as members of the group, and articles written for their needs appear regularly, in the Experimenter.
8. For those members who still like to extract a watt or two from valves, there are circuits and ideas included in each issue of the journal.

BUILD IT AND USE IT

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 to give you an appreciation of the scope of activities of the CW OPERATORS QRP CLUB.

In each issue of *Lo-Key* we include as many technical articles as possible on all types of QRP equipment and we encourage our 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 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 QRPers a great feeling of achievement and satisfaction. It certainly 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.

Cut along this line

CW OPERATORS QRP CLUB

Promoting the Use of Low Power
CW Mode Communication
and Home-Brewing
in the Amateur Radio Service

Please post this application to:

Kevin Zietz VK5AKZ (43)
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/DO NOT (strike out one) agree to publishing of my street name and number.

SIGNATURE .....

MARCH 1990 900317 OBC Z56A/C2

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