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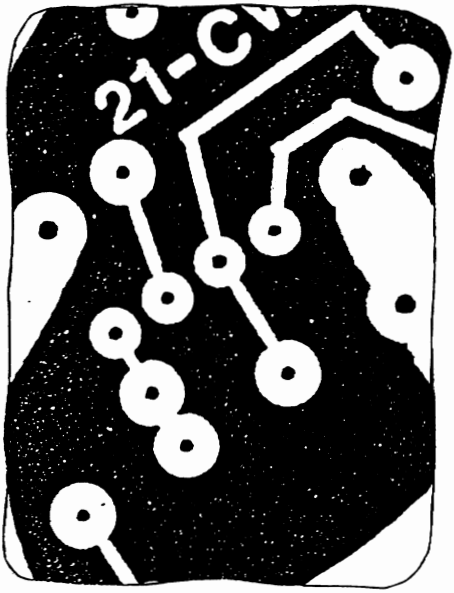
ISSUE No.22

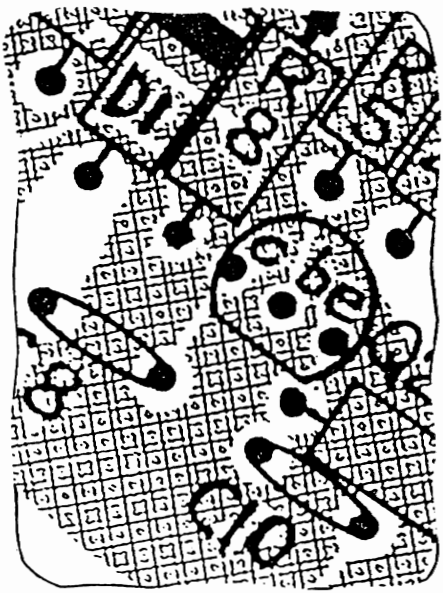
LO-KEY

THE JOURNAL OF THE CW OPERATORS QRP CLUB

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

The FORRESTFIELD 21MHz CW QRP Tx





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890610 P1A Z60A/C5

NXT CW SCRAMBLE *See P.19* *Write yourself a note NOW*

POSITIONS

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- 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, donations, other financial correspondence, changes of details such as address or call-sign.

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Also, please send award claims, scoreboard entries and contest logs to Ian.

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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.

CLUB STATION VK5BCW
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Send to Don orders (with payment) for kit-sets; technical queries & suggestions.

PROJECTS OFFICER
Rod Green VK6KRG (28) 4 Rothsay St. FORRESTFIELD WA 6058 Australia
Radio projects for Lo-Key and kit-sets.

THE BOOKSHOP
Norm Lee VK5GI (139) 25 Ralston St. NORTH ADELAIDE SA 5006
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
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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.

ORGANISER'S OFFERINGS By Max VK5OS (2)

Hello again, At this moment there does not appear to be any matter of *great* importance to proclaim, so this "offering" will be brief.

Firstly, thankyou to those who were able to enter and enjoy the Scramble. In a Club with such a geographically widespread membership, joint activities must necessarily be limited in scope and could tend to become monotonous unless the chosen activity is one of "perpetual" appeal.

For this reason Scrambles appear to be popular with an increasing list, and I hope this tendency will grow rapidly.

I trust that the ensuing months will be enjoyable for *you* - and if you want to bring some joy into *my* life please join us just once, perhaps, on/near 3620kHz at 1030Z any Friday night.

73 from Max

CLUBTIVITIES By Don VK5AIL (75)

WELCOME TO NEW MEMBERS !

We have 7 new Members to welcome in this issue of Lo-Key. We are glad to have you with us and hope you enjoy the various activities of the Club.
Maybe you have friends interested in CW__QRP__Homebrewing. If so, we suggest you show them Lo-Key . . . .

NUMBER	CALL	NAME	QTH	
16	VK2CBI	Ken Elkington	Springwood	NSW
24	VK3FML	Marlene Brown	Yarrambat	Victoria
36	VK2CVR	Vincent Roberts	Frederickton	NSW
39	VK3DGE	Garry Newton	Vermont	Victoria
53	VK3BNC	Bob Terrill	Wendouree	Victoria
55	VK3EII	Graeme Brown	Drouin	Victoria
60	SWL	Trevor Thomas	Ravensthorpe	Western Australia

New Amateur Operator.... Brian Cooper VK5PAS (145) QTH Peterborough S.A.
CONGRATS to Brian who was shown as SWL in the December 1988 membership list. You can guess how pleased Brian is to gain an Amateur Licence - and he has followed this up by building a Club Communicator.

'JOY OF QRP' BOOK
To those who have indicated interest: SRI about the holdup, but we are waiting to receive a firm price before placing an order. Those who sent a SASE will be given immediate advice when we know the price.

PREFACE.....FORRESTFIELD 21MHz Tx
By Don VK5AIL (75)

The following article is the first of a series on VK6KRG (28) Rod's new design, which was foreshadowed in Lo-Key #21 March 1989 pages 14 & 19. It is my present intention to set up one batch of 7 short-form kit-sets for each module after it appears in Lo-Key. The actual number of kits produced will depend on the amount of interest shown by Members.

If you want a VFO kit please order by writing to Don VK5AIL (75) *BY 20 JULY 1989.* You will be given preference for kit-sets for future modules. Prices will appear in the Kit-Set Activity Centre pages in this and future issues of Lo-Key.

The FORRESTFIELD 21MHz Tx - Part 1

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

INTRODUCTION

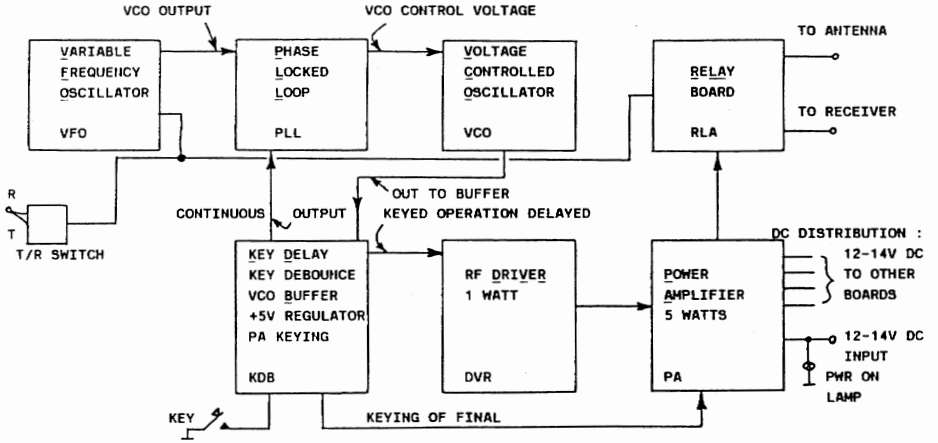
This article is the first of a series which will describe the FORRESTFIELD 21MHz CW QRP transmitter designed by Rod Green VK6KRG. The design is modular, with a number of separate PCB's, and a circuit has been devised that should be able to be used on all bands by simply changing a few components. This 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, assembly of the rig, tuning & operation. Each board is dealt with in turn, so you can build each module as you read the series.

SPECIFICATIONS Type 21-CW-1

FREQUENCY COVERAGE	21.000 to 21.300 MHz. May be varied to suit user.
RF OUTPUT POWER	5 Watts. Within QRP limits.
POWER REQUIREMENT	13.8V DC specified. 12V to 14V permissible. Shown as +12V on circuit diagrams and parts overlays.
FRONT PANEL CONTROLS	Main tuning knob. T/R Transmit/Receive switch.
REAR PANEL	Antenna socket, Key socket, Socket for signal to receiver, DC Power socket, Earth terminal.
ANTENNA	Nominal 50 ohms impedance is required.
CW MONITORING	Transmitted CW is monitored on station receiver.
T/R OPERATION	Full break-in.
OTHER FEATURES	Capacitor-tuned VFO with vernier tuning. High stability is achievable. Easy to construct, using 7 PCB's.

FIGURE 1 - BLOCK DIAGRAM



BASIC CIRCUIT DESCRIPTION See Block Diagram Figure 1.

The output frequency is generated directly, without mixing, by the VCO Voltage Controlled Oscillator. The signal then passes on to a buffer and gate circuit on the KDB Key Delay, Buffer board. The function of the gate is to allow the signal to pass to the driver and final circuits immediately the key is pressed. However, when the key is lifted the final amplifier needs to have a signal present at its input, momentarily. This gives the envelope shaping network on the 5 Watt PA Power Amplifier board time to do its work, thus avoiding key clicks. The KDB also has a transistor switch to key the final in time with the operation of the Morse key.

The signal passes from the gating circuit into a very sensitive 1 Watt driver stage on the DVR Driver board. The 1 Watt output, with slow release keying action as described above, feeds the 5 Watt PA final stage. The output of the final is fed to the relay board which switches the antenna to the transmitter or the receiver, depending on the position of the Transmit/Receive Switch. This switch also prevents the final being keyed during receive periods.

The Phase Locked Loop or PLL board actually controls the output frequency of the VCO and hence the output of the entire transmitter. The transmitter would still work without the PLL but would suffer from relatively poor stability and give a slowly wandering signal that may also chirp. You may have seen some complex PLL circuits in the past and, as a result, may not like them. Well you can rest assured you haven't seen anything like this one - *It's absolutely simple !* We feel it is simpler than the usual oscillator-mixer combination found in most rigs. It has the added advantages of spectral purity and NO TUNING is needed.

This about covers the basic circuit of the rig. Now for the first board, the VFO.

THE VFO BOARD See Circuit Diagram Figure 2.

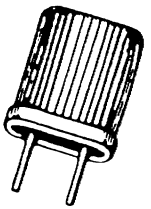
DESCRIPTION

The VFO is of the Seiler type, which exhibits very light loading on the tuned circuit. This is because of the relatively large capacitance across the base to emitter and emitter to ground, in comparison with the capacitance in the tuned circuit. See values on circuit diagram. Thus any changes of capacitance in the transistor itself will be swamped by the large capacitance just mentioned. To aid stability the VFO has an on-card zener regulator. The oscillator output is taken to a single stage buffer Q2. From there it is lightly coupled to the PLL board.

The VFO is capacitor tuned and has a vernier dial with 100 graduations. Builders are advised to aim for a VFO frequency range from 1000 kHz to 1300 kHz, for reasons which will be made clear later in the series. In the meantime, the arithmetic is given here, based on the use of a 4.000 MHz quartz crystal on the PLL board.

A 4.100 MHz crystal was used for the first prototype, however, 4.000 MHz crystals are recommended because they are only a fraction of the price of 4.100 MHz. The frequency range of the first prototype VFO is from 500 kHz to 680 kHz. Other crystals can be used e.g. 5 MHz or 10 MHz crystals or 'odd' frequencies, with no other changes to the circuit.

To calculate the required VFO range for a given crystal, the aim being to give the Tx a range from 21.000MHz to 21.300MHz:



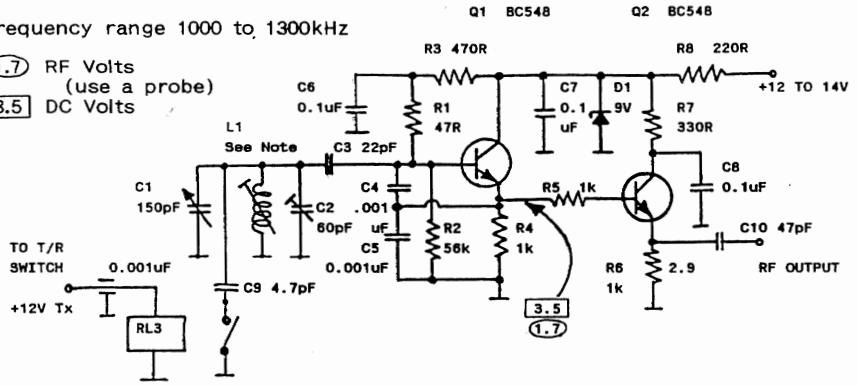
- Find the value of the nearest harmonic frequency to 21MHz. This is 20MHz for a 4MHz crystal.
- Calculate difference frequency for bottom of range. This is 21.000 - 20.000 = 1.000MHz.
- Repeat for top of range. 21.300 - 20.000 = 1.300MHz.
- VFO must be built with a frequency range 1.000MHz to 1.300MHz.

Current drawn is about 20mA in Rx mode and 32mA in Tx, because of additional current through the coil.

FIGURE 2 - CIRCUIT DIAGRAM

NOTES:

1. Frequency range 1000 to 1300kHz
2. (1.7) RF Volts (use a probe)
3. [3.5] DC Volts



PARTS LIST

Resistors...All 1/4W

R1..... 47k
R2..... 56k
R3..... 470R
R4 R5 R6 1k
R7..... 330R
R8..... 220R

Capacitors

C1..... 150pF Variable, air dielectric Dick Smith #R-2980 3 gang in parallel
C2..... 60pF Trimmer capacitor Dick Smith #R-2930 or similar
C3..... 22pF Polystyrene; or 39pF & 47pF in series
C4 C5.. 1000pF Polystyrene
C6 C7 C8 0.1uF Ceramic
C9..... 4.7pF Ceramic NPO
C10..... 47pF Ceramic NPO or polystyrene

Semiconductors

Q1 Q2... BC548 Transistor (or 548B, 2N2222A)
D1..... 9V Zener diode 1N757 or similar

Miscellaneous *VERNIER DRIVE NOT IN KIT*

1nbr.. PC Board Type 21-CW-VFO or equiv't
4nbr.. Stand-offs, brass, 10mm, each with 2nbr M3 or 1/8" BSW screws
1nbr.. Vernier drive dial, Dick Smith #H-3900 or similar. *NOT IN KIT*
L1.... Coil, Dick Smith #L-0260 Only use the one with a red slug
RL3... Reed relay SPST 12V Tandy #275-233 Coil resistance 1050R

FIGURE 3 - PARTS OVERLAY

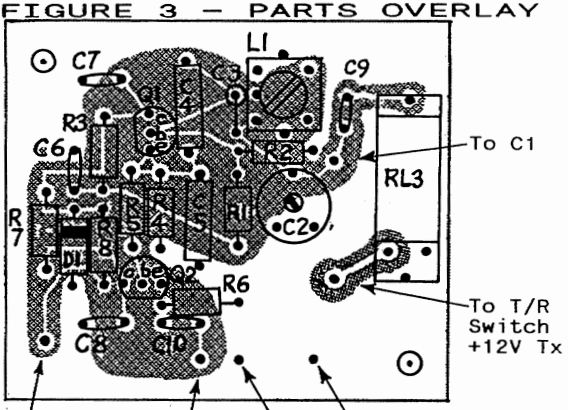
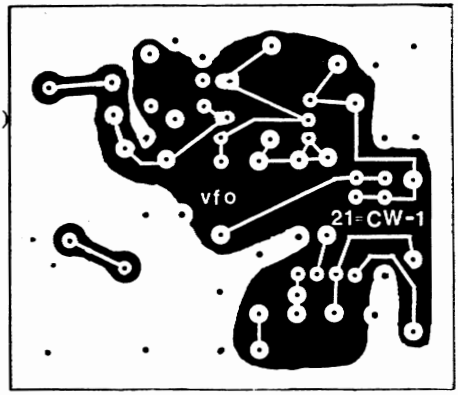


FIG. 4 - PCB ETCHING PATTERN

White = Copper



CONSTRUCTION See Parts Overlay Figure 3 and PCB Etching Pattern Figure 4.

Construction is straightforward. It is a good idea to use PCB pins at the six terminal points on the board. Install L1 early. Install Q1, Q2 and C3 late. Put C3 on end exactly as shown, so that it doesn't matter if its lead touches the can of L1. You may need to use 39pF and 47pF in series to make C3 22pF.

TESTING AND ADJUSTMENT

1. The VFO may be tested on its own, after completion of the board. It is best to mount it in an RF-proof metal box, preferably the final case, but this is not essential at this stage.

2. Connect the main tuning capacitor C1 into the circuit. Then connect a power supply with an output in the range 12 to 14V to the +12V line, preferably through a line fuse, and through a switch to the relay coil terminal: To T/R Switch. If the VFO is in its case you should use 0.001uF feedthrough capacitors where the two 12V leads (the second being the relay lead) pass into the compartment.

Switch your T/R switch ON to its transmit (T) position, which closes the relay and brings 4.7pF capacitor C9 into the circuit.

3. In the next few steps you will tune a receiver somewhere in the AM band, or set in CW mode, to detect the oscillation and read its frequency. Alternatively, use a digital frequency meter/counter or a CRO if you have one. If you are not sure that the VFO is oscillating, use a diode probe and multimeter to check that an RF voltage exists at the point RF Output. See the section: RF PROBE.

4. Now adjust the preset controls on the VFO, after checking voltage readings.

5. Set C1 to its maximum capacitance and Rx on 1000kHz. Adjust the slug of coil L1 until a blip is heard on the Rx. Then adjust it so that a beat note is heard or a reading of 1000kHz is obtained on your frequency counter.

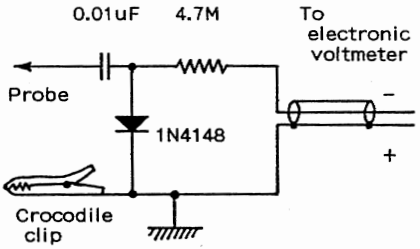
6. Set C1 to its minimum capacitance and Rx on 1300kHz. Adjust trimmer capacitor C2 until a beat note is heard or until you get 1300kHz on the counter.

7. Repeat the previous two steps, but this time tune as close as you can to a zero beat on your receiver. Repeat this several times until both frequencies are correct. The extreme positions of the main tuning capacitor C1 should give a frequency range of at least 1000kHz to 1300kHz.

8. Test the shifting of VFO frequency when it is in receive mode. Set on a frequency of say 1100kHz. Use the T/R switch to turn the relay OFF. Search for the signal about 10kHz higher, at 1110kHz. With the 4.7pF capacitor C9 switched out of circuit, the frequency is raised by about 7kHz at 1000kHz ranging to an increase of about 15kHz at 1300kHz.

RF PROBE

The circuit illustrated is recommended for use with a digital voltmeter or multimeter if you do not already have a suitable RF probe. The meter must be a high impedance type, such as a FET input. If you only have a low impedance or analogue type, then the value of the resistor will need to be reduced and will be determined by the meter range used and its sensitivity in ohms/volt.



If you do not have a digital voltmeter/multimeter for RF voltage measurement, you can make comparative measurements by using a convenient resistor value (e.g. 10k) in the probe. This will enable you to make RF peaking adjustments, with only a rough idea of actual RF voltages. This may suffice if you are not fussy about these measurements. If you are able to access a known RF voltage, you could temporarily make the probe resistor variable and calibrate your meter/probe combination. Remember that if your meter is not an electronic/digital voltmeter you will need a different resistor value for each meter range used.

An electronic Morse code keyer

This electronic Morse keyer is easy to make and all components are available on the local scene. It uses virtually "state of the art" techniques and it should be an interesting project for CW enthusiasts.

by IAN POGSON

One only has to tune the HF amateur bands to realise that the transmission mode most used is single sideband (SSB), either upper or lower sideband as required. Other modes are also used of course, including AM, NBFM, RTTY, etc. Oh yes, I nearly forgot, CW or Morse code is still also used by quite a large number of enthusiasts. The same comments could also apply to the VHF amateur bands, with the emphasis somewhat less on SSB and perhaps more on FM, but there are still the followers and users of CW.

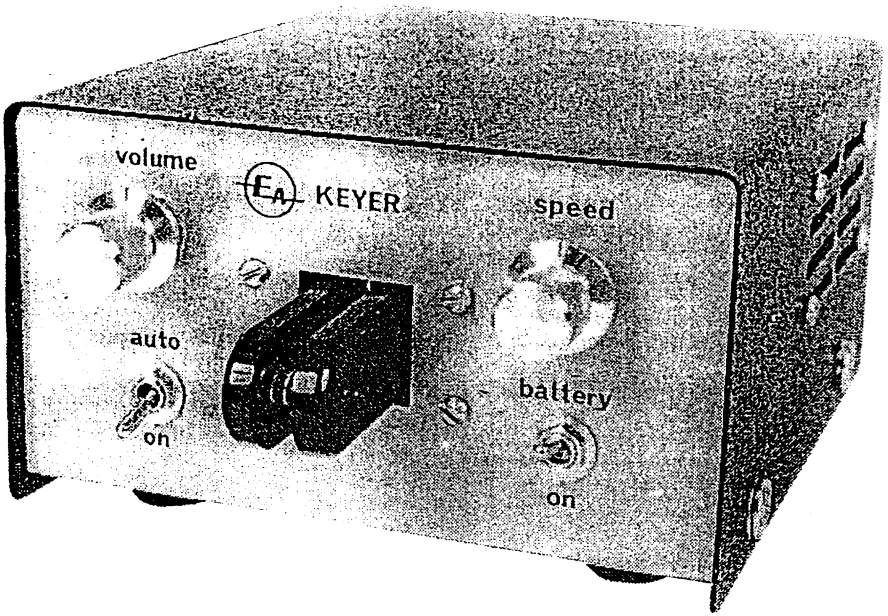
There is a lot to be said for the use of the CW mode of transmission. In its simplest form it requires a minimum of equipment and with even low power, quite often a signal can be got through where all other modes fail. There is also a fascination for CW which is difficult to explain, but is experienced by those who use it. Enough of that however. I do not intend to enter into a discourse on the pros and cons of the various modes. Suffice to say, the use of CW is also keeping up with the state of the art, along with the others.

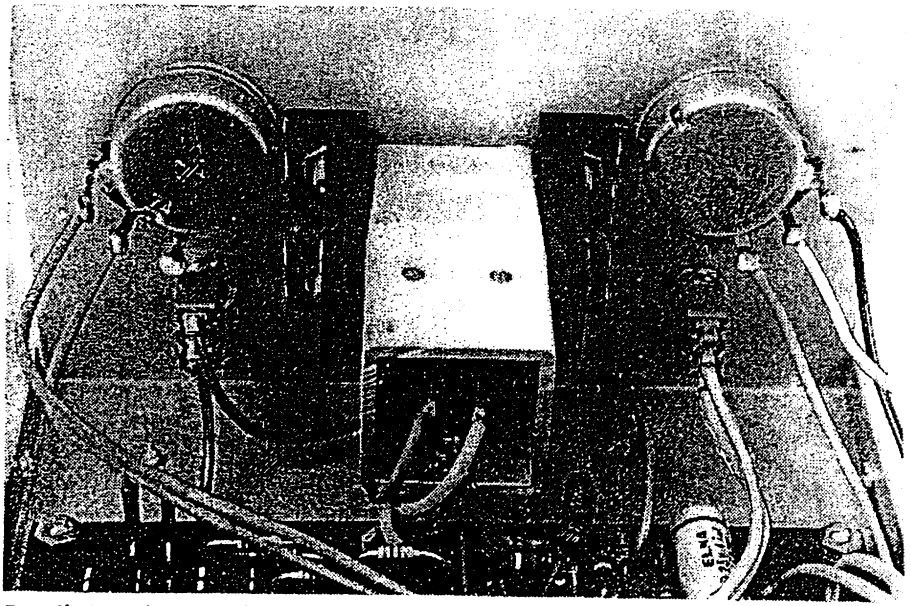
In earlier times, Morse code was sent by means of the ordinary hand key which is familiar to most of us. Then other types of keys were developed. Some of these were semi-automatic and others somewhat more elaborate types, all mechanical, and the method of use was usually by sideways motion of a handle or paddle. These devices were all capable of excellent results.

More recently, with digital techniques being available, various electronic keyer circuits were devised. By suitable design, it then became possible to form the Morse characters virtually to perfection. All the operator then had to do was to learn to drive it! I have had a go at sending with such a keyer and while it seemed rather tricky at first, it did not take very long to get the hang of it. Although the sending was slower than might have been done with the ordinary key, the results were as one could expect. Obviously, further practice would result in higher speeds.

In the American amateur radio magazine QST for August, 1973 appeared an excellent keyer design by James M. Garrett, WB4VVF. It made use of the 7400 series TTL devices, and I made one up on "Proto" board. It worked as expected straight away. However, the TTL devices are rather hungry with respect to current and a further article in QST for January, 1976, described how the keyer could be made up using the pin-compatible CMOS 74C00 series of ICs. This reduced the current consumption dramatically and to such a low level that a small battery could be used, and still last for many months.

I modified my Proto board accordingly and fitted the appropriate CMOS devices. The results were again up to expectations. Encouraged thus far, I decided to make up a printed





Detail view showing the wiring to the keyer module and the front panel controls.

board which would be available readily to readers in this part of the world. Before doing so however, a number of outstanding points had to be cleared up. The board made by the original designer was adequate for the TTL version but some modifications to the circuit for CMOS require that some extra resistors and connections had to be made directly to the copper tracks on the board. Also, a monitor oscillator would be desirable for the new board.

A commonly used audio oscillator for Morse practice, etc., using a 555 timer IC and capable of driving a loudspeaker was chosen as being ideal for this purpose. And so a PCB was worked out which included the modifications for CMOS and also including the audio oscillator. This makes it very easy to make up the keyer, as the board is simple to assemble and then only has to be fitted into a suitable box, along with the paddle, battery and controls.

The circuit may be conveniently divided into four sections. In describing the sections I will use the same terms as used by the original author.

The non-synchronous section consists of the paddle, next-dot memory (IC1A & B), next-dash memory (IC2C & D), initial dash (IC1C), initial dot (IC2A) and the iambic gate (IC1D & IC2B). The synchronous section consists of the clock (Q1 & Q2), present-dash memory (IC3A), present-dot memory (IC3B), counter (IC4, IC5A & IC7A), missing-bit detector (IC6B, IC6A & C), dash start-stop gate (IC6B), dot start-stop gate (IC6D) and the OR gate (IC7B).

The output section consists of the output driver (Q3 & Q4), and the monitor (IC8). The power supply consists of a 9V battery and a filter circuit consisting of a 47 ohm resistor, a 15V zener diode and a 47uF electrolytic capacitor. The filter is included as a precaution against any possible spikes which may find their way into the supply.

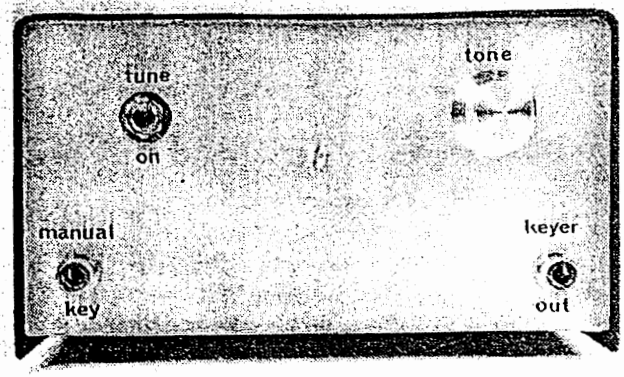
The finished article includes a number of controls and facilities for the operator. The battery on/off switch can be disposed of quickly. The clock has a speed control which is adjusted to suit the sending speed of the operator. A volume control is provided to adjust the monitor volume to suit the operator. Also, a tone control is provided to adjust the audio frequency of the monitor. A tune switch is also provided so that the transmitter may be keyed on while tuning and adjustments are made. In parallel with this switch, is a socket making it possible to use an ordinary hand key for keying the transmitter.

An interesting feature of the keyer is the provision for automatic character spacing. A dot has a definite length as set by the speed control and the spaces between dots and dashes are equal to a dot in length. A dash is equal to three dots. With proper sending, the Morse characters will have the correct proportions. However, without the automatic character spacing, the spaces between characters will be determined by the operator. With the automatic facility, the spacing between characters will be equal to three dots, provided the operator operates the paddle for the first part of a new character within this time.

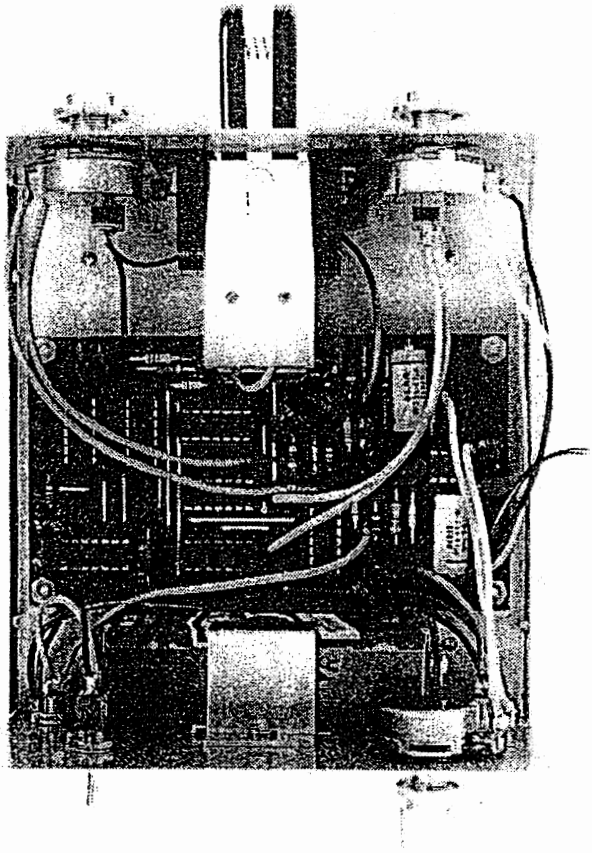
Finally, we have a socket which is the keyer output and which is run via a coax cable to the transmitter to be keyed.

As mentioned earlier, there have been previous articles describing this keyer. Also a printed board was made available in the United States, but this would not have been readily available to prospective builders in Australia. We have had the advantage in that we have been able to modify the board where desirable and in addition, to incorporate the monitor circuitry on the same board.

Apart from the addition of the monitor of our choice on the board, modifications to suit the CMOS devices have also been included. These consist of connecting pin 4 of both IC4 and IC5 to the supply rail. Also, a 10k resistor is added to pin 1 of IC1A, pin 9 of IC2C, pin 13 of IC5B and pin 5 of IC7B. The other end of each resistor is connected to the supply rail. Although it was not included in the article in QST



The rear panel of the Electronic Morse Keyer. RCA sockets were used for the "manual key" and "keyer out" input/outputs.



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We acknowledge and thank
Jim Rowe, Managing Editor of
Electronics Australia,
for permission to reprint the Electronic Morse Code Keyer article from the March 1978 issue.
The article is for the use of Members ONLY.

Readers will be aware that EA often has articles relevant to Amateur Radio. Mr. Rowe has indicated that EA is also interested in articles on QRP operating and equipment - so there is an opportunity here!

****

The printed circuit board accommodates most of the components.

describing how CMOS devices could be used, we found that the inputs of the third and unused gate of IC7 were left floating. This did not effect the operation but it did take unnecessary battery current. Pins 9, 10 and 11 of IC7 are automatically grounded on our new board.

Because the types originally specified do not seem to be readily available here, we found it necessary to substitute for the transistors in the clock and the output circuits. We have used BC548s instead of the 2N2222, a BC558 for the 2N2907, and a 2N5401 for the 2N4888. These functioned quite satisfactorily.

The Vceo rating of the 2N5401 is 150V and this should be adequate for most requirements, at least up to a key-up voltage of about —100V. Above this, it would be wise to seek out a transistor with a suitably higher voltage rating. Alternatively, it should be possible to introduce a relay which will cope with the higher voltage.

While all of the components should be available to builders, a few comments may be helpful. The most important item and the one which may take a little seeking out, is the "dual paddle squeeze key", to give it its full title. The one which we used came from New Zealand. Details were given in "Break-In" for July, 1977.

There are other possible sources of suitable keys, although I should stress that our electronic keyer has been arranged physically to take the New Zealand key. Other keys, while they would do the job adequately, may call for a somewhat modified physical arrangement. Some keys are designed to be used as a seperate unit and external to the electronic keying circuitry. Two places are suggested as possible sources of suitable keys, both in the United States. They are: Wm. M. Nye Company Inc., 1614 130th N.E., Bellevue, Wash. 98005, and MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762.

The box which is used to house the electronic keyer was obtained from Dick Smith Electronics and supplies should be readily available from this source directly or possibly through your local supplier. The miniature 57mm (2.25in.) loudspeaker was also obtained from DSE.

The printed board was supplied by RCS Radio Pty Ltd and supplies may be obtained either directly or through your local supplier. Supplies of boards may also be available from other manufacturers. Transistors have already been touched on and no problems should be experienced with them. The 74C00 series of ICs are made by National Semiconductor and again, no trouble should be experienced in obtaining all types required.

While there is quite a full printed board, construction of the complete unit was not difficult. However, some precautions must be observed to avoid possible damage to vulnerable components. As CMOS devices are used, care should be taken when soldering them into circuit. The barrel of the soldering iron should be connected with a clip lead to the earth part of the copper on the board. Also the + supply and earth connections should be made first to each of the ICs as they are fitted. In addition, the usual precautions should be taken not to overheat components when they are being fitted.

There are two schools of thought relating to the use or otherwise of sockets for ICs. If you do not use sockets, then the precautions listed above naturally apply. However, if you elect to use sockets, then they may be soldered to the board without any particular precautions. When all soldering is complete, then the ICs may be plugged into the sockets. You will notice from the pictures that I used sockets. The main reason for this was to allow me to use either CMOS or TTL devices, without the annoying job of having to unsolder a large number of connections.

When assembling the board, I suggest that you start with the links, of which there are quite a number. Then all of the other small items such as resistors, capacitors, etc., are added, finishing with the ICs or sockets. There are also a number of leads which run

from the board to other parts of the box and these should be added, with sufficient length in each case to reach its intended termination.

You will need a bracket to hold the battery in place. This can be seen in the picture and I made mine from a small scrap of 18 gauge aluminium. Four holes have to be drilled in each of the back and front panels. In addition, a square hole must be cut out of the front panel to take the key assembly. Assuming that you are using the New Zealand key, the hole which we cut was 21mm square, with four screw mounting holes to suit.

In addition to all that hole cutting, you still need four holes to mount the board and one hole at the back to fix the battery. All this done, you are now ready to assemble the various items into the box and connect up the various leads from the board to the pots, switches, etc.

I used RCA sockets on the back panel for the "keyer out" and "manual key". These are quite satisfactory, but some readers may wish to use other types.

The unit is almost complete, except for mounting the miniature speaker on the side of the box cover. On the box which I used, there are ventilating slots on each side. Fortunately, use can be made of these to mount the speaker. I used four 1/8in Whitworth screws, passed through appropriate points and then put a nut on each on the inside, such that the speaker outer edge was just a snug fit between the nuts. This adjusted, the nuts were tightened. Flat washers were then dropped over each screw and more nuts fixed the speaker firmly in place.

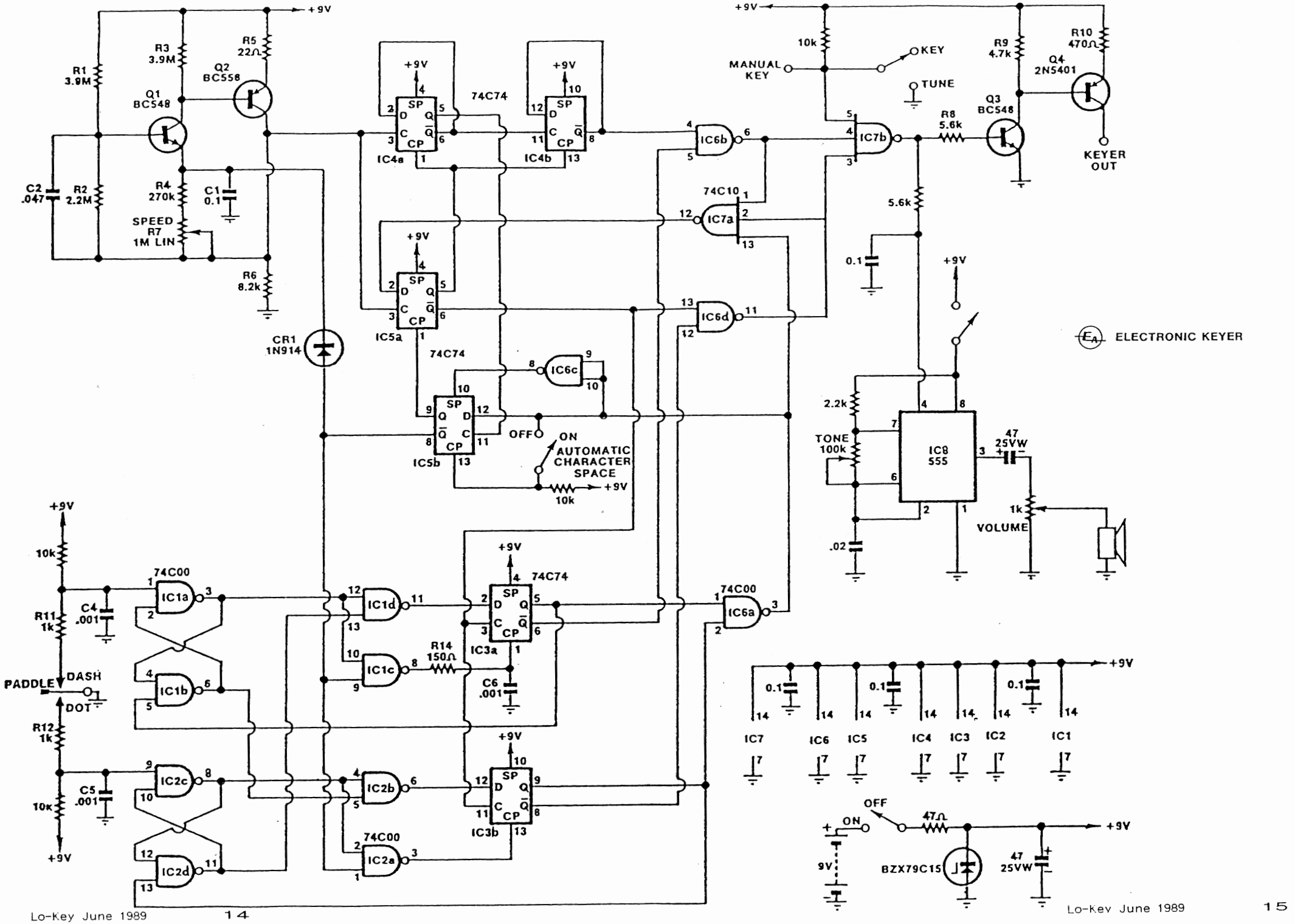
This completes the keyer and it is virtually ready for use. It is simply a matter of adjusting the various knobs etc., to give the desired results, as far as the keyer proper is concerned. However, it will depend upon the actual requirements for keying the particular transmitter as to just how it will be interfaced with the transmitter. The output circuit shown is for negative grid-block keying. Where other methods of keying, such as cathode keying, may be desired, then I suggest that reference to the original article and to the ARRL handbook be made. The use of coax cable is a must.

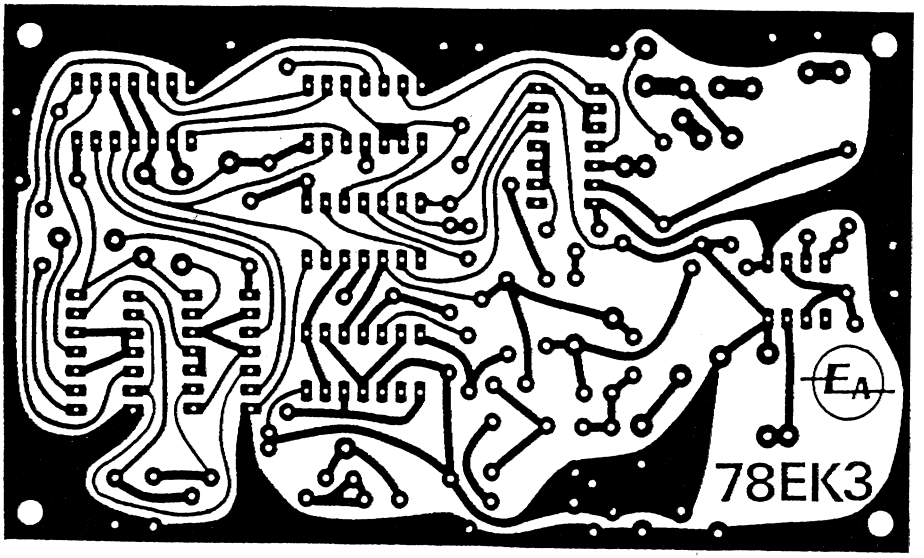
It is also worth noting that with quite a number of modern tranceivers, a built-in monitor oscillator is provided. If this is so in your case, then the monitor already provided on the board may be omitted.

Having built the electronic keyer and mastered its use, perhaps you may be interested in adding a memory to give the ultimate touch to the device. If you have access to the 1977 edition of the ARRL Handbook, then I suggest that you have a look at the article beginning on page 359.

ERRATA - One diagram has been amended in accordance with the errata note published in EA June 1978. In August 1978 the following note appeared:

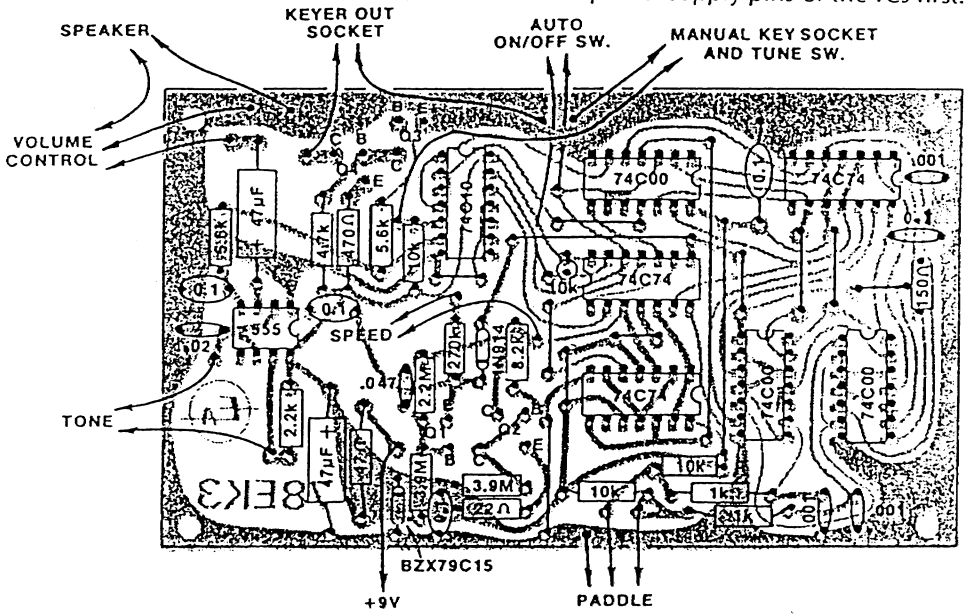
"The two 10k resistors at the inputs from the paddle are incorrectly placed on the PCB, compared with the circuit diagram. There is no apparent degrading in performance as a result and they may be left as they are. However, readers who want to adhere strictly to the circuit may reconnect the 10k resistors underneath the board."


+9V
R1 3.9M
R2 2.2M
R3 3.9M
R4 270k
R5 22Ω
R6 8.2k
R7 SPEED 1M LIN
C1 0.1
C2 .047
Q1 BC548
Q2 BC558
CR1 1N914
74C74
IC4a
IC4b
IC5a
IC5b
IC6c
OFF
ON AUTOMATIC CHARACTER SPACE
10k
MANUAL KEY
KEY
TUNE
R8 5.6k
R9 4.7k
R10 470Ω
Q3 BC548
Q4 2N5401
KEYER OUT
74C10
IC7a
IC6b
IC7b
IC6d
5.6k
0.1
ELECTRONIC KEYER
2.2k
TONE 100k
IC8 555
47 25VW
1k VOLUME
.02
74C00
IC1a
IC1b
IC1c
IC1d
IC2a
IC2b
IC2c
IC2d
IC6a
R11 1k
R12 1k
C4 .001
C5 .001
C6 .001
R14 150Ω
IC3a
IC3b
PADDLE
DASH
DOT
IC7
IC6
IC5
IC4
IC3
IC2
IC1
OFF
ON
47Ω
9V
BZX79C15
47 25VW



an actual size reproduction of the PC pattern, shown from the copper side.

This wiring diagram shows the PC board as viewed from the component side. When assembling the board, leave the CMOS devices until last and then observed the following precautions: earth the barrel of the soldering iron with a clip lead to the earth pattern on the board, and solder the power supply pins of the ICs first.



PARTS LIST

1 Metal cabinet 134mm wide x 76mm high x 150mm deep (see text)
1 Metal bracket for battery
1 Printed board 121mm x 71mm code 78EK3
3 Knobs
1 Paddle (see text)
1 Battery 9V Eveready No 2362
3 SPDT miniature toggle switches
2 RCA sockets, single hole mounting
1 Miniature loudspeaker, 57 mm (2.25in) with 8 ohm VC
2 Transistors, BC548 or similar
1 Transistor, BC558 or similar
1 Transistor, 2N5401
1 Silicon diode, 1N914
1 Zener diode, BZX79C15
1 IC, 555 timer
3 ICs, 74C00 quad 2-input NAND gate
3 ICs, 74C74 dual type D flip-flop
1 IC, 74C10 triple 3-input NAND gate

RESISTORS
(½W unless stated otherwise)

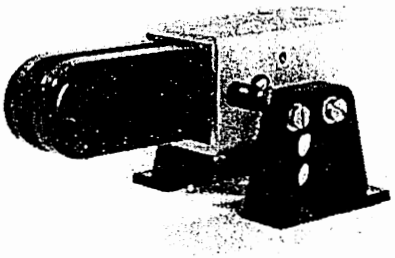
1 22 ohms	2 5.6k
1 47 ohms	1 8.2k
1 150 ohms	4 10k
1 470 ohms	1 100k linear pot
2 1k	1 270k
1 1k linear pot	1 1M linear pot
1 2.2k	1 2.2M
1 4.7k	2 3.9M

CAPACITORS
3 .001uF greencaps
1 .022uF greencap
1 .047uF greencap
5 0.1uF greencaps
2 47uF 25VW electros

MISCELLANEOUS
Hookup wire, solder, screws, nuts, coax cable and plugs as required.

NOTE: Resistor wattage ratings and capacitor voltage ratings are those used in the prototype. Components with higher ratings may generally be used provided they are physically compatible. Components with lower ratings may also be used in some cases, provided the ratings are not exceeded.

Simple, robust keyer paddle from NZART



The "Gailbraith" keyer paddle, GK1, used in the accompanying project, is marketed by the Christchurch Branch of the NZART. The paddle arms and the mounting brackets are cast in black plastic, and the body is extruded aluminium with anodised finish. Silver contacts are riveted to phosphor-bronze leaves in the paddle arms. The common contact is a silver-plated pillar between the paddles.

The mounting brackets may be rotated to suit either chassis or panel mounting and the tension on the paddles may be varied by selecting one of three positions for a small coiled spring between the paddles. The movement of the paddles is also adjustable by means of knurled screws protruding from each side of the housing. Together, these adjustments provide a wide range of "feel".

The GK1 is available, built and tested, for $NZ15.00, plus $NZ1.00 air mail post and packing to Australia. Spare parts are also available in the unlikely event that they will be needed. All enquiries should be directed to: The NZART Christchurch Branch Inc, Projects Group, PO Box 1733, Christchurch, NZ.

GALBRAITH KEYER PADDLE By Don VK5AIL (75)

FOR USE WITH SEMI-AUTOMATIC, AUTOMATIC OR IAMBIC MODE KEYERS

If you are building an electronic keyer but don't wish to build a paddle for it, then you may be interested in the Galbraith keyer. These have been popular over many years and are still available. The picture on page 17 is 62% full size.

Steve VK5AIM broke into the Club Info. Net earlier this year to pass on details of the source. I wrote away and received information that the Galbraith keyer is still available from:

Projects Group Manager
NZART, Christchurch Branch Inc.
P.O. Box 1733
CHRISTCHURCH New Zealand

≡ GK111 Galbraith Keyer Paddle. Iambic keyer paddle. Price is $NZ 24.50 including postage & packaging (P&P).

I ordered one myself and was told the best way to make payment is to obtain a bank draft. When this was written $NZ 1.00 was worth about $A 0.78, but the bank charged another $6.10 in fees and stamp duty, total $A 25.29.

Other Galbraith items from the same source are:

≡ PA1 2 metre 25W Amplifier kit. For handhelds. 2.5W IN - about 25W OUT at 13.8V. Price $NZ 87.00 plus $NZ 2.00 P&P.

≡ PS2 Power Supply. 8 Amps continuous at 13.5V. Current limited with foldback. Suits radio equipment to 50W. Price $NZ 180.00 plus $NZ 8.00 P&P. Kit includes all parts.

≡ RF1 RF Preamplifier. 2, 6, 10 metres and CB. 18db gain 2.5db N.F. Kit includes all parts.

≡ RC1 VHF Converter 2 metre. MOSFET converter 20 to 200MHz. Any IF. Complete kit except crystal. Price $NZ 19.50 including P&P.

≡ 05 Packet Radio Controller. For Commodore C64 computer on HF/VHF Packet. Includes PC Board and instructions, software on disk and operating instructions manual. Based on the AM7910 modem chip. This is NOT a kit - you source the parts. Price $NZ 28.75 plus $NZ 1.50 P&P.

≡ Nicad Charger 12V IN 45mA OUT. For handhelds, radios, torches with rechargeable batteries etc. Price $NZ 10.50 including P&P.

If you have queries I suggest you send a note direct to the Projects Group Manager Gareth J. Bradshaw ZL3VP at the above address. My information was received in February 1989. Don't forget all these prices are in New Zealand dollars, hence the need to visit your 'friendly financial institution'.

PCBs for the EA78 Electronic Keyer

THANKS to Peter VK2EMU a visitor to the Club Info. Net who broke in to tell us about some sources to try if you are after a PCB for the EA78 electronic keyer. Who knows, they might sell kits or the 7410 IC, which may be tricky to get.

R.C.S. Radio Pty. Ltd.
651 Forest Rd.
Bexley NSW 2207
Telephone (02) 587 3491

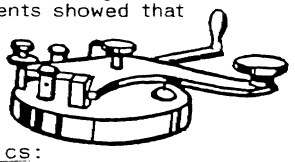
Geoff Wood Electronics Pty. Ltd.
229 Burns Bay Rd. (or P.O. Box 671)
Lane Cove West NSW 2066
Telephone (02) 427 1676

Sometimes there is a Directory of Suppliers in Electronics Australia magazine.

AWARDS AND CONTESTS By Ian VK3DID (112)

CLUB CW SCRAMBLE #9 RESULTS

Greetings all fellow QRP Contesters ! The main news for this last quarter must be the SCRAMBLE held on 27 April 1989. This was a most successful night, the band literally being alive with QRP signals for two hours. Comments showed that everyone enjoyed it and hoped for more.



Results:				Pts	QSOs	
1st Place	Ted	VK2CWH	(89)	5	13	* * *
2nd "	Ian	VK3DID	(112)	35	11	
3rd "	Don	VK5AIL	(75)	28	7	Statistics:
4th "	Reg	VK3BPG	(7)	24	6	
=5th "	Jack	VK4SF	(14)	21	6	Logs received to 20 May...7
" "	Roy	VK4RE	(15)	21	6	Total QSOs reported.....55
7th "	Ron	VK4EV	(130)	18	6	Average QSOs per station..8

My congratulations and sincere thanks to all who took part. The first three placegetters have been sent their well-earned certificates.

My own approach was simply to work as many stations as possible anywhere on 80m. I note that some of you confined your working to QRP stations only - or maybe that's just how it worked out. I was pleased to hear so many different States involved. Obviously VK2 operators are in a prime location for working anywhere on the eastern & central parts of the continent, but the VK4s scored the best total !

CLUB DX SCOREBOARD - 1 Aug '88 to 31 July '89
Have received marvellous logs from Rai VK7VV (3) and Ian VK8CW (91) for DX on 20m. Good stuff, fellas - keep it up ! Is anyone else working *real* DX QRP ???
We will publish the final results as soon as logs are available. The Organiser has advised that NO Scoreboard is planned for 1989/90.

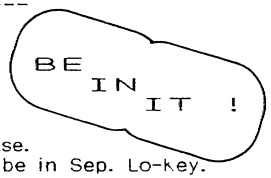
** 40m SCRAMBLE 40m SCRAMBLE 40m **

CLUB CW SCRAMBLE #10 is to be held on **40m** on **THURSDAY 27 JULY 1989.**
Between 7000kHz - 7040kHz. We hope to have the Club Station operating.
Use homebrew Tx & Rx if possible. *SPECIAL WELCOME TO DX MEMBERS.*

RULES **OBJECT:** To score points by working as many stations as possible on the 7MHz band. **DURATION:** 2 hours, starting at 1030Z and finishing at 1230Z. **MODE:** CW only. Club Members to use QRP (maximum 5 Watts output). **CALL:** No Control Station to check in to. JUST COME UP AND START CALLING. The call to use is **CQ QRP TEST** and Members should use the **/QRP** suffix. No need to exchange QSO serial numbers.

SCORING:

CW STATION WORKED	POINTS SCORED
QRO VK	1
QRO DX	5
QRP VK	5
QRP DX	15
CLUB STATION VK5BCW	15



ENTRIES: Send log extracts to me *without delay* please.
RESULTS: Results including certificate winners will be in Sep. Lo-key.

Final Comment:

Although I don't have a huge amount of time for radio, I would love to work some of you QRP round 28.200, 7.030 and 1.810 MHz. How about it Members ? The thing is: CALL -- You never know who will emerge !!!

73, Ian VK3DID (112)
I. Godsil, Awards and Contests Manager, P.O. Box 411 NORTH BALWYN Vic 3104

KIT-SET ACTIVITY CENTRE By Don VK5AIL (75)

KIT-SETS

The Club currently has four kit-sets available to Members:

* The *Club Communicator* CW QRP 3.5MHz (80m) transmitter - Full Kit-Set.
* VFO kit, as used in Club Communicator.
* VFO short-form kit for the *Forrestfield* CW QRP 21MHz (15m) Transmitter.
* Sensitive SWR Meter - short-form kit - with 5W dummy load.

Prices are on the list which follows.

CLUB COMMUNICATOR KIT-SET

The Club Communicator is an 80m band QRP CW transmitter, power output up to 4W, according to skill of builder. About two dozen have been sold in little over a year. 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 the assembly into your 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.

You can buy the Full Kit-Set or a kit for the VFO module only.

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, *written with beginners in mind.*

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. An appropriate instruction manual is supplied to suit each order.

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.

I set up the kits in small batches. If your order is received when a batch is nearly ready you will get the parcel in a week or two, but if you just miss a batch it will take 4 weeks or more.

If you have queries, contact me on the Club Info. Net (SSB) or telephone or write or maybe catch me on 80m (CW/QRP). I will also try to help with technical queries you may have when building the rig.

SUPPLY OF COMPONENTS

We also have available for purchase by Club Members a range of components, particularly items difficult to obtain 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 PRICES of the items listed below are PER PACK. The list shows how many of each you get in one pack. PLEASE ADD $A 2.00 TO THE TOTAL VALUE OF YOUR ORDER, TO COVER POSTAGE & PACKAGING ETC.

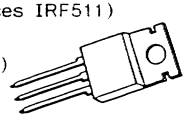
ORDERING

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 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 $1.00 or less !). The receipt will come with your next copy of Lo-Key. If you don't receive a packet within a month please contact me on the Club Info. Net or write, because things may have gone astray.

PRICE LIST
From 15 June 1989

Code No.	Nbr in a pack	$A Price per pack		Description
K001	1	77.00		Club Communicator Full Kit-Set 3.5MHz CW QRP Tx complete with 52 page manual.
K002	1	18.00		VFO, variable inductor tuning As used in the Club Communicator. with manual.
K006	1	24.00		Sensitive SWR meter - short-form kit - and 5W dummy load. Manual included.
K007	1	27.00		VFO for Forrestfield 21MHz CW QRP Tx. Short-form kit. See bottom of page 3.
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	3.50	H	IRF510 transistor N-channel MOSFET (Replaces IRF511) Used in some of VK3XU (49) Drew's projects.
C003	10	1.50		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.
C005	5	2.50		330pF Polystyrene (styroseal) capacitor 630V Unused old stock.
C006	5	2.50		560pF Polystyrene (styroseal) capacitor 125V Unused old stock.
C007	2	3.00		BS170 transistor VMOS N-channel FET.
C008	2	5.00	H	VN88AF transistor.
C009	1	4.00		Coil assembly, Club Communicator type (See Lo-Key #20) Suitable for other VFOs.
C010	1	6.00		Manual, as supplied with Club Communicator Tx. Comprehensive coverage. More than 50 pages.
C011	2	6.00	H	IRFZ32 transistor.
C013	2	1.10		Toroidal core 9mm od x 6mm id x 3mm ht Philips 4322 020 97170 Material 4C6 (violet)
C014	2	1.40		Toroidal core 14mm od x 9mm id x 5mm ht Philips 4322 020 97180 Material 4C6 (violet)
C015	4	1.70		BA102 equivalent - 1S2688 varicap (varactor) diode
C016	4	1.30		Compression trimmer max. 1500pF approx. Mica dielectric Ceramic body 24 x 22 x 9mm
C017	4	1.30		Compression trimmer As C016, except max. 2500pF approx.



NOTES: **Add $A 2.00 to your total order, for postage and packaging etc.**
Prices may change at any time without notice.
A simple data sheet will be provided with transistors.
'H' means that a set of insulated mounting hardware is included.

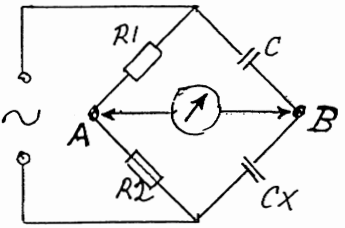
CAPACITY BRIDGE USING A 555

By Bob Lukes VK3BBI (111) 22 Dorothy St., East Burwood, Victoria 3151

RANGES

0	-	100pF
100pF	-	1000pF
1000pF	-	0.01uF
0.01uF	-	0.1uF

DIAGRAM SHOWING PRINCIPLES OF A CAPACITY BRIDGE



The bridge is able to measure less than 1pF.

CIRCUIT DESCRIPTION

In the diagram above, if R1 = R2 and C = CX there is no current flow between A and B. Note that in the actual circuit on the opposite page R1 and R2 are provided by the two 'halves' of a 10k pot VR1. C is the multiplier capacitor, with different values switched in for 1X, 10X, 100X or 1000X. See PCB-A. CX is the unknown capacitor, connected between terminals T1 and T2.

If CX causes the bridge to become unbalanced, then current flows between points A and B. Balance is restored if the ratio R1/R2 is made to be the same as the ratio C/CX i.e. R1/R2 = C1/CX.

NOTES ON CONSTRUCTION PROCEDURE

The accuracy of this bridge depends on the quality of components, mechanical design (e.g. reduction gear) and mainly on the operator, who has to compensate and eliminate variations arising from temperature change, lead capacitance, proximity capacitance etc. in order to obtain best results.

In my unit I used a 10 turns 10k pot for VR1. If accuracy is of secondary importance, you need only use a good quality 10k linear pot. Use as large a knob as possible with VR1 because balancing (zero output) is very sensitive.

If an internal 9V power supply is used then Jack 1 can be omitted.

Jack 2, the monitoring jack, must be COMPLETELY ISOLATED from the chassis.

For calibration use close tolerance capacitors. As mentioned earlier, the accuracy of the bridge depends on the quality (including tolerance and stability) of the components.

My 555-based oscillator was built on veroboard. See PCB-B. The actual value of frequency of the oscillator is not important.

Calibration of points between 100 and 1000 is done by switching the multiplier to 10X. Examples: With a 100pF capacitor and range switched to 10X we get the 10pF calibration point. And with a 120pF capacitor and range 10X we get 12pF.

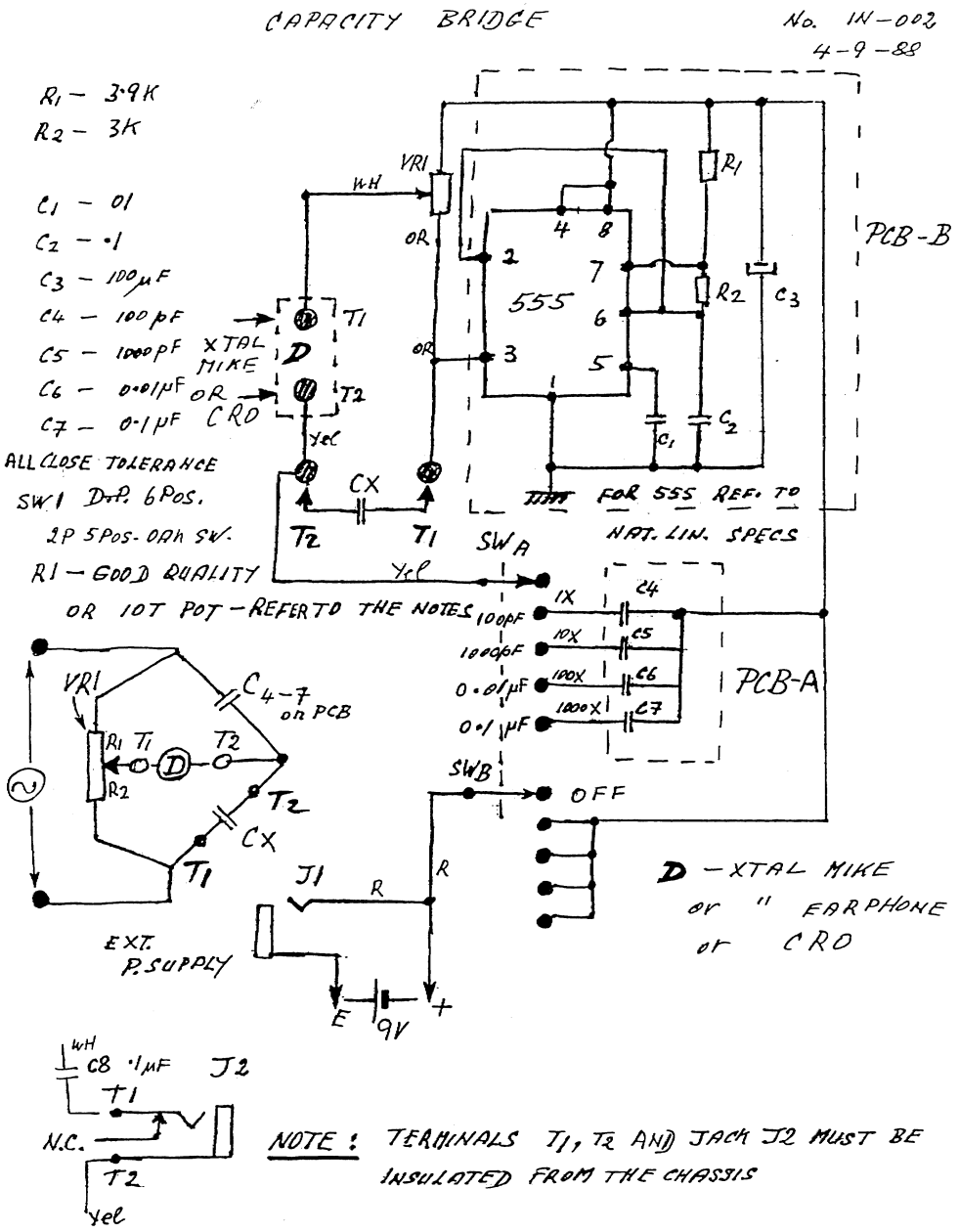
CALIBRATION OF THE BRIDGE

Note that the monitoring device D between A and B must must be of high impedance, so that it will not load the circuit. For monitoring use a crystal mike, crystal earphone or CRO. The CRO earth must not touch the chassis (floating earth).

The steps in calibration are:

1. Leave terminals T1 and T2 open. Set multiplier on 1X.
2. Tune VR1 for zero ouput and mark this point 0.
3. Place a capacitor of known value between T1 and T2.
4. Tune VR1 for zero output. Mark this point 100pF. 100pF/10 = 10.
5. Switch the multiplier to 10X and tune VR1 to zero. Then mark it 10pF.

Using this method we can calibrate (with standard capacitors) the dial scale on all ranges. E.g. for the part of the low range under 1pF I used 0.68pF, 0.82pF and 0.88pF NPOs to obtain three calibration points.


CAPACITY BRIDGE
No. IN-002
4-9-88
R1 – 3·9K
R2 – 3K
C1 – 01
C2 – ·1
C3 – 100µF
C4 – 100pF
C5 – 1000pF
C6 – 0·01µF
C7 – 0·1µF
ALL CLOSE TOLERANCE
SW1 D.P. 6 Pos.
2P 5Pos. OAh SW.
R1 – GOOD QUALITY
OR 10T POT – REFER TO THE NOTES
VR1
WH
OR
YEL
T1
T2
XTAL MIKE OR CRO
D
CX
555
PCB-B
FOR 555 REF. TO NAT. LIN. SPECS
SW A
SW B
1X
10X
100X
1000X
100pF
1000pF
0·01µF
0·1µF
PCB-A
C4-7 on PCB
OFF
J1
R
EXT. P.SUPPLY
9V
D – XTAL MIKE or " EARPHONE or CRO
C8 ·1µF
J2
N.C.
NOTE : TERMINALS T1, T2 AND JACK J2 MUST BE INSULATED FROM THE CHASSIS

VK2/QRP ASSAULT By Garry VK2AGC (121)

At the time of writing this I am preparing for a three month sojourn into VK4 so the information on QRP will be relatively limited.

The long weekend at Easter encouraged many Amateurs to 'pack up their cares and woes' and head off to all parts of the State and call CQ. One such adventurous group was Greg VK2GJS, Ken VK2GKM and Rob VK2ADR along with tents, fishing gear, all sorts of radio equipment (QRP of course), not to forget the XYLs and various harmonics.

Although history has shown that it always rains on long weekends, these hardy (or is it foolhardy ?) souls persevered and QRP signals were heard loud and clear being emitted from Nundle, a large metropolis (!), south of Tamworth.

Greg VK2GS was in control of the key in the front seat of their stationary mobile/portable station, while Ken and Rob were left to operate from the back seat.

Using a long wire and tuner, their QRP rig - running 1.5 Watts - exceeded all expectations. Signal reports of 559 were commonplace on 80 metres, especially during the late afternoon before the noise level had a chance to build up.

Ted VK2CWH (89) joined in on Tuesday evening 28 March 1989 along with Ern VK2BVY and a really great QSO was enjoyed by all.

Earlier, on 18 March 1989, another very nice contact was made with **Ron VK4EV (130)** at 0234 UTC on 7.010MHz running about 5 Watts. At first I thought I had a great DX contact on 80 metres when Ron gave his QTH as *TEXAS*. However it was that well-known town of Texas, *QUEENSLAND* ! Reports were 559 each way. Ron is very active with QRP on 80, 40, 20 and 15 metres, mainly using equipment which he has built himself.

As promised last issue I have obtained the circuit & details of the Westlake AR Club's QRP project.
(*Editor's Note: I should have room in the September issue.*)
MANY THANKS to the **Westlakes Club** for permission to use this information.

Regards / 73 *Garry* VK2AGC (121) VK2 State Co-ordinator
22 Johnston Road
BASS HILL NSW 2197

COPIES OF PAST ISSUES OF LO-KEY

By Kevin VK5AKZ (43)

Last issue it was mentioned we were setting ourselves up to supply past copies of Lo-Key. This is a big project but we have made some progress. After preparing each set of masters we will print and collate a small stock of copies. We also plan to publish a consolidated index of Lo-Key as soon as one is available.

More recently, a Member suggested that we should supply copies of Lo-Key circuits and/or articles for a fee and postage. We do not propose to do this as a Club activity at present, as it is not economical in terms of money or time.

Full copies of past issues are now available to Members on request to the Treasurer Kevin VK5AKZ (43) or the Editor Don VK5AIL (75) - addresses on page 2. The price is $A 2.00 (or $US 2.00), including postage and packaging.

This service is intended to allow **paid-up Members** to obtain selected issues or to build up one full set of issues. We cannot guarantee to fill your order.

You've read all about the BEFORE in *Volcano Power* (March Lo-Key page 11), now to complete the pair we bring you the AFTER !

Field Day 1989 at the Morsery Ranges

By Maggie VK3CFI (138)

Field Day 1989 was my first attempt at the 24 hour Division. Just a few weeks before, Liz VK3JQ said she couldn't make it. I really didn't want to work 24 hours at Colac's favourite volcano by myself, so I traipsed up to the Misery Ranges, about 50 km west of Ballarat. It's 1000 ft above sea level and very quiet. On the other side of the paddock was VK3XEX who operated VHF only.

I strung up a homemade G5RV through an antenna tuner and my power output was 10 w or less. Usually less because my batteries had been unevenly charged by a wind generator. The first battery lasted one hour only. How I wished I had brought along a voltmeter. Anyway, accurate reports from other stations soon let me know about my signal. An RST of 229 and "Hey lady, you gotta lotta chirp" were two of the general indicators.

I operated within a dome tent but it was so hot that I needed to throw a cover over the top. Well, I flung it so hard that I lost my balance and fell off the chair onto ball bearings in the mega quantity. Fortunately it was dry, hard ground which meant the ball bearings didn't stick. A mob of sheep were on the horizon, eager to leave more ball bearings.

Meanwhile, about 500,000 March flies had entered via the open tent flap. I certainly learned a great deal about the anatomy of those beasts when I swept out their carcasses as evening drew on.

I was so nervous that first day. Truly, more operating experience would have made this factor negligible. I am surprised anyone actually copied my cw. Between the heat and my nervousness, my fingers stuck to the paddles of the iambic keyer. I hooked up the straight key but my sending was worse, if you can imagine! I worked Neil VK7FN and also Lindsay VK3DXH through his club station. Thank you both for slowing down for me.

There were two heartaches. I called some ssb stations for cross mode QSOs but they said their cw wasn't good enough. Later, when their cw op was at the helm, I could hear them working ZLs at 20 wpm. One VK1 op told me, "No cw stations. You take too long." Oh well. Did he want me to speed up or slow down?

I had foolishly brought along only two pencils and one pen. One pencil disappeared and I used the other until it had no graphite showing. The pen ran out of ink in the middle of a QSO. It was with a ZL, too, and they give the longest, strangest set of numbers for their exchange. Oy. So, using fingernails, I managed to peel off enough wood to make the pencil usable.

In the end, I made (hold onto your hats) 24 contacts.

73 de Maggie VK3CFI

Maggie

WIRE GAUGE EQUIVALENTS

Diam. mm	B&S (AWG)	SWG
0.16	34	38
0.18	33	37
0.20	32	36
0.23	31	34
0.25	30	33
0.29	29	31
0.32	28	30
0.36	27	29
0.41	26	27
0.46	25	26
0.51	24	25
0.57	23	24
0.63	22	23
0.72	21	22
0.81	20	21
0.91	19	20

ARTICLES ON HOMEBREW AND/OR LOW POWER BY DREW VK3XU (49)

By Rob Gurr VK5RG P.O. Box 35 Daw Park SA 5041

Thanks Drew, for checking the list's accuracy and advising us of some additions.

Drew Diamond VK3XU (49) has been a practical and prolific writer of technical articles for the magazine *Amateur Radio* for over 15 years.

Any amateur interested in home construction and/or low power operation could well spend an hour or two looking at some of the articles he has written. They contain adequate guidance to complete various construction projects including receivers, transmitters, test equipment and linear amplifiers.

It is not necessary to copy the articles in intimate detail or to use the specific components listed. Experimenting is all about trying alternatives. Drew often uses CA3028 RF ICs which are not always readily available in Australia. You can substitute with a MC1550-G or even three transistors wired together to give the same configuration as the CA3028. Another difficult item in some cases has been Aegis coil formers used for band-pass filters etc. A good source of coil formers for these purposes is the IF transformers (3/4" cans) used in old TCA1675/1677 transceivers, which are now being released from service in large quantities.

Drew often lists sources of parts if you wish to buy new, but it is a good idea to buy 'big and cheap' at auction nights at your local radio club - the bits I salvage for various projects would amaze you.

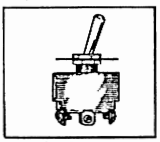
So get started, read up on some of the articles listed - and let the Editor know if we have missed any !

LIST OF ARTICLES BY DREW DIAMOND VK3XU (49)

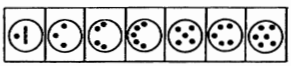
"Nar-Meian", Gatters Rd., Wonga Park, Victoria 3115

AMATEUR RADIO 'n' by date = in Novice Notes column

Oct '73	p10	A VFO for 5 - 5.5MHz
Nov '75	p15	QRP CW Rig for 7MHz
Oct '76	p9	A Method of Reducing HV Power Line Noise
Sep '80	p8	Five Watt CW Transmitter
Jul '81	p28	Homebrewer's Linear Amplifier for the 3.5, 7.0, 14, 21 and 28MHz Bands
Aug '81	p11	Direct Conversion Receiver for 3.5, 5 or 7MHz
Oct '81	p7	QRP Solid State Linear Amplifier for HF
Dec '81	p12	QRP CW Transmitter with Breakin Part 1
Jan '82	p5	QRP CW Transmitter with Breakin Part 2
Feb '82	p8	QRP CW Transmitter with Breakin Part 3
Jan '83	p8	A 'Square-One' Receiver..Pt 1
Feb '83	p14	A 'Square-One' Receiver..Pt 2
Mar '83	p11	A 'Square-One' Receiver..Pt 3
Apl '83	p33	A Sensitive SWR Meter See p. 21 K006 Kit
Dec '83	p24	'Square-Two' Converter
Mar '84	p14	High Performance Direct Conversion Receiver Part 1
Apl '84	p10	High Performance Direct Conversion Receiver Part 2
Mar '85	p14	DSB/CW Transmitter for 80 Metres
nDec '85	p34	Basic Metalworking - "Chassis Bashing"
nFeb '86	p37	Starting a Radio Electronics Workshop
nApl '86	p20	Four-Watt CW Transmitter for 80 Metres
nJun '86	p24	The Open Wire Feed, HF Multiband Dipole
nSep '86	p34	Direct Conversion Receivers - Here to Stay
nOct '86	p16	DC86 Direct Conversion Receiver for Eighty Metres
nMar '87	p22	Some Troubleshooting Tips
nSep '87	p30	Converting the DC86 VFO
nOct '87	p34	A Crystal Calibrator and Signal Source (sic)
nJan '88	p45	Some Practical Tips of VFO Construction
nFeb '88	p30	A Handy Quartz Crystal Checker
nMay '88	p26	Measuring Small Coils and Capacitors with a Dip Meter
nOct '88	p6	MOSFET Power Amplifier for 1.8 to 10.1MHz
nMay '89	p30	A Simple Impedance Bridge



AMATEUR RADIO ACTION
Vol.2 No.11 p22 Incredible Noise Cancelling Antenna



FROM THE EDITOR'S DESK By Don VK5AIL (75)

There was an exceptionally good response to the cover story in the March Lo-Key - VK5BA (8) Malcolm's mini QRP transceiver. I have promised several people that I will clarify one or two points with Malcolm and will do this soon.

This issue contains a couple of substantial technical articles and I have worked hard to fit in as much as possible. (It's not your eyesight, the lines are closer together !)

NEXT ISSUE will contain Part 2 of VK6KRG (28) Rod's Forrestfield Tx; also an RF amplifier by Ian VK8CW (91) of Tassie Devil fame and maybe we can fit in an LM4250 IC meter amp.

Don't hesitate to use Lo-Key as a means of asking for help from others. If you've solved the problem before the question gets asked in print, thats good - you can let me have the solution for our next issue !

It's nice to be important...
...But it's also important to be nice.

73 Don

890610 EDTOR

U CAN HELP ! By Don VK5AIL (75)

Norm VK5GI (139) is extemely pleased about receiving information he requested in this column last issue. MNI TNX to Hollis WF6U (17) who sent an address for Norm to write to about the Hallicrafters S38 Rx - which was. Also, Hollis indicated appreciation with the March issue and mentioned success on 20 metres (14060kHz) with the VXO circuit provided by Peter VK6BWI (66), p.16. Then Mike W3TS (9) kindly set over the Funmitter series of articles (which will go into the Boomerang Circuit Book now nearing completion).

Here are some more requests. 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. Members names and postal addresses were published in the December Lo-Key.

1. Reg VK3BPG (7) wants to find a substitute for a MPSU31 transistor.

QRM/ED: It's in my book, but the substitutes are equally obscure. 'Over to U'.

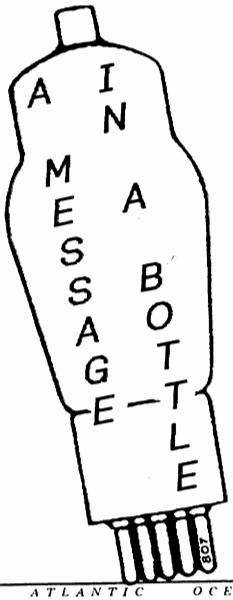
2. Norm VK5GI (139) is looking for a CRP-9 (or is it PRC ?) Army type transceiver. Norm's address is on page 2 or telephone (08) 267 4518.

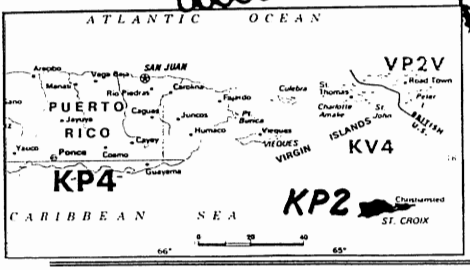
eQRPMENT BUY-AND-SELL

1. Jeff VK5BJF (57) has two rigs for sale - with the amounts received to be donated to our Club. Thanks Jeff - now lets see if there are buyers. Its a good way to get on the air quickly and to see how an experienced homebrewer constructs equipment. More details to follow.

SILENT KEYS

We regret to advise Members that
Frank Filby VK2EFF (77) of Speers Point NSW and
C. Pope SWL WIA L20944 (51) of Dubbo NSW
have become Silent Keys





Fred Bonavita W5QJM #31
P.O. Box 420321
Houston, Texas 77242-0321

30 April 1989

USA

Don:

Please pass the word along to the other club members I plan to mount a one-person QRP operation from the U.S. Virgin Islands (KP2) early in August and would be very pleased to work any and all VK/ZL stations.

I am scheduled to arrive on or about August 8 on St. Croix, and I should be on the air by next day, if all goes well. I should be on most of the weekend of Aug. 12 and 13 as conditions permit.

Look for me on 40, 30, 20, 15 and 10 metres on the traditional QRP frequencies. I will spend a fair amount of time on 30m around 10.110 MHz for those needing KP2 for that band. I will cease operation on the 14th. All operation will be CW. QSL will be via my address above, since my listing in the 1989 and earlier editions of the Callbook is out of date.

Thanks, and keep up the good work. My best to all of the gang.

vy 73,

W5QJM (31)

INTERESTED IN JOINING US ?

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, $A12 for ZL Amateurs, $A14 for DX Amateurs, which is the annual membership fee.

(please print)

FIRST NAME & CALL SIGN ....

INITIALS & SURNAME ....

ADDRESS .....

....

..... 890521 BOTL Z61A/C4 JUNE 1989