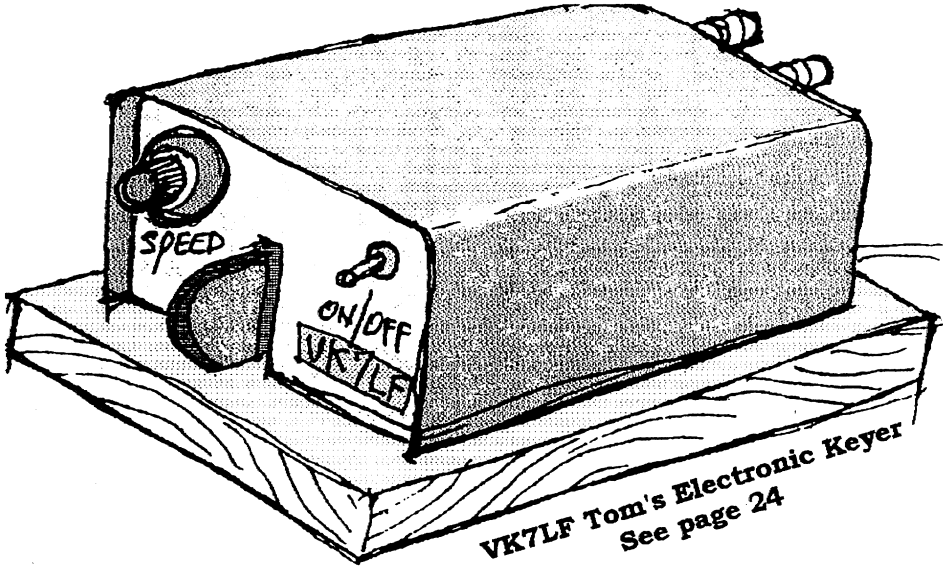


Lo-Key

The Journal of
the CW Operators' QRP Club Inc. ~
Promoting Low Power CW Mode
Communication and Homebrewing

No. 43 - September 1994



VK7LF Tom's Electronic Keyer
See page 24

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Editor: Don Callow VK5AIL #75

5 Joyce St., Glengowrie SA 5044



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VK5 BLS Chat ...

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

Well members, it is Lo-Key time again and I really look forward to my chance to talk to you all! And to read for myself all the other articles in our club journal! It never fails to amaze me that a small group such as we are can come up with the wide variety of articles necessary to fill each issue. Our club is most definitely alive and well; keep it up!

Annual General Meeting - Council Members are invited to attend the first A.G.M. of the CW Operators' QRP Club Incorporated. This is for the year ended 30 June 1994 and is our first. It is scheduled to be held at 5 Joyce St., Glengowrie, Adelaide, South Australia on Monday 5 Dec. 1994, starting at 8.00pm.

Technical Symposium - On 17 Sep. I will be making a presentation on the subject of HF QRP to the South Coast A.R.C. Technical Symposium at O'Halloran Hill, south of Adelaide. This is a team effort, as Steve Mahony VK5AIM will be handling a major section on homebrewing and we will display homebrewed station equipment; also some CW Ops QRP Club publicity material!

Boomerang Circuit Books - BCB's #2, #3 and #4 are circulating to members, as listed on page 9 of Lo-Key #42. Don't forget there is no #1.



At last, a new book! I have produced BCB #5 which is now on its first 'flight'.

Some additional names have been received and will be shown on circulation lists in December Lo-Key.

Thanks to Ron Everingham VK4EV and Ian Godsil VK3DID, the recent QRP Weekend was a winner. We greatly appreciate their initiative and efforts (over a long period) to make this a success.

Kit-Sets - For some time now I have thought that Don Callow VK5AIL, our Lo-Key Editor and kit-set & components supplier could do with some assistance in kit-set activities, which is a big task. At our Committee meeting in June, Steve VK5AIM volunteered to assist with kit-sets and you will start to see some results of this later this year.

I would like members to have access to an economical, reliable, serviceable and usable range of kits that would make up a complete QRP Station. Perhaps consisting of transmitter, key, earphones, receiver, audio filter, antenna tuner, antenna & power supply and maybe other important test/accessory gear.

Please let us have YOUR suggestions on how we might organise supply of kit-sets for members. Write in to Don, Steve or me. I expect there will be quite a variety of interesting comments and ideas. Change is becoming necessary these days - alive and vibrant clubs like ours have never been afraid of it. So let us move into the future - which looks good to me.

My best wishes to you all.

Barry VK5BLS

A small logo consisting of the letters 'QRP' in a stylized, outlined font.

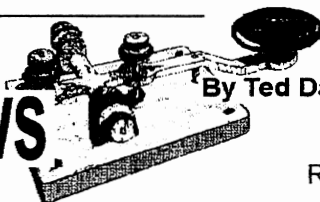
Welcome To New Members

We're glad to have you with us - and if you know of others who might enjoy membership please let them know about the CW Ops QRP Club!

| | | | | | |
|-----|--------------|-----------------|---------------|--------------------|--------|
| 396 | VK4KBI | Rodney SILCOCK | DALBY | Queensland | Aust. |
| 397 | VK6KAR | Don GRIMBLE | MARANGAROO | Western Australia | |
| 398 | VK8JJ | Jeffrey LAMBERT | ALICE SPRINGS | Northern Territory | Aust. |
| 399 | VK6MJC | Mike CRACK | BULL CREEK | Western Australia | |
| 400 | VK2AWH | Harry MARTIN | LYNDHURST | Victoria | Aust. |
| 401 | K5FO | Chuck ADAMS | COPPER CANYON | Texas | U.S.A. |
| 402 | G8SEQ/VK2XYD | John BEECH | WYKEN | Coventry | U.K. |
| 403 | KB0LRB | Lynn GEITGEY | WESTWOOD | Kansas | U.S.A. |
| 404 | VK5NDD | Trevor MUNN | NANGWARRY | South Australia | |



CW Net News



By Ted Daniels VK2CWH #89
Wombat Hole,
Bylong Rd.,
Rylstone N.S.W. 2849

Since June an increase in outside commitments has left me with quite a few meetings and, as a result of this and a bit of winter illness, I have been unable to run the CW Net on about half the Net nights.

This lack of continuity has resulted in a drop in the number of participants. ***If any member is prepared to take over net control duties I would be very grateful, as things are unlikely to change here in the short term.*** Please contact Barry VK5BLS or Don VK5AIL if you can assist.

A few comments on breaking into the net may be in order

My practice, when there are several operators on the net, is to pass it right around the group, so, on busy nights, there could be quite a wait for an opportunity to answer my CQ call.

In this situation send **BK** at the end of any over. If I hear it I will cut in and send "QRZ de VK2CWH/QRP" and bring you straight into the net.

If everyone is not on the same frequency (often !), try to make sure your Tx frequency is the same as that of the operator sending, not mine - because I will be listening on the operator's frequency.

On bad nights (QRN or QRM - or both) I use a very narrow filter and it is important to be quite close to my listening frequency (± 200 Hz) or I may miss you. I normally switch the filter out at the ends of overs and when listening for answers to my CQ call - but, yes, I have been known to forget !

So, if you have tried to join the net in the past and been unsuccessful or just got sick of waiting, these comments may help.

One recent contact definitely worth mentioning was **ZL3BAF/QRP Athol** on 1/3 watt, RST 439 !

72 to all,
Ted.



TREASURER'S ANNUAL REPORT

STATEMENT OF RECEIPTS AND EXPENDITURE FOR YEAR ENDED 30 JUNE 1994

| | <u>\$ RECEIPTS</u> | <u>\$ EXPEND- ITURE</u> | <u>\$ BALANCE</u> (1) | <u>1992-93</u> \$ |
|--------------------|--------------------|-----------------------------|--------------------------|----------------------|
| ADVANCE | 0.00 | 0.00 | 0.00 (6) | - 500.00 |
| BANK CHARGES | 0.00 | 28.17 | - 28.17 | - 29.25 |
| CREDIT ACCOUNT | 10.60 | 26.95 | - 16.35 | 5.80 |
| DONATIONS | 0.50 | 0.00 | 0.50 | 32.96 |
| BANK INTEREST | 70.09 | 0.00 | 70.09 | 78.30 |
| KIT SETS | 1759.05 | 2006.62 | - 247.57 (3) | 422.26 |
| LO-KEY | 211.70 | 2677.47 | -2465.77 | -2270.43 |
| POSTAGE GENERAL | 4.05 | 114.14 | - 110.09 | - 131.43 |
| ADMINISTRATION | 0.00 | 395.51 | - 395.51 | - 531.50 |
| LOGO STICKERS | 0.60 | 0.00 | 0.60 | 0.00 |
| SUBSCRIPTIONS | 3549.25 | 0.00 | 3549.25 (2) | 3006.70 |
| SUNDRIES | 10.00 | 0.00 | 10.00 | 10.00 |
| SUB TOTALS | \$ 5615.84 | \$ 5248.86 | \$ 366.98 (5) | \$ 93.41 |
| CASH: | | ORDINARY A/C | 305.85 | |
| | | CHEQUE A/C | 3093.22 (7) | |
| 1993-94 | 366.98 | SPECIAL PURP: | 21.99 | |
| B/F BALANCE (6/93) | 3188.93 | IN HAND: | 134.85 | |
| NEW BALANCE | \$ 3555.91 | CURRENT: | \$ 3555.91 | |

1994-95 BUDGET:

| | |
|-------------------------------------|-----------------|
| BROUGHT FORWARD | \$ 3555.91 |
| EST. LOKEY | \$-2800.00 |
| EST. STATIONERY +POST | \$- 650.00 |
| EST. BANK | \$- 30.00 |
| BUDGET WORKING BALANCE 93-94 | \$ 75.91 |

NOTES:

These accounts are prepared on a cash flow basis and therefore do not account for stock or liabilities. Significant items are addressed in these notes.

- 1/ Approximately \$900 of reimbursement expenses incurred during the fiscal year have not yet been claimed.
- 2/ \$271.85 included in the subscription accounts is in respect of subscriptions received in advance for 1995 and beyond.
- 3/ The Kit Set activity has stock of approximately \$962, at sale price. See note (6).
- 4/ Membership stats. for the year ended 30/06/94: 25 members left the club and 63 joined the club. Current financial membership is 308. THANK YOU to ALL those responsible for joining up new members.
- 5/ We have shown a cash flow surplus for the 1993-94 fiscal year. Your committee has been keeping a close eye on budget matters during the year and we have shown a "surplus" for three consecutive years. Overall, for the last four years expenditure has approximated income.
- 6/ An advance of \$1000.00 towards new kitset batches and Lo-Key production is held by Don Callow VK5AIL #75, Kit-Set Centre manager and Lo-Key editor.
- 7/ Made up of \$2400.49 bank statement + \$692.73 paid in since.
- 8/ A BIG THANK YOU FOR YOUR SUPPORT and especially to those of you who made DONATIONS of TIME, FINANCE or COMPONENTS/EQUIPMENT.

K. R. Zietz VK5AKZ #43

TREASURER 1993-94



Just Kitting !

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



ON THE WAY

Noel Hill VK2JG has donated a large quantity of unused (new - in about 1943 !) 5955 kHz crystals, in FT-243 case, which gives you access for grinding. These may be of use for those experimenting with crystals or working with design and construction of crystal ladder filters for the first time, although they are not ideal for the latter task. If you have tried FT-243 and have any comments on this, please let me know. If possible we will sort them into sets before making them available to members. *Good one, Noel !*

SPECIALS

Steve VK5AIM has donated some used salvage components which would be very useful for homebrewers. As a start there are eight (8) 12V N.O. reed relays, double pole. See label above.

They are suitable for PCB mounting and appear in excellent condition. Size 13 x 15 x 27 mm. Coil resistance is 1500 Ω (nominal) and they switch on at about 5 - 7V and switch off at about 2V5 to 3V5, so 9V or 12V operation would be OK.

Price: 80 cents each.

TIMER IC'S & KEYSER KIT

We have a short form kit-set for the simple keyer from Solid Sate Design, our K018, including all circuit board components and a prototype board DSE Cat. No. H-5660 (worth \$5.25), but no case, paddle or switches. Price is \$15 plus \$4 post/pack per order.

We also have a selection of timer IC's - the 555 (70 cents), CMOS 555 (\$1.70), 556, a dual 555, (\$1.30).

BONUS BITS

We are still receiving donations of components to be available as Bonus Bits. The latest catalogued is a batch of small type 'K' crystal sockets from **Tom VK7LF** - *Tnx Tom !*

F035 **Crystal sockets 'K' type**
[5nbr/pack] Suit xtals with 5 mm (0.2")
pin centres [PE2362]



'MINICOM' CORRECTIONS

Basil Dale VK2AW has pointed out a couple of small errors in the Minicom Receiver article (Lo-Key #37 March 1993 p.4). The Version 4 General Coverage Receiver schematic on page 6 should show a connection to the 5V rail from pin 4 of the MC3357. Also, the 100 ohm resistor in the 5V rail should be deleted.



THE BEDFORD 80 METRE SSB RECEIVER

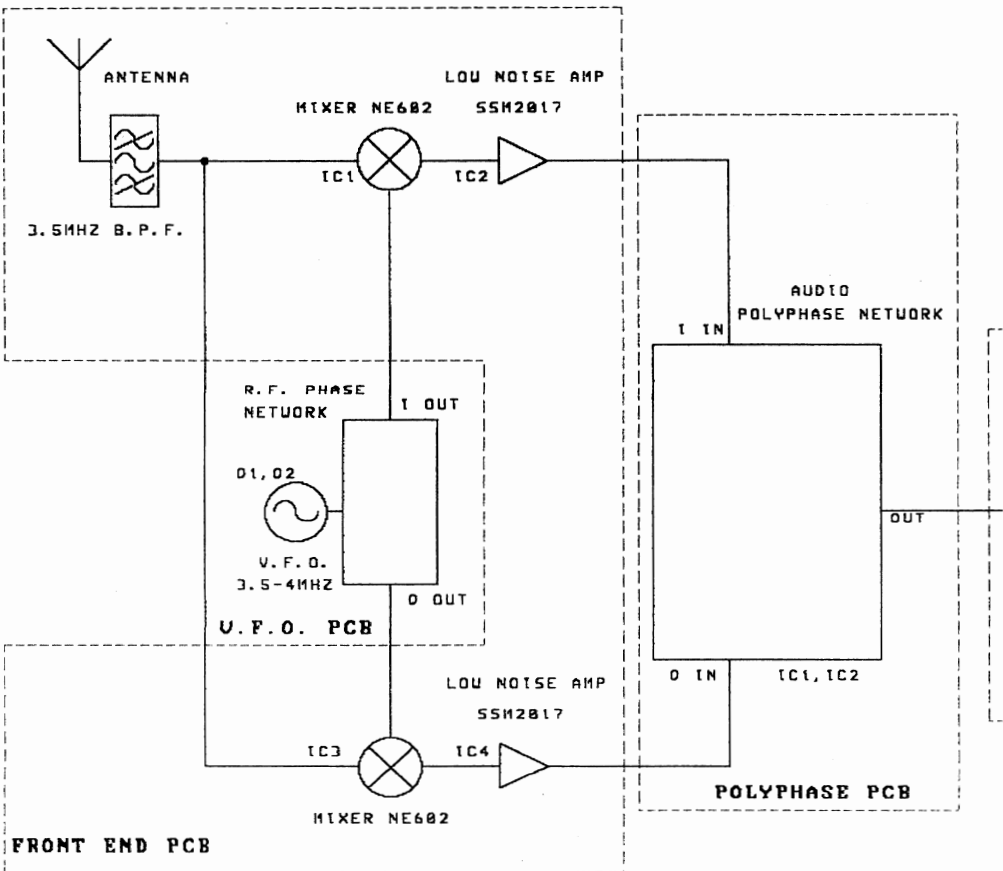
By Rod Green VK6KRG

106 Rosebery St., Bedford, W.A. 6052 (Tel. [09] 271 7145)

The Bedford receiver is a direct conversion receiver which behaves similarly to a superheterodyne receiver in that the audio image normally associated with this type of receiver is phased out, and is thus not present. This receiver has some other interesting features, including AGC.

The entire receiver project will be published over three issues. Each issue will concentrate on one section of the receiver, as each section is built on its own PCB.

Apart from the overall description to follow, this issue will describe the **audio/ agc section** in detail. This sec-



tion can be used as a stand alone audio unit for any direct conversion receiver. AGC is entirely within this unit and there is no requirement to feed AGC back to the front end. More about that later.

OVERALL DESCRIPTION

The **overall block diagram** should be used along with this description.

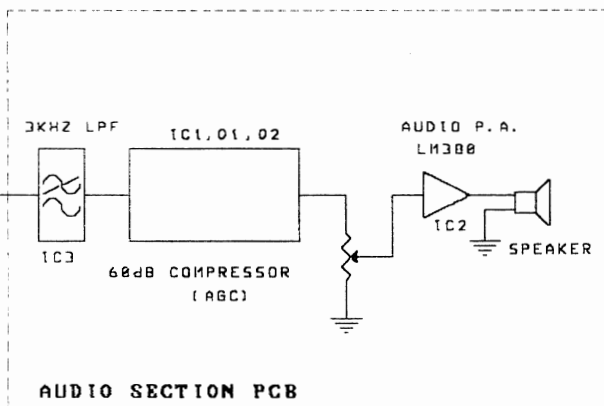
Signals from the antenna are coupled into the 3.5 MHz bandpass filter which passes the frequency range of 3.5 to 4 MHz. From the filter the signal feeds two mixers directly. Each mixer is also fed with a signal derived from a V.F.O. The bottom mixer is fed 90 degrees out of phase with the top mixer.

The resultant mixer outputs are simply audio, and the two audio signals are also 90 degrees apart. If these two signals were amplified and sent to different speakers, no difference could be

seen from the signal from two conventional direct conversion receivers. However if the audio signals which are already 90 degrees apart, are shifted a further 90 degrees and summed together, the resultant signal would either be a complete cancellation as in $90+90 = 180$ degrees, or a doubling of the audio voltage as in $90-90 = 0$ degrees, an in phase condition. This cancellation or reinforcement depends on whether the audio from the bottom mixer leads or lags that from the top mixer, and this in turn depends on which side band is being received.

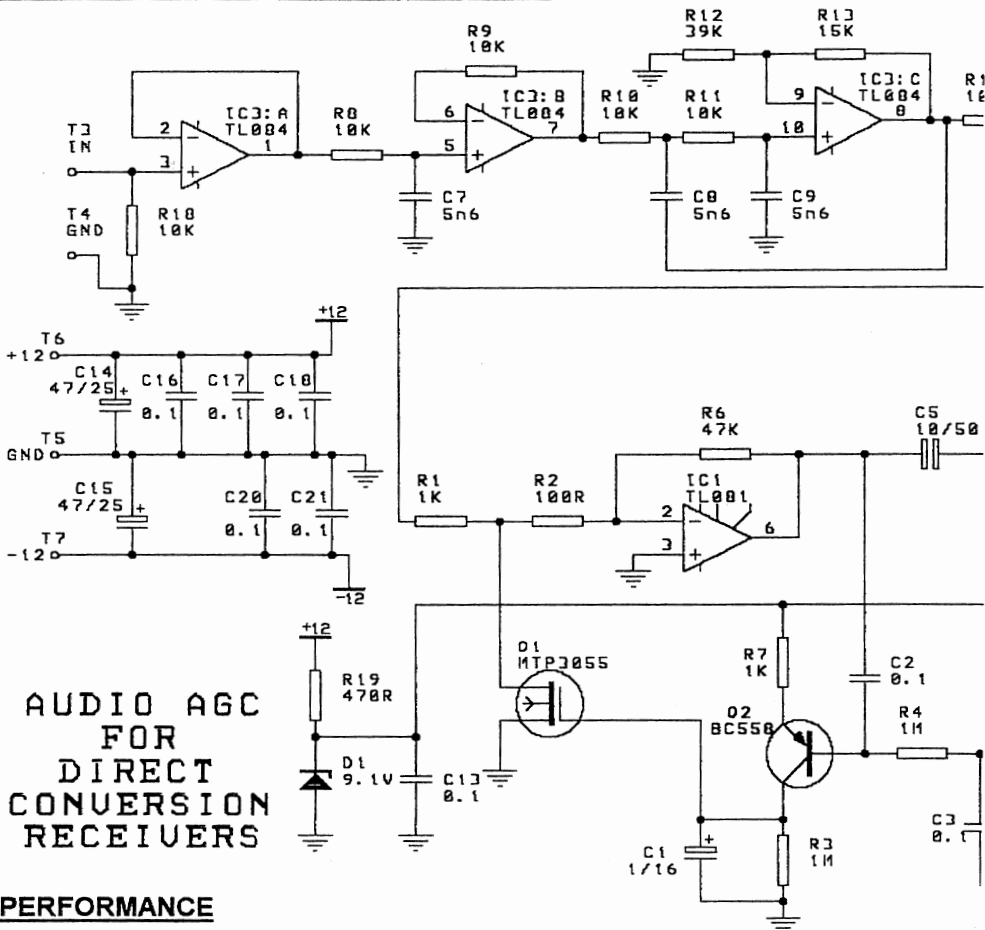
The desired sideband can be selected in two ways, either by reversal of the local oscillator connections to the mixers, or by reversing the audio connections within the polyphase audio phase shift network. The unwanted sideband is cancelled within the polyphase network which effectively sums the two audio channels as mentioned

above. The audio is fed from the polyphase network to the audio board, where it is further amplified, compressed, and filtered before emerging at the loudspeaker terminals.



OVERALL BLOCK DIAGRAM THE BEDFORD 80 METER SSB RECEIVER

THE AUDIO SECTION - CIRCUIT DIAGRAM



PERFORMANCE

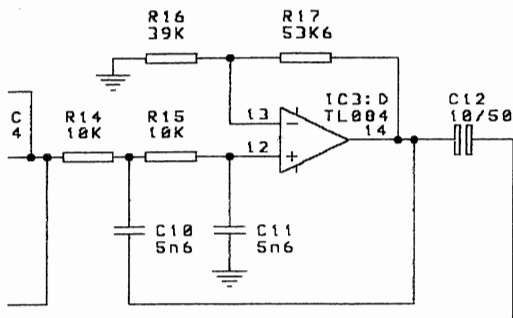
The receiver performs very well indeed and the sound quality from the speaker is pleasing to the ear. Sensitivity is good at 0.3 microvolts for a listenable signal. AGC action is excellent with a 60dB range.

DETAILED DESCRIPTION

This section is a self contained PCB measuring 107 x 37 mm. Both the **circuit diagram** and the **PCB overlay** are shown, and I hope that a kitset will

become available shortly. [Being considered, depending on level of interest - VK5AIL]

Audio feeds a voltage follower IC3:A, which has a very low output impedance which is required to feed the following active lowpass audio filter. The input impedance of the voltage follower is high to avoid loading any input likely to feed it. Resistor R18 can be made as high as 1 megohm if desired.



age divider and in a no-signal condition the resistance of Q1 is high, and does not inhibit any of the signal from entering IC1 which is set to have a voltage gain of approximately 43.

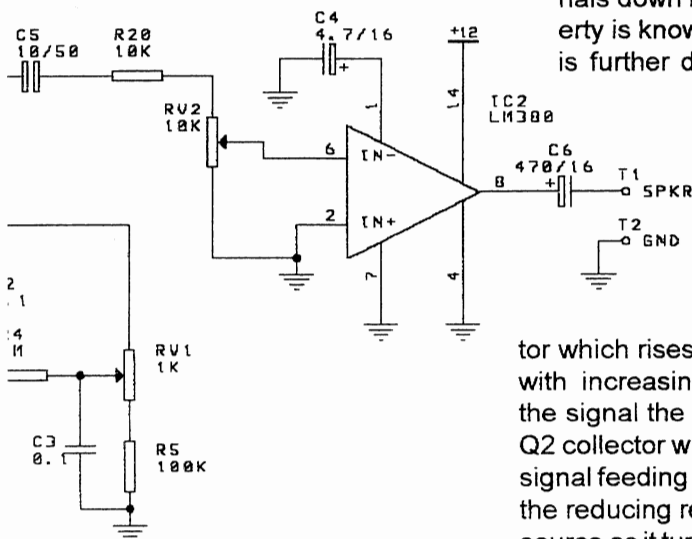
Output from IC1 feeds both the output amplifier IC2 and the AGC rectifier Q2. RV1 sets the AGC threshold, that is the amount of signal required to start the AGC action (you don't want AGC to act on signals down in the noise). This property is known as AGC delay. There is further delay because the gate

voltage of Q1 needs to be about 4 volts to start to turn it on. The signal from IC1 is rectified by the base emitter junction of Q2, and an amplified version appears at Q2 collector

which rises from 0 to about 5 volts with increasing signal. The stronger the signal the higher the voltage from Q2 collector which causes more of the signal feeding into R1 to be shunted by the reducing resistance of Q1 drain to source as it turns harder and harder on with increasing signal.

The net effect of this action is that above the AGC threshold there is virtually no increase in audio output level over a 60 dB increase in input range.

The compressor also needs to have two timing requirements. Firstly it needs a fast attack time to prevent sudden strong signals from overloading both the operator and the audio output stage. This time is set by R7 and the lower its value the faster is the



The audio filter was designed by **Richard VK6BRO** who has co-developed this receiver, and the Active Filter Cook Book was used for the design equations. This filter consists of IC3:B to IC3:D and is a 5 pole design having a good rolloff above 3 kHz.

From the filter the signal feeds the AGC compressor. This consists of IC1, Q1, Q2 and parts surrounding. The audio feeds the compressor via R1. Resistor R1 and FET Q1 form a volt-

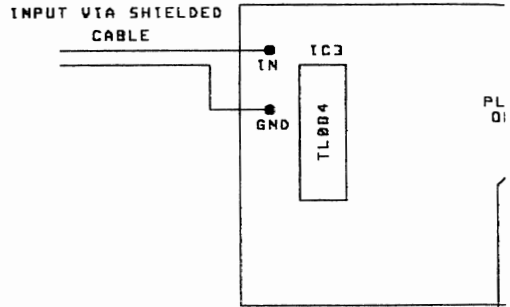
attack time. Secondly, a slow decay time is needed. This is to prevent the compressor affecting the individual audio cycles and distorting them. Resistor R3 sets this time by slowly discharging C1.

This concludes the description of the audio unit.

WIRING AND CONSTRUCTION

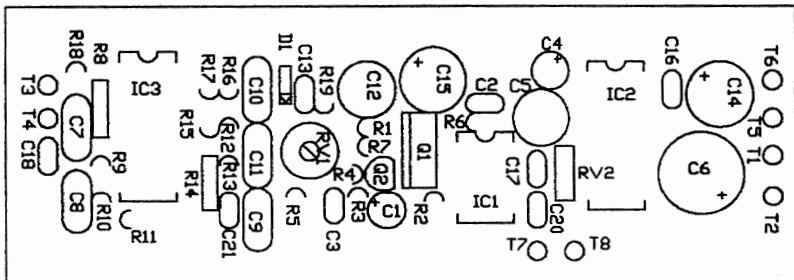
The prototype was built using a double sided pcb designed to have plated through holes. Simply solder in components where shown on the overlay and all should be well. Note however that RV2 is shown as a resistor on the overlay; this shows where to place the wires leading to an external volume control.

See also the **wiring diagram** which shows the locations of a couple of components not on the pcb. These components reduce the level of the signal feeding the output amplifier IC2.

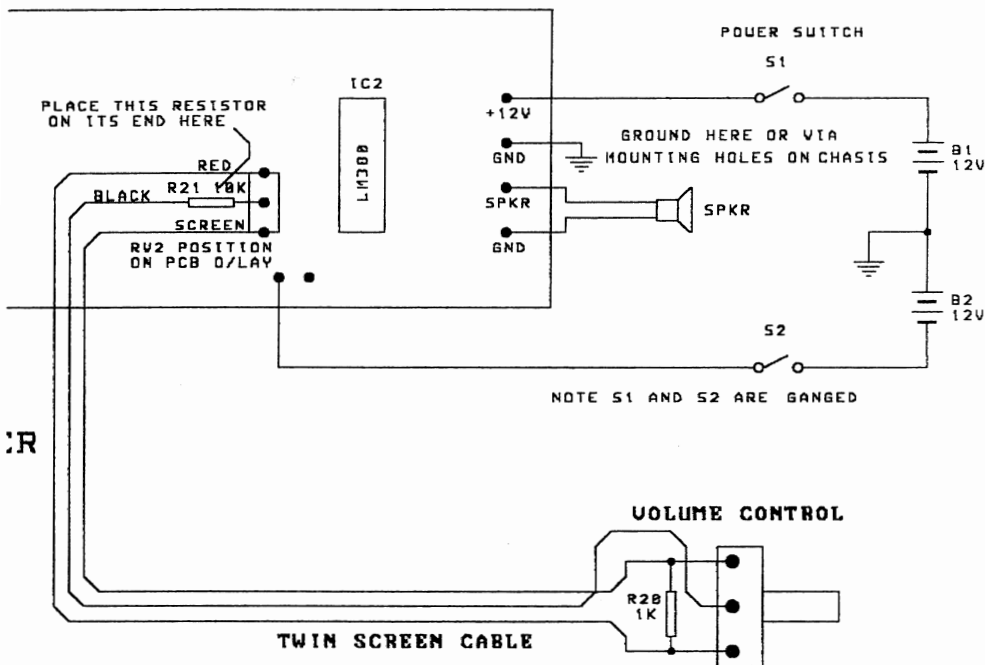


BEDFORD SSB RECEIVER

WIRING DIAGRAM FOR AUDIO AGG CARD



PCB COMPONENTS LAYOUT



NOTE S1 AND S2 ARE GANGED

SETTING UP

In my prototype RV1 was set so that the voltage on its wiper was the full zener voltage i.e. 0 volts from base to emitter of Q2. You need only adjust RV1 if you require a low audio input, in which case simply feed the desired audio level required for AGC onset and adjust RV1 for a voltage at the collector of Q1 to about 3V.

FINAL COMMENTS

Enquiries regarding the possible availability of kits should be directed to the club in the usual way. I am happy to answer technical queries personally and you may contact me either on telephone 09 271 7145 or write to me at my QTH 106 Rosebery St., Bedford, W.A. 6052.

*Best regards,
Rod Green VK6KRG.*

QRP



FROM THE EDITOR'S DESK



By Don Callow VK5AIL #76
5 Joyce St. Glengowrie SA 5044
Telephone (08) 295 8112 day/night

JUST GIVE ME THE FAX !

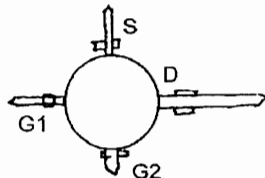
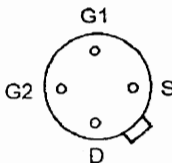
I have owned a Canon FAX-350 fax machine for several years and now have it in an accessible position and in use - at last ! This also means that you can use FAX to send urgent documents to me. There is no fax switch so a 'phone call will have to be made first, to the number above. Also, I have a large stock of Canon 2A4-50 210mm x 50m plain/carbon paper roll sets, so if you can use some let me know, as it is about half normal retail price.

ASAP Tx

Dave VK3DVB has provided some additional information regarding the ASAP - see June Lo-Key #42 page 15:

- The book from which I got the idea for the ASAP is The Transistor Radio Handbook by Stoner & Earnshaw, published by Editors & Engineers, New Augusta, Indiana U.S.A. (1963). See pages 136 & 137.

- The following fets and mosfets are all suitable:



UNDER VIEWS

BF244/5
TIS34
TIS88
2N3819

MPF102/3/4/5
2N5486

40673 BFR84
40481 3N201
MFE131 MFE121
2SK149 3N140/141

BF960
BF981

VISITING VK5 ?

If you are visiting Adelaide you are most welcome to call in to my QTH. Please 'phone first, although I am almost always at home as I am a full time carer for my XYL.

WORTH READING

The first article in VK6KRG Rod Green's series on a new receiver design is worth a careful read, as this should turn out to be a technically significant approach.

NEXT ISSUE

- The 'Canning' Rx - Peter Parker VK6BWI has come up with another practical homebrewing project: an HF Rx based on an AM car radio.

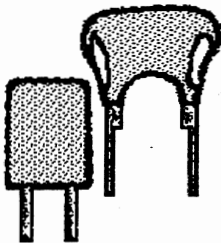
- Notes on the Z-Match (Lo-Key #42) from Michael Austin #332 SWL.

- Kit-sets and components complete price list - maybe December, maybe March !

- And quite a few other items we had no room for this time !

Best 72 *Don* VK5AIL





Some Experiences With 3.580 MHz Ceramic Resonators

Some Experimenter's Notes
Provided By Phil Carne VK3AAM
2731 Point Nepean Rd., RYE Victoria 3941

I built the circuit shown in Lo-Key #34 June '92 p.6 but found the amplifier (as built by me) not so good and the frequency too high for practical CW QRP. By paralleling the two sections of the gang capacitor I pulled the frequency down to 3.516.500. I then added a Standby Offset circuit, with three additional capacitors across the variable, their values being 47 pF, 56 pF & 33 pF.

When the offset is switched in, the frequency of the oscillator covers 3.513 MHz to 3.527 MHz. I fed this directly into VK3XU Drew Diamond's 80 Metre Amplifier (Amateur Radio Dec '91 p.12) and the rig has been used twice a week for S.P.A.R.C. QRP CW Nets and for the Club's Scrambles over the last two years. Furthest contacts were Wellington N.Z. and VK4. I have it running at about 3 watts.

After that experience I became interested in the circuit in Lo-Key #39 of September '93 p.12 and built up that oscillator. I didn't get the 120 MHz range of article's prototype, however, tests with 5 different ceramic resonators provided oscillator frequencies of:

- (1) 3.514.300 to 3.613.900
- (2) 3.517.200 to 3.607.800

- (3) 3.512.500 to 3.610.300
- (4) 3.514.400 to 3.615.200
- (5) 3.512.700 to 3.612.600.

I then altered the feedback capacitor from base to emitter from 330 pF to 680 pF leaving the emitter to earth capacitor at the 330 pF value. I then had a frequency range of 3.506.000 to 3.611.000. By adding a standby circuit offset with a further 47 pF across the tuning capacitor on transmit I achieved a range of 3.500.600 to 3.530.000.

This is adequate for the Drew Diamond doubler circuit, and the 40 metre amplifier. The rig delivers 2 watts on 40 metres, without chirp, and with a steady frequency. I did reduce the oscillator output coupling capacitor from 0.01 μ to 1.5 pF as for Drew's circuit in AR December '91 and included the MFE131 buffer before the doubler.

I think that it is easier to get a stable VFO using the Ceramic Resonator, in that shielding etc. is not difficult and there is less chance of frequency pulling by the amplifier. However they do have their limitations and the power supply needs to be regulated.

Hope these notes are of some interest to other homebrewers.

GDG

The Novisker 80m QRP Transceiver

Part 2: Optional Improvements



By: Ron Steinfeld VK3WHM #274

Introduction

This article presents some optional improvements which can be installed into the basic Novisker transceiver¹. Each improvement is mutually exclusive of the others so that the constructor can choose to install any combination that he wishes. I will therefore describe each improvement separately.

The main improvement offered is the addition of DSB voice transmission, which is compatible for communication with common SSB stations. The others are small circuits designed to improve the overall performance of the Novisker (e.g. Rx selectivity improvements).

The circuits are numbered as follows:

- 1 DSB voice transmission (about 5W PEP into 50 ohms).
- 2 Electronic Tx/Rx switching to enable:
 - * PTT microphone DSB operation.
 - * Semi Break-in (QSK) CW operation (adjustable delay time).
- 3 Rx audio bandpass filter (800 Hz) for CW.
- 4 Rx 'Pre-selection' RF filter (3.5 - 3.7 MHz).
- 5 Rx Switchable RF attenuators (3 - 21 dB).

Improvement 1: **DSB voice transmission**

This is the largest improvement and requires quite a lot of extra circuitry to be added. The original driver and P.A. are replaced by this circuit. The VFO output from C47 O.O.B (as in the schematic, O.O.B stands for 'On the Original Novisker Board') is injected to a diode balanced modulator which mixes the VFO carrier signal with the audio signal (from the microphone) to produce at the output (the rotor of trimpot RV1) the required DSB signal which contains the two modulation sidebands (upper and lower), but having the carrier (the VFO frequency) suppressed. RV1 is adjusted for maximum carrier suppression at the output.

The diodes are schottky types available at low cost from the CW Ops Club. A -6 dB 50 ohm attenuator follows the modulator to ensure a reasonably good 50 ohm resistive termination for the modulator.

Two broadband 50 ohm input-output power amplifiers (Q1,Q2) are then used to boost the signal power to a level suitable for driving the IRF510 MOSFET power amplifier (Q4). This stage is biased to a standing DC current of about 100 mA for operation at class AB, suitable for DSB transmission. The bias is adjusted by trimpot RV2 for a suitable saturation output power.

The supply of the P.A. is double decoupled first by L4 (primary), then by L5. L4 is a step-up transformer, matching Q4's drain impedance (12 ohms) to the Antenna/lowpass impedance level (50 ohms). A five element low-pass

filter (C16-19, L6,7) filters the RF output to suppress harmonics.

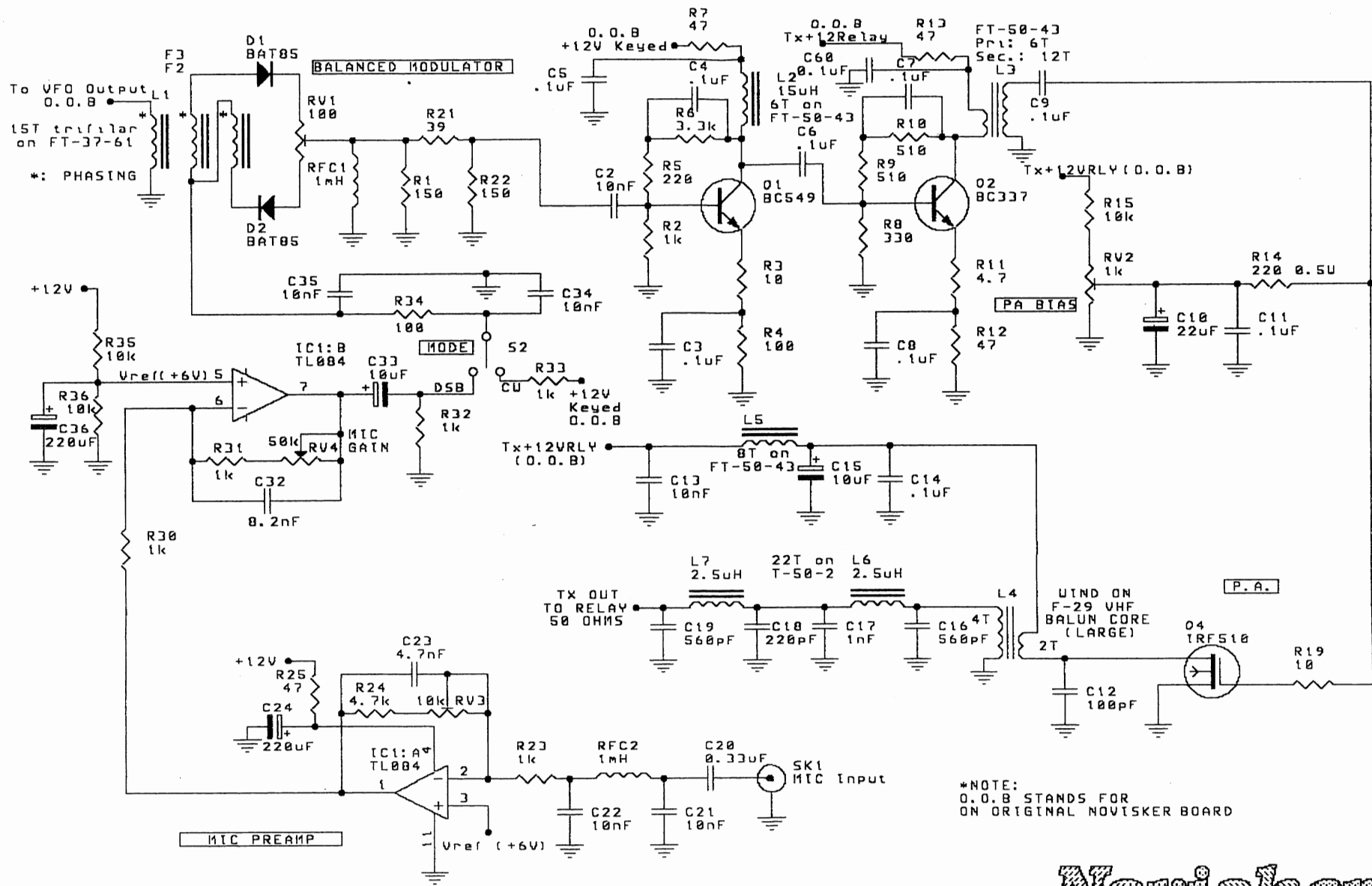
The microphone low level audio signal is amplified by op-amps IC1(A,B), the gain adjustable via MIC GAIN pot. RV4. Mode switch S2 selects the transmission mode. In CW mode, a +12V DC bias unbalances the balanced modulator when the key is pressed to allow the RF signal to go through, while attenuating the signal considerably when the key is up.

The supply voltage of the amplifier stage around Q1, is also keyed to ensure good RF suppression during key up periods. In DSB mode, the amplified microphone audio signal is applied to the balanced modulator, yielding a DSB signal at the wiper of RV1.

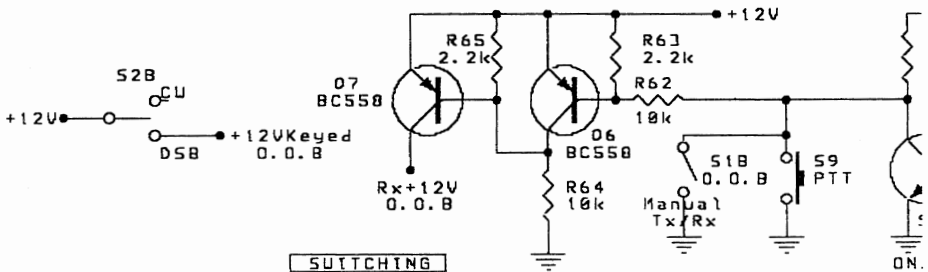
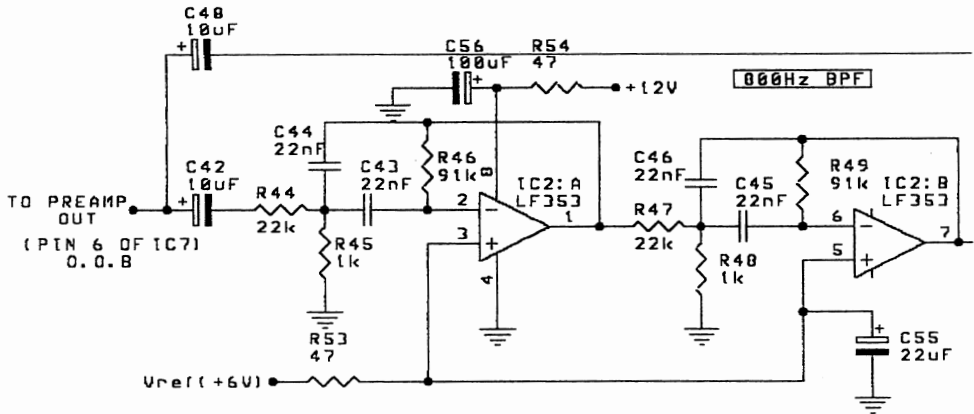
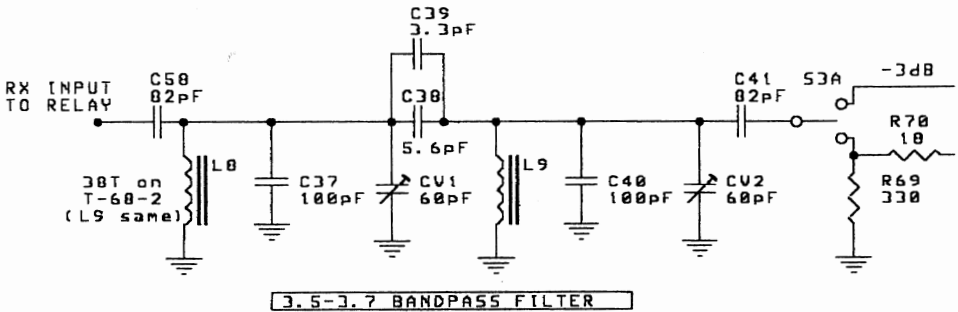
Adjustment:

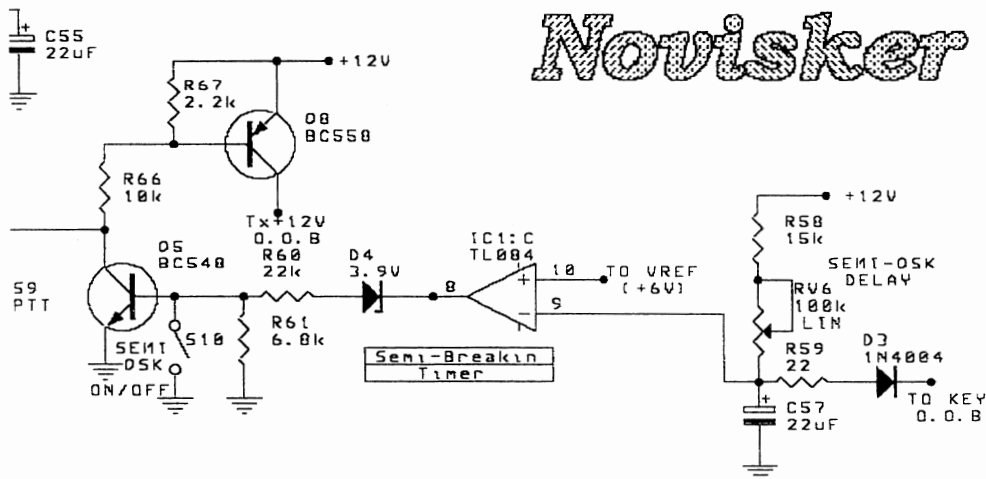
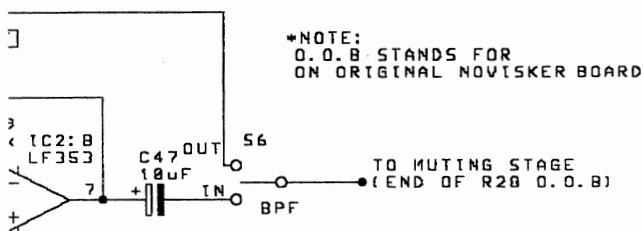
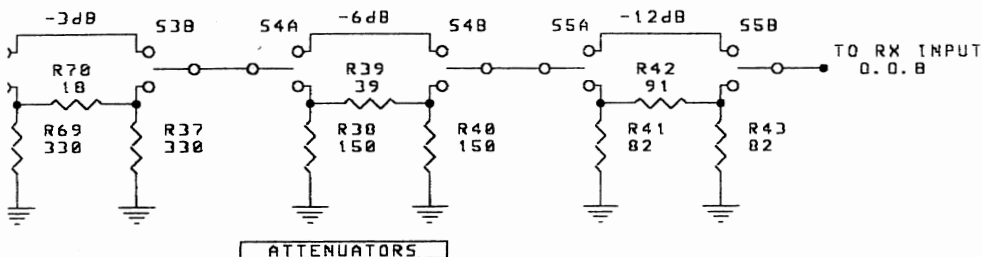
Connect a 50 ohm dummy load to the transmitter output, and measure the power output into the load using an oscilloscope, diode probe, or similar.

1. Begin with RV2 most anticlockwise and RV1,RV3, RV4 at mid-travel.
2. Switch S2 to 'CW' mode. Adjust RV2 clockwise (increasing bias) until output power is about 2.5W average (i.e. approx. 32V p-p). The standing DC current in Q4 should then be approx. 100 mA. Make sure Q4 is bolted to a suitably sized heatsink (a small 30 by 30 mm was sufficient in my case).
3. Switch S2 to 'DSB' mode. Short the MIC input (SK1) to ground. Adjust RV1 for minimum output power (should be very low - around 30 mV p-p).
4. Connect a microphone to SK1. RV3 and RV4 (MIC gain) should be adjust-



Novisker





ed so that the PA does not saturate while speaking to the microphone at a normal distance/intensity.

Note: The Tx output monitor meter used on O.O.B can be connected to the new Tx output. Depending on the output power, the current limiting resistor R63 may need to be increased.

Improvement 2: Electronic Tx/Rx Switching

This circuit replaces the mechanical SPDT changeover switch S1 in the original Novisker. This allows Tx/Rx switching via a simple SPST switch (S9) - allowing PTT microphone operation. Also, this enables a simple Semi-Break-in delay timer to switch Tx/Rx modes. Manual switching is also provided by S1B.

The circuit is based around three switching transistors. When S9 (PTT) is pressed bias is supplied to transistor Q8 which switches to its 'on' state thus providing +12V on the Tx +12V line. At the same time, Q6 is also turned on, supplying about 12V at Q7's base. This turns off Q7 so the +12V disappears from Rx +12V (Q7's collector). Thus the transceiver enters Tx mode (Tx +12V = 12V, Rx +12V = floating). When S9 is released, Q8 and Q6 are cut off, turning on Q7, and the transceiver enters Rx mode (Tx +12V = floating, Rx +12V = +12V).

The Semi-QSK timer is based around opamp IC1:C, used as a comparator. Normally, when the key is up for a long time, C57 charges to +12V. Thus, since the voltage at the '-' opamp

input is higher than the '+' input (connected permanently to a reference voltage of +6V), the output (pin 8) swings low, around +2V. This voltage is not enough to 'break down' the 3.9V Zener diode D4 which thus presents a high resistance. Transistor Q5 thus receives no base bias current and is in its 'off' state - corresponding to the Rx mode (unless this is overridden by the PTT or the manual switch).

When the key is pressed to begin transmission, C57 immediately discharges through R59, and the voltage across it drops to around zero volts. This causes the opamp output to swing high (the '+' input greater than the '-' input) to around 10V. The Zener diode breaks down, and base bias is supplied to Q5 which turns 'on'. This has the same effect as pressing the PTT button as described above, and the transceiver switches to Tx mode. As soon as the key is released, C57 begins to charge via R58 and RV6. The charging time constant is adjustable by pot. RV6, and determines the delay time from when the key is released to the time the transceiver switches back to Rx mode (variable in the range 0.3s to 2.5s). Switch S10 can be used to disable the Semi-QSK function by shorting the Q5 base to ground, keeping it permanently 'off'.

Improvement 3: Rx 800 Hz Audio Bandpass filter

The original Novisker uses a low-pass filter for CW reception. This allows easy tuning to zero beat for the transmitter to be on frequency. However-

er, once this has been done, and the RIT used to create a comfortable received audio tone, a bandpass filter at that frequency can be used to further enhance the adjacent frequency selectivity during severe QRM conditions. The circuit around IC2 gives a reasonably sharp peak at approx. 800 Hz and can be inserted in the Novisker audio 'chain' between the post-filter amplifier (IC7) and the muting/LM386 P.A. stage. The filter is very similar to one previously published in Lo-Key². It is switched in/out by switch S6.

Improvement 4: **RF Preselection filter (3.5 - 3.7 MHz)**

One minor but sometimes annoying problem in the original prototype of the Novisker Rx was broadcast band leak-through. In my area, the AM station 3MP (1377 kHz) is very strong and could be faintly heard in the earphones when receiving weak stations with the volume control up high. This reduced intelligibility of weak signals. A relatively simple solution was used. An extra 80m bandpass filter was added in front of the Rx to further reject strong out of band interference.

The filter is a two resonator Butterworth bandpass filter selected from a reference table³. Trimcaps CV1,2 are used to align the filter. This is done by tuning to a signal at 3.6 MHz and tuning CV1,2 alternately for a peak audio output. The audio output can be measured using a 'scope or an AC voltmeter for more accurate alignment than just 'tuning by ear'.

Improvement 5: **Rx switchable RF attenuators**

Another occasional problem which has been encountered while using the Novisker is overload of the Rx when very strong nearby stations are transmitting. This had two effects. When tuned to a different frequency than the interfering one, a distorted copy of the strong station could be heard in the background - effectively adding QRM. When attempting to tune to the strong station, the amplifiers saturate and the signal is distorted.

These effects were reduced by installing switchable RF attenuators in front of the Rx. When an overload problem occurs some attenuation can be switched in., as necessary. Three attenuator sections were used, giving 3, 6, 12 dB attenuation each. It is thus possible to have any attenuation between 0 - 21 dB in 3 dB steps, depending on what combination is selected. The attenuator resistors were soldered directly on the DPDT slide switches, short wire used between the switches.

References

1. Steinfeld R. "The Novisker 80m QRP Transceiver", Lo-Key March 1994, No. 41, pp. 9-18.
2. Callow D. (Circuit by Smith I.) "Audio Filter for CW Rx", Lo-Key June 1993, No. 38, pp. 12-13.
3. Hayward W. and DeMaw D. "Solid State Design for the Radio Amateur", ARRL, 1986, pp. 237-241.



AWARDS AND CONTESTS

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

Greetings to all Members!

How the year is getting away – Winter is very much with us and, according to the logs that you send, so is the QRN.

My sincere thanks once again to those who have shown continued support for the monthly Scrambles; also the QRP Weekend. **Ron Everingham VK4EV** will report on that event elsewhere, but on behalf of the Club thanks **Ron** for a job well done.

Not very high-scoring contests these, but really good to see a new callsign, **Stephen VK2SPS**, in there. Surely, Members, there are more of us who can make an effort to participate on these special occasions. After all, the way things are, *you* may be the winner!

I know that Winter doesn't induce one to sit huddled over a key and a pair of earphones, so with that and the high QRN levels I have programmed only two Scrambles in the Spring Quarter:



SCRAMBLE RESULTS

Scramble #37 4 May 1994 40m
1 **VK2WES Wes #162** 1 point

Scramble #38 23 June 1994 80m
1 **VK3AAM Phil #224** 17 points
2 **VK2WES Wes #162** 12 "
3 **VK2SPS Stephen #363** 5 "

Scramble #39 13 July 1994 80m
1 **VK4EV Ron #130** 5 points
2 **VK2WES Wes #162** 2 "

#41 Wednesday October 19th
80 metres 1030-1200 UTC

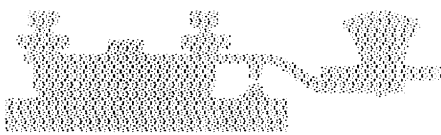
#42 Thursday November 3rd
20 metres 1030-1300 UTC

So PLEASE write these down now and make the BIG EFFORT to join in. (Perhaps if I get around to retiring I'll be able to practise what I preach.) Rules are as in Lo-Key September 1993, p.9.

Keep the bias well adjusted and those carriers emitting – the finals love it!

73, *Ian* VK3DID #112

GGC





QRP CW WEEKEND CONTEST RESULTS

By Ron Everingham VK4EV #130
30 Hunter St., EVERTON PARK Queensland 4053

It is very pleasing to report that our first QRP Weekend appears to have been a great success!

After checking the received log sheets, I estimate that over 40 QRP stations were active during part of the weekend.

A lot of QRO stations also joined in and gave out numbers and signal reports. Maybe they have now seen what can be done with QRP power and will try a bit of low power operation for

themselves.

From some of the reports I received, I think it has been a worthwhile exercise and should help to get the message across that QRP can be very interesting. THANKYOU TO ALL THOSE QRP STATIONS WHO TOOK THE TROUBLE TO SEND IN THEIR LOGS and also THANKS to Ivor VK3XB and Mavis VK3KS who both operated QRO but submitted a check log of their QRP contacts.

LOGS RECEIVED:

| | | | |
|------------|---------|-----|--------|
| VK7LF/QRP | Tom | 214 | points |
| VK3WAC/QRP | Ross | 207 | " |
| VK2EVD/QRP | Vik | 128 | " |
| VK2RJ/QRP | Les | 123 | " |
| VK2WES/QRP | Wes | 121 | " |
| VK2FKE/QRP | Bill | 93 | " |
| ZL1ATW/QRP | Matt | 77 | " |
| VK4EV/QRP | Ron | 54 | " |
| VK4RE/QRP | Roy | 48 | " |
| VK2SPS/QRP | Stephen | 31 | " |
| VK2CW/QRP | Greg | 22 | " |

Certificates

1st Place and Highest Score VK7
2nd Place and Highest Score VK3
3rd Place and Highest Score VK2

Highest Score ZL
Highest Score VK4



Congratulations to the placegetters. Also, special mention must be

made of the mammoth QRP efforts of Tom VK7LF and Ross VK3WAC.

73s Ron VK4EV #130



The Simple Electronic Keyer - At Least 555 More Words

Collected
By Don
VK5AIL

Short Form Kit-Set

The keyer featured on page 12/13 of Lo-Key #42 has been a popular project since the circuit was published in *Solid State Design for the Radio Amateur*. Several members have asked if we could supply parts so they could try out this circuit. We organised a short form kit-set, our K018, including all circuit components and a prototype board DSE Cat. No. H-5660 (worth \$5.25). Price is \$15 plus \$4 post/pack.

If you cannot locate components, see QRP Kit-Set Centre column where we list some timer IC's.

VK7LF Tom's Version

Tom van Andel VK7LF has sent in some constructional details that should help if you are intending to build the keyer on a printed circuit board.

"These sketches (on opposite page) are of the electronic keyer which appeared in Lo-Key #42, together with my '50 cent special' paddle. The whole unit is made out of recycled bits & pieces like an old cheese drawer out of a fridge, an aluminium faceplate off the freezer compartment door in an old fridge, part of an old VCR cover and old bits of aluminium for the paddle. The box is spray painted and looks nice.

I've had fun building the keyer and even more fun using it. The homebrew paddle works well and was made because I didn't see the point in spending over \$100 when I could do it for \$1 - or less. Anyway, here it is! I think that's what homebrewing is all about."

A Variation by Rick Littlefield K1BQT

I recently found a K1BQT variation of the original *Solid State Design* circuit. It appeared in *Ham Radio* January 1990 (p.72). Rick's version, named the QRP TLC-Keyer, was designed for a QRP DXpedition, so he took special care to keep size, weight and current drain to a minimum. He used TLC555 IC, a CMOS equivalent to the NE555, and reduced current to only 1.4 mA from a 9V battery. The keyer was built into a case with a homebrew paddle. Output was via a reed relay connected between the positive supply rail and the collector of the output transistor.

The 1994/95 Dick Smith Electronics catalogue lists TL555CP/ICM7555 as a single CMOS timer for \$2.95 (cat. Z-6144). Our Kit-Set Centre has suitable NEC enclosed reed relays, miniature type, for \$1.80 a pair (cat. C067).

Ten-Tec Kit

Fred Bonavita W5QJM tells us that: "Ten-Tec in the U.S.A. produce a kitset based on the Solid State Design circuit. T-T has taken this a step further by using the NE556, the dual CMOS version of the old, reliable NE555 timer. T-T takes things even further by saying the TLC556 may be substituted for the NE556 for a much lower standby current drain, something always of concern to QRP'ers. And, if that's not enough, there's the even-newer TLC556CN. I hesitate to ask whether anything else has come along!

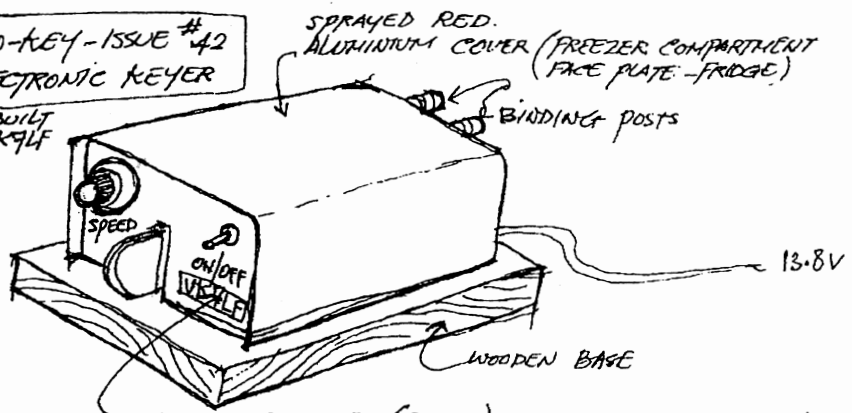
The T-T kit sells for \$US 9.00, plus shipping. The address is T-Kits, 1185 Dolly Parton Parkway, Sevierville, Tennessee 37862 U.S.A."

By the way, the circuit uses 1/2 of a 556 to produce sidetone.

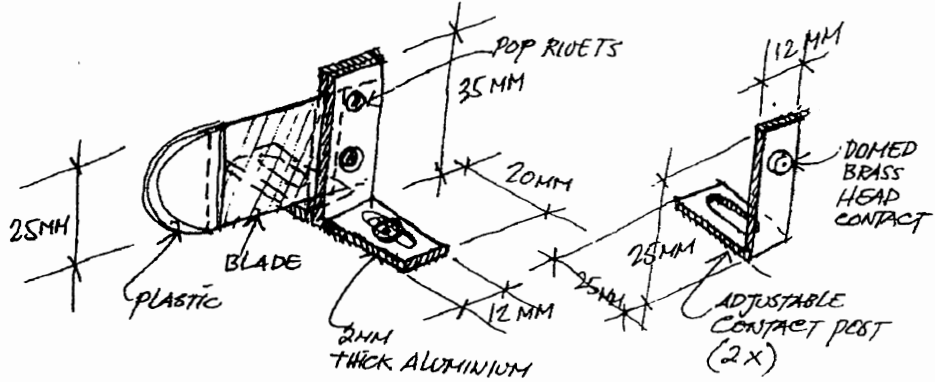
VK7LF Tom's Version (See p.24)

Lo-Key-Issue #42
ELECTRONIC KEYS

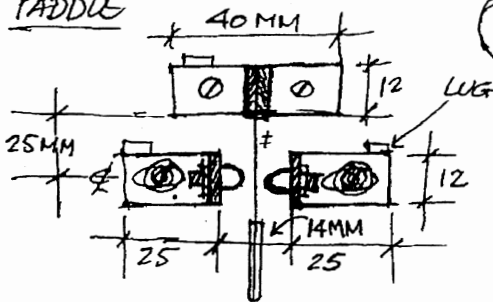
As BUILT
BY VK7LF



FRONT & REAR — OLD CHEESE DRAWER (FRIDGE) RECYCLED - SPRAYED BLACK
PADDLE & KEYS



PADDLE



" THE VK7LF/QRP
50CENT PADDLE!! "

VK7LF/QRP
RSD 556 DILLONS HILL RD.
GLAZIERS BAY
TASMANIA 7112

PLAN

‡ Paddle arm material is light spring steel, similar to old-style razor blade.

ELECTRONIC KEYER

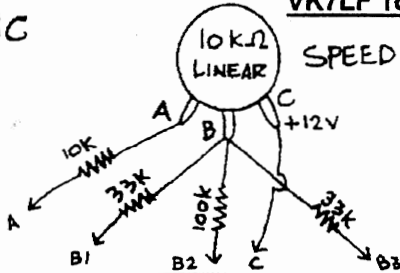
LOKEY #42
JUNE 94.

VK7LF Tom's Version (See p.24)

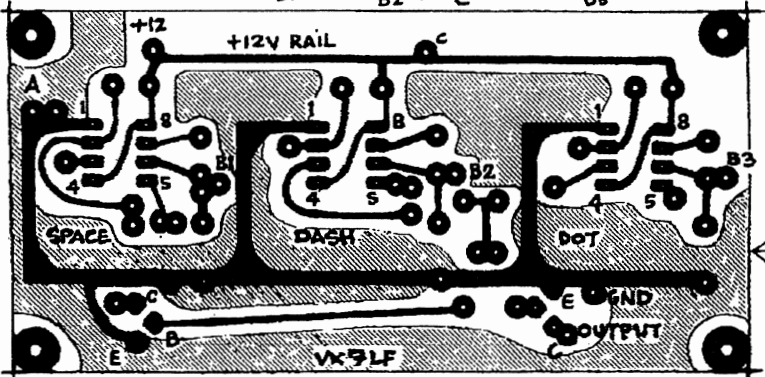
SPEED CONTROL

BLANK SIDE.

3D12 J107



10 mm



A - POT GND
B - WIPER
C - POT +12V

← ALTERNATE
GND FOIL
SHAPE SHOWN
SHADED

2N3565 (BC 108)
BC 208
BC 548



TO-106
CASE

BOTTOM

SPEED CONTROL

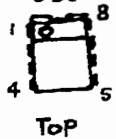
2N3053 (BD137)



TO-39
CASE

BOTTOM

555

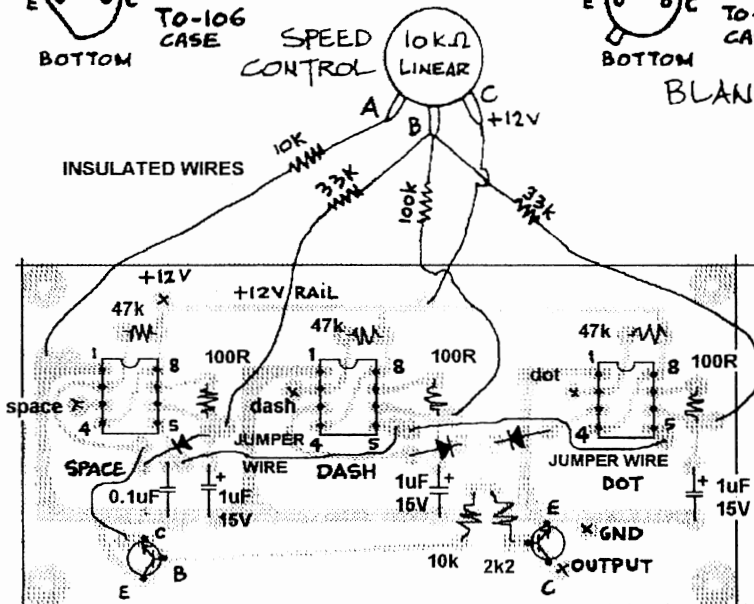


TO-39
CASE

TOP

BLANK SIDE.

INSULATED WIRES



A - POT GND
B - WIPER
C - POT +12V

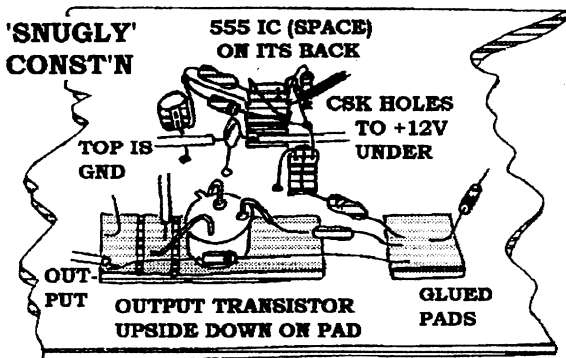
VK5AIL's First Keyer !

Mine has been built using what I call **SNUGLY** construction - Slightly Neat **UGLY** construction. I draw a layout on computer first to try to achieve a reasonably neat, efficient layout. See sketches of several aspects of the end result. The components are mounted on double-sided PCB stock by gluing them 'upside-down', with either Super-Glue or just held in place with Blue Tack. Most component cases have to be insulated from the ground plane of course. Where necessary, small pieces of PCB stock are stuck on to support wiring junctions, a method suggested by Peter **VK6BW1**. The top copper

layer is the ground plane and the underneath copper (or at least a large section of it) is used as the 12V supply 'rail'. No etching is necessary but holes are drilled and countersunk where necessary, to get to the 12V copper.

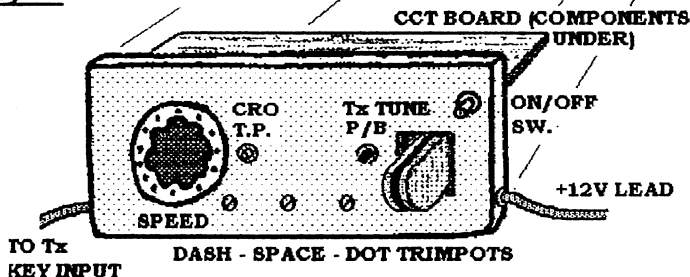
I left plenty of board area and space in the case for additional circuitry and experimentation. Enclosed 100k trimpots were glued to the inside of the front panel so that Dot, Dash (with a 47k resistor in series with the trimpot) and Space could be adjusted from the front panel.

The keyer draws around 20 - 22 mA when in or out of use. There are two firsts here for me: first keyer built and first used.



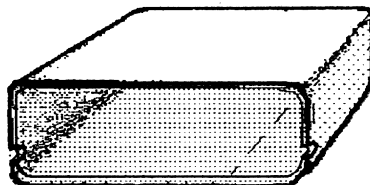
EVERYTHING IS MOUNTED ON FRONT PANEL

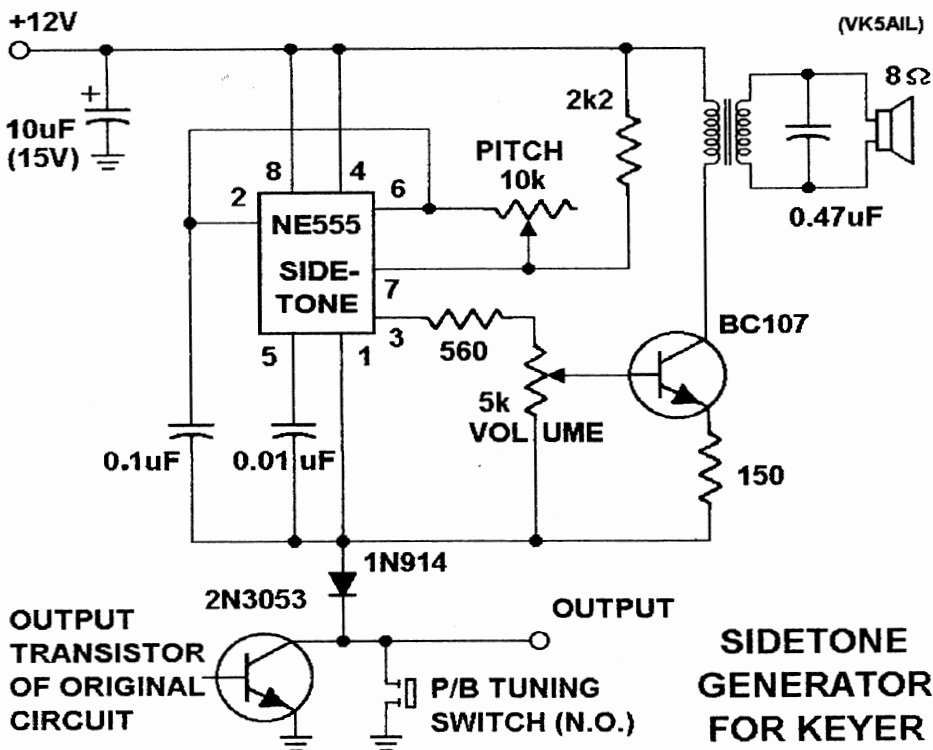
VK5AIL's First Keyer !



p.s. I used mine for the first time on VK2CWH's CW Net one night in August. Sorry Ted - terrible CW, due to the operator, not the equipment. I thought electronic keyers were supposed to make it easier - **Not So !**

Continued over ...





Need Sidetone ?

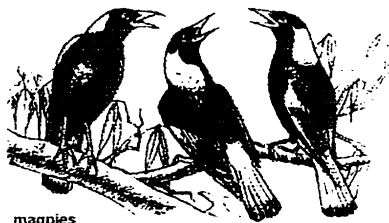
References

A variation on the 555 theme exists in an article by Mike Hadley G4JXX which appeared in the British magazine *Amateur Radio*⁴. Mike adapted the original S.S.D. circuit by adding a fourth 555 timer IC to give sidetone. See 'Sidetone Generator' circuit diagram at top of this page, This diagram has been drawn to be read in conjunction with the original schematic as shown in Reference No. 1. It shows the connection to the output transistor; also shown is a handy N.O. switch for tuning up the rig.

- 1 *Lo-Key* #42 June 1994 p.12 'Simple Electronic Keyer Using 555 Timers' by Len McGowan VK4CWM.
- 2 *Solid State Design for the Radio Amateur* (ARRL) p.178 by Wes Hayward W7ZOI & Doug DeMaw W1FB.
- 3 *Ham Radio* January 1990 p.72 'The QRP TLC-Keyer' by Rick Littlefield K1BQT.
- 4 *Amateur Radio* (British) April 1984 p.58 'Build an Electronic Keyer' by Mike Hadley G4JXX.



CLUBTIVITIES



magpies

ANOTHER ONE ON AIR !


Some good news from **Peter Walters**, Member #299. Peter is now **VK3MAW**, so watch out for this callsign !

V K 4 C M Y


QRP

K
5
H
P

"Thunder from Down Under!"



VK QRP CLUB NO. 221
ENACTS NO. 1464



DR "DOC" MESCOMBE-DOWN
PO BOX 34
DALVEEN QLD 4574
AUSTRALIA

DOC'S DX

Here's an extract from a recent letter from 'Doc' **VK4CMY/VK5HP**:-

"I'm still QRP, 20 years of it and 11,000+ QSOs, all CW, with DXCC on 20m from 3 different QTH - Christies Beach (A south-eastern suburb of Adelaide - **VK5AIL**), Whyalla and now up here in Queensland.

Current rigs are HW8, IC710 geared down, and Argonaut 509. Not being on mainspower, I operate from an 11 plate auto battery. Antennas are 66 ft 80m GP, 33 ft 40/20m GP, all with 120 half wave radials for 80m (i.e. 133 ft long = 5 km wire) plus 2 ele quad for 20/15 nearly finished. We live on top of a hill 915 m above sea level - a near perfect takeoff. All verticals are fed 4 m up off the ground to clear fences, garages etc." (red card) 

NATTER NET NOTES



By Steve **VK5AIM**

My, how time flies; here we are with the notes for the third quarter of the year and it only seems a little while ago that I was writing the first notes for 1994 !

I am still disappointed in the number of members we get on the 80m Friday night Natter Net. Over 300 members (most in VK) on the membership list and we only get 4, yes four (!), on some nights. Not good ! Sure, some members do odd shifts with their work, some like the VK6's have a hard time making it all the way across the Bight, but take a look at the call areas distribution of the membership list. A quick check shows:-

VK1 = 2 VK2 = 62 VK3 = 89 VK4 = 22

VK5 = 25 VK6 = 24 VK7 = 12 VK8 = 1

That totals nearly 250 members; the other 50 or so are SWL's or overseas members. Where are you all on a Friday night? Sure, on some nights 80 is a load of "Crashes & Bangs", but other nights the ZL & Asian stations are a 5/7-8. With the sunspot numbers so low 80 should be even better.

When you get so low a number on the Net it makes you wonder if it is all worth it !

On a happier note, on the Natter Net of 10th June, when Murray **VK3EZM** ran the net, we had:-

VK2ADW Dennis VK2KW Alan

Continued over ...

FOR SALE

(1) **AMATEUR'S DELIGHT! 10.3 Ha (25.5 acres) PRIME MOUNTAIN PASTURE** 15 MINS STANTHORPE, 25 MINS WARWICK, 2.5 HRS GOLD COAST & BRISBANE, 915m ALTITUDE WITH TEMPERATE CLIMATE, **3 BR BRICK HOME** 18 MTHS OLD ON SLAB, 6x6 GARAGE ON SLAB, FULLY FENCED PLUS 2 ACRE HOUSE Paddock FENCED, 20 x 20m ORGANIC VEGIE GARDEN ON RECYCLED DOMESTIC WATER, BITUMEN ROAD, SCHOOL BUS, RATES #250 p.a. 80/40 AND 40/20m GROUND PLANE AERIALS WITH 4.5 km OF COUNTERPOISE RADIAL SYSTEM. GREAT TAKE OFF AND FABULOUS 180° VIEWS. NATURAL MOSS ROCK OUTCROPS, 4 DAMS, 5000 GAL. RAINWATER PLUS SPARE TANK-STAND, TREES etc. **\$136,000 negotiable 'Doc' WESCOMBE-DOWN VK4CMY/ VK5HP 076 852167 Home.**

(2) **QRP TXCVR HEATHKIT HW-8**, 80-15m, 3W INPUT, AS NEW AND MANUAL SUPPLIED; GREAT PERFORMER AND SUITS PORTABLE, MARINE OR HOME STATION USE. BEST OFFER.

(3) **HOME BREW Tx**, GELOSO VFO, 6146 FINAL, A TOUCH OF YESTERYEAR, ANY OFFERS ?

(4) **HEATHKIT CAPACITANCE BRIDGE MODEL IT-11** CAPACITANCE 5 RANGES: 10µF TO 0.005µF; 0.001µF TO 0.5µF; 0.1µF TO 50µF; 20µF TO 1000µF; EXTERNAL STANDARD (MAX. 25:1 RATIO COMPARISON BRIDGE) RESISTANCE 4 RANGES: 5W TO 5kW; 500W TO 500kW; 50kW TO 50MW; EXTERNAL STANDARD (MAX. 25:1 COMPARISON BRIDGE). MEASURES 10x7x5 INCHES; WEIGHS 3 kg; MANUAL SUPPLIED. BEST OFFER.

**'Doc' WESCOMBE-DOWN VK4CMY/VK5HP
PO Box 24 DALVEEN Queensland 4374**

Natter Net (continued) ...

| | |
|---------------|--------------|
| VK3BPG Reg | VK3CTM Tony |
| VK3GDM | VK4LDJ David |
| VK5AIL Don | VK5AIM Steve |
| VK5BZ Brenton | VK5BLS Barry |
| VK6BWI (& CW) | VK7KDM David |
| ZL1AWR Hal | |

A good round up !

On another night when it was my turn we had:-

| | |
|--------------|---------------|
| VK2ACN Alan | VK2ADW Dennis |
| VK3BPG Reg | VK5AIL Don |
| VK5AIM Steve | VK5BZ Brenton |
| VK5BLS Barry | VK5YY John |
| VK6BWI Peter | VK7KDM David |
| VK7LF Tom | |

You can see the regulars who support this net, but where are the rest of the Members ? There are about 13 'regulars' - maybe 13 is the Unlucky Number ?

I am getting to the stage that if it is not my turn to take the net I will just sit and listen and see how many come up, and if only 2 or 3 I will switch off and do something constructive on the work bench !

That's all for now, I've had my stir, so please give it a try some Friday evening. You know with 250 VK's and 50 Fridays in the year you only need to come up 5 times in the year !

C'mon, give it a go ...

Steve Steve VK5AIM



VALVES FOR SALE

Brenton Zerbe VK6BZ 5 Chelmsford Grove, Andrews Farm SA 5114

| | | | | | | | |
|-------|--------|-------|--------|-------|------|------|------|
| 1T4 | 1N8 | 1S2A | 6DL5 | 6AV6 | 6AR5 | 6U8 | 6DJ8 |
| 6EW6 | 6CQ6 | 6AL5 | 6BJ6 | 6CG8A | 6KV8 | 5879 | 6EH7 |
| 6GS8 | 6CS4 | 6EJ7 | 6AW8A | 6AM6 | 6AK5 | 6DT6 | 6JS6 |
| 6U8 | 6ES6 | 6BQ5 | 6AU6 | 6JW6 | 6AW5 | 6CS6 | 6BA6 |
| 6AE8 | 6AT6 | 6X9 | 6CB6 | 6BL8 | 6AN8 | 6AT6 | 6HG8 |
| 6BJ5 | 6X4 | 6EB8 | 6BY7 | 6AS8 | 6CL6 | 6CQ8 | 6BZ6 |
| 6AL5 | 6GV8 | *6CW7 | 6BN6 | 6J6A | 6BM8 | 6BX6 | 6AL3 |
| 6BE7 | 6CW5 | 6Y9 | 6CU5 | 6GU7 | 6BV7 | 6DR6 | 6ES8 |
| 6J7 | 6H6 | 6GV8 | 6DX8 | 6AS6 | 6V4 | 6AQ5 | 6CJ6 |
| 6CM7 | 6GJ7 | 6GM6 | 6T8A | 6JT8 | 6C4 | 6AM8 | 6AQ8 |
| *6CZ5 | 6LF8 | 6AU8 | 6DS8 | 6BN4A | 6KZ8 | 6KA8 | 6J8 |
| 6KM6 | # 6HF5 | 6CA7 | § 6BW6 | 6CM5 | 6L6 | 6SN7 | 6J7 |
| 6FM7 | 6DQ6 | 6H6 | 6AR5 | 6DQ5 | 6EM7 | 6AG5 | |

| | | | | | | | |
|--------------------------|--------|--------|------|-------|---------|-------|---------|
| 6GV8A | 6SL7GT | 6J5GT | 6J7G | 6U7G | 6G8G | 6L7GT | 6SN7GTA |
| 6AX5GT | 6SJ7GT | 6AS7GT | 6F6G | 6JB6A | 6CZ6045 | 5Y3GT | 6JM6A |
| NUVISTOR 239 & 7586/6CW4 | | | | | | | |

| | | | | | |
|-------|--------|----------|--------|-------|--------|
| 12BE6 | 12AH8 | 12J8 | 12AO5 | 12AT6 | 12AU7A |
| 12BA6 | 12K5 | 12SN7GTA | 12K7GT | 12BH7 | 12AT7 |
| 12HG7 | 12AZ7A | 12DQB | 12AX7 | 12AV6 | 12GN7A |

| | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|---------|
| 17Z3 | EY51 | EL95 | R17 | 3GK5 | 50EH6 | 1X2B | 21A6 |
| 3A5 | EL84 | E80L | EY91 | 35W4 | E88C | 5879 | 2E26 |
| 35Z4GT | 35L6GT | EF92 | OA3 | EF86 | E88C | EF184 | 25L6GT |
| 16A5 | 85A2 | 6939 | 1X28 | W3747 | 2AV2 | 4HA5 | 1BQ2 |
| 4BZ6 | 5U8 | 18GV8 | 1BQ2 | 3BZ6 | 1BC2 | 35C5 | 829B |
| 866A | AV44 | EBF35 | 1P5GT | *5AS4 | VP23 | DL70 | 3GK5 |
| E55L | 5R4GBY | *5U4GB | EAC91 | EL81/L | 1BC2 | LC801 | 5LJ8 |
| 19T8 | 4HA5 | 50EH5 | 18GV8 | 5KE8 | 7025 | 2050 | 5U46B |
| OC3 | 807 | N359 | 7027A | N339 | DT70 | 22JF6A | 1B3GT |
| 1D21 | EA50 | 17JZ8 | VX8125 | 1N5GT | L63 | M8204 | PL509 |
| VLS631 | Z700U | 90AG | ORP90 | 90AV | ZA1002 | OD3 | GTE175M |

| | | | |
|--------------|----------------|------------------|----------------|
| W61=6U7G | 6CJ3=DW4B=6CL4 | 6GW6=6DQ6B | *5AR4=GZ34 |
| 6BK4C=6EL4A | 6AU4GTA=6DE4 | 6EM7=6EA7 (=2) | 6CG3=6CE3=6CD3 |
| VT112=6AC7 | VT87=6L7 | VT135=12J5GT | 3HM5=3HA5 |
| 6CG7=6FQ7 | 6HM5=6HA5 | PCC189=7ES8 (=1) | ECH84=6JX8 |
| 3AW3=3A3 | ECC88=6DJ8 | 6BC8=6BZ8 | 6DZ4=6AF4A |
| 6BQ7A=6DZ7 | PCF200 | PCF201 | PCL84=15DQ8 |
| PL82=16A8 | 6EM7=6EA7 | PL81=21A6 | PL84=15CW5 |
| PHILIPS 5684 | VT864=6KG7G | | |

| | | | | | | |
|--------|--------|--------|--------|-------|--------|--------|
| C1144 | CV1198 | CV2253 | CV4014 | CV138 | CV4007 | CV4024 |
| CV4048 | CV4055 | CV287 | CV2171 | CV140 | CV261 | CV2134 |
| CV4006 | CV2209 | CV2253 | CV2127 | CV469 | CV850 | |

QEO8/200 (Offers \$??) QQVO3/20 QQEO3/20 VIBRATOR UNIT V6524

All valves are new, to the best of my knowledge.

Price \$3:00 each, unless otherwise stated. Add \$3:00 per order for shipping.

§ 6BW6 \$20:00 # 6HF5 \$15:00 * 6CZ5 6CW7 5AR4 5U4GB 5AS4 \$5:00

POSITIONS

President: Barry Samuel VK5BLS #209
P.O. Box 158 GUMERACHA SA 5233
Membership enquiries. General matters.
Boomerang Circuit Books.

Treasurer & Secretary:

Kevin Zietz VK5AKZ #43

41 Tobruk Ave. St Marys SA 5042

VK5AKZ@VK5TTY.#ADL.#SA.AUS.OC

Membership applications and subscrip-
tions. Changes of address, callsign etc.

Editor of Lo-Key: Don Callow VK5AIL #75

5 Joyce St. Glengowrie SA 5044

Items for Lo-Key. Kit-set & component
orders & payments.

(08) 295 8112 - day/night

GENERAL INFORMATION

Annual Subscriptions: Due January.

Ordinary: VK \$A 10; N.Z. \$A 12; DX \$A 14

Council: VK \$A 15; N.Z. \$A 18; DX \$A 21

Lo-Key: Our quarterly journal, posted mid-

March, June, September & December

ARTICLES ALWAYS WELCOME

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

Photocopy or cut along this line

Please post this application to:

Kevin Zietz VK5AKZ

41 Tobruk Ave.

ST MARYS SA 5042

Australia

Please print

FIRST NAME

SURNAME

CALL SIGN

ADDRESS

L-K #43 September 1994

QRP calling frequencies:

1 815 3 530 7 030 10 106

14 060 21 060 28 060 kHz

§ SCRAMBLES §

Awards & Contents Manager

Ian Godsil VK3DID #112

25 Monaco St. Parkdale Vic. 3194

#41 80m - Wednesday 19 Oct '94

#42 20m - Thursday 3 Nov '94

More details on page 22

Rules in Sep '93 Lo-Key #39 p.9

§ CW NET (QRP) §

Net Controller: Ted Daniels VK2CWH

Tuesday evenings

From 0930 UTC & Summer 0845 UTC

3529 kHz (lower if QRM)

Call: CQ CW OPS/QRP DE VK2CWH/QRP K

QRP power used - 5W maximum to antenna

§ SSB 'NATTER NET' §

Controllers: Steve VK5AIM's roster

Friday evenings

From 1030 UTC

& Summer 0930 UTC

3620kHz ±QRM

I apply for Ordinary Membership of the
CW Operators' QRP Club Inc.

Enclosed is the annual membership fee of:

\$A10 for VK Members, or

\$A12 for ZL Members, or

\$A14 for DX Members.

I agree to these details being held on the
Club's data base and published.

I DO AGREE to publishing of my street
name and house number. (If not, write
'NOT' in the space provided.)

SIGNATURE

Your receipt and membership number will
be sent with your New Member's Pack.
Future receipts will be inserted in your
copy of Lo-Key.

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