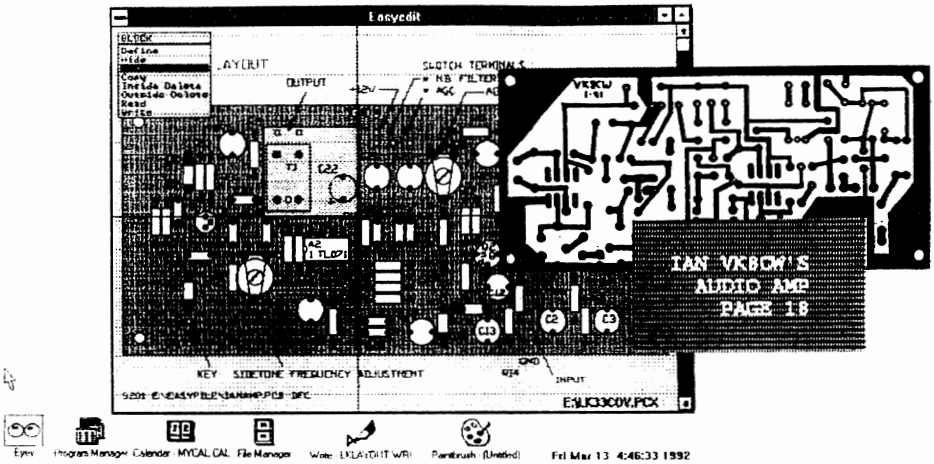
March 1992
Issue No. 33

Lo-Key

THE JOURNAL OF
THE CW OPERATORS QRP CLUB

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



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Editor: Don Callow VK5AH. #75 5 Joyce St. Glengowrie SA 5044 Australia
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POSITIONS

EXECUTIVE COMMITTEE

ORGANISER
(Vacant)
General Club business; Membership enquiries.

TREASURER &
MEMBERSHIP SECRETARY
Kevin Zietz VK5AKZ #43
41 Tobruk Ave. St Marys SA 5042
Membership applications; subscriptions; other payments (except for kit-sets); requests for past issues of Lo-Key; financial correspondence; changes of address, call-sign or other details.

EDITOR OF *LO-KEY* &
KIT-SET ACTIVITY CO-ORDINATOR
Don Callow VK5AIL #75
5 Joyce St. Glengowrie SA 5044
Contributions, ideas and suggestions for Lo-Key; technical requests; kit-set and component orders & payments.

GENERAL INFORMATION

QRP CALLING FREQUENCIES (kHz)

1 815	3 530	7 030	10 106
14 060	21 060	28 060	

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

LO-KEY - THE CLUB JOURNAL
Published quarterly -
March June September December
ARTICLES ALWAYS WELCOME
The Editor reserves the right to edit all material including letters sent for publication and to refuse acceptance of material without specifying a reason.

OTHER POSITIONS

* * CW NET * *

CW NET CONTROLLER
Ted Daniels VK2CWH/QRP #69

Call is "CQ CW OPS/QRP de VK2CWH/QRP k". QRP power is used - 5W maximum to ur antenna. Ted adjusts speed to suit the slowest operator on the Net.

ALL WELCOME - TUESDAY NIGHTS
From 0945 UTC at 3529kHz or lower if QRM.
Daylight Saving -
7031 to 7035kHz from 0830 UTC

* * SSB NET * *

INFORMATION NET CONTROLLERS
Steve VK5AIM #184 and colleagues.
Call used is generally that of the Controller. QRO SSB is used. Talk is social + technical. CW stations pse call "BK de callsign" and your presence will be acknowledged.

ALL WELCOME - FRIDAY NIGHTS
From 1030 UTC near 3620kHz.
Daylight Saving -
0930 UTC near 3620kHz

CLUB STATION VK5BCW
Based at the Richmond SA QTH of Len O'Donnell VK5ZF #1.

AWARDS AND CONTESTS MANAGER
& PUBLIC RELATIONS OFFICER
Ian Godsil VK3DID #112
25 Monaco St. Parkdale Vic. 3194
Scramble logs and suggestions.

PROJECTS OFFICER
Rod Green VK6KRG #28
106 Rosebery St Bedford WA 6052
Club radio projects.

THE BOOKSHOP
& BOOMERANG CIRCUIT BOOK
Norm Lee VK5GI #139
25 Ralston St. North Adelaide SA 5006
Magazine & book reviews.

cwqc

Organiser's Offerings

By John Bishop VK5JO #223

Firstly I would like to thank all those members who wrote such encouraging notes on their membership renewal forms or sent in letters. Many of the comments were short and direct but they have been a great vote of confidence in the way the Executive has been operating; many suggested ways of commemorating Max VK5OS #2 and expressed appreciation of his approach as Organiser and value to the Club; all suggestions have or will be considered. Some extracts from your responses may be listed below, the *Knight of the Red Pencil* - the Editor - permitting.

40 metre Net - As you are aware Max instituted another SSB/QRO net on 40 metres on Thursday evenings as a trial. His untimely illness took over just after he made this arrangement and he was not able to be present on this net. Whilst the first few nights had many members calling in, this number reduced to zero once or twice in December. It was then decided to close this net until further notice.

Brief extracts from responses - Sorry to hear of Max's passing away - Pass on my condolences to Max's family - He had the right touch - Will be missed by all - Membership No. 2 not to be reissued - Memorial Trophy/certificate in memory of Max - Keep up the good/fine work - I like things the way they are - Thanking all the team that keep Lo-Key going - Cannot find any criticism/adverse comment to make - When any vacancy occurs .... membership as a whole should vote for the candidate of their choice - membership is on the increase .... must surely indicate things are being done right - My thanks and vote of confidence in the current structure to be registered - There are areas of club work where the committee would be glad of a helping hand - Start to introduce more technical content into the net - Congratulations for another successful year - Try to encourage state sub-groups to have meetings - How do you manage to keep the membership fees remaining at $10 - I enjoy the scrambles on 40 & 80 - Is a membership card planned ? - What about a list of QRP equipment manufacturers ? - Thanks for am interesting journal - Look forward to receiving Lo-Key - Good little publication - Most pleasing to see that Lo-Key's circuits neater than those in AR - Merry/Happy Christmas, New Year, holidays - OK as it is now.

Final note - This year my work load has increased significantly and promises to get even heavier in about mid March. This fact coupled with increased family responsibilities has reduced the amount of time that I can devote to carrying out the duties of Organiser of the QRP club. As I have not had sufficient time to do any more for the club than pen this and run a few nets on 80 metres I believe that it is time for me to step aside in favour of another person who has both the available time and the appropriate expertise to take over the role of organiser. So that it is with regret that I announce my resignation from the position of acting Organiser of our club.

KEVIN'S KOMMENTS

By Kevin Zietz VK5AKZ #43 Treasurer and Membership Secretary
41 Tobruk Ave. St. Marys SA 5042 Australia

WELCOME TO NEW MEMBERS

Greetings to six new members who have found us this quarter !! Three from W.A. is good. We are now getting very near the 200 mark. To all of you:- *Please pass on the word about this club to other prospective members.*

#243	VK6QO	STAN	MOLLOY	Forrestfield	WA	6058
#244	VK7CS	ALEX	SZOPOKO	Lengana	TAS	7277
#245	SWL	REX	BUNN	Metz via Armidale	NSW	2350
#246	VK3DKE	LYNN	EADY	Yarra Glen	VIC	3775
#247	VK6BRO	RICHARD	HOSKING	Mt Hawthorn	WA	6016
#248	SWL	PETER	NEUTEBOOM	Cannington	WA	6107

As you can see I have been busy amending the club records and catching up with multiple changes (addresses etc.) for some members, whilst processing many renewals. A big thankyou especially to those who sent in their subscriptions early, and for the update / corrections to membership details - it has helped to spread the load. This work has coincided with my annual holidays and an urgent need to catch up on some exterior painting (to keep the roof still up there, over my head !).

Your receipt for subs should be enclosed with this Lo-Key, along with an explanatory note if appropriate.

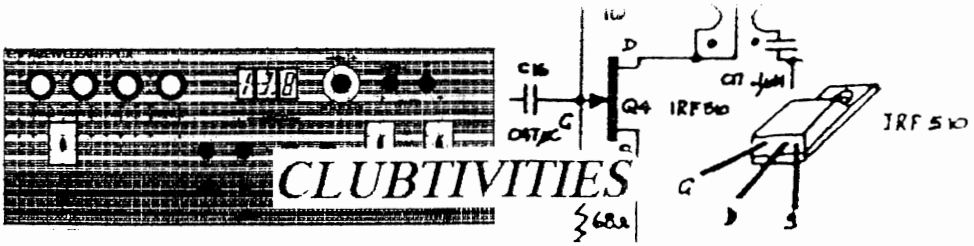
To those members whose subs are OVER DUE I have enclosed a special note with this Lo-Key. **IF YOU RECEIVED AN OVERDUE NOTICE WITH THIS LO-KEY THEN IT WILL BE YOUR LAST LO-KEY UNLESS I HEAR FROM YOU.** If you have any queries regarding your account or other matters please feel free to contact me at the address at the top of this page.

Thankyou to all those who took the time to pen some comments, no matter how short, on the back of their renewal notices. The Committee is always grateful for this feedback. This information has been reviewed and some results published elsewhere in this edition of Lo-Key.

Regards, *Kevin* VK5AKZ *cccc*

FOR SALE - THE CLUB'S PHOTOCOPIER

This is a Ubix photocopier, purchased 'used' by the Club about 5 years ago. It works, but has not been used for Lo-Key for about 4 years because of its condition. You may inspect it (by appointment) at the QTH of the Treasurer, Kevin VK5AKZ #43, to whom any queries should be directed. The buyer will be entirely responsible for all aspects and consequences of removing it. **Tenders should be submitted in writing to the Treasurer at 41 Tobruk Ave., St. Marys SA 5042. Tenders close on 1 May 1992.**



Congrats to the 'Upgraders':- Brian Cooper VK5BSC #145 ex VK5PAS Peter Scales VK6IS #80 ex VK6KHZ Alex Berkuta VK2XTX #206 ex SWL Ian Jones VK2IRJ #227 ex SWL.

VK4CMY is the new callsign of Doc Wescombe-Down #221, who is also retaining his existing VK5HP call. Explanation:- Doc has moved TAFE's, from Whyalla S.A. to Warwick Qld.

Luke Dodds W5HKA Secretary/ Treasurer of QRP-ARCI has sent us a number of '72' (Good QRP'ing) buttons.. Wear these at hamfests or similar events and you will create interest in QRP amongst other Amateurs. This will also help promote our Club. If you would like to use these, please contact Don VK5AIL #75 (Address on page 2).

Amateur Radio magazine (Jan '92) reports that Drew Diamond VK3XU #49 has won the Higginbotham Award. This is given *for meritorious service to amateur radio generally* and was for his "splendid and continuing efforts in encouraging 'homebrew' construction".

This is well deserved. From comments heard over the years from our members, it is fair to say that Drew is VK Amateur Radio's number one creator of 'buildable' homebrewing projects. The gear is always useful and quite simple, and the parts can be obtained in Australia.

THANKS to John Bishop VK5JO #223 for a fine effort in filling the position as Organiser in an acting capacity for the last few months; also for controlling the Friday InfoNet on a number of occasions.

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SSB Net

VOLUNTEERS - VOLUNTEERS - VOLUNTEERS - VOLUNTEERS

The Club is seeking volunteers (if you haven't guessed by now) for members to be Net Controllers for the Friday night 80m Club Info. Nets. These are ssb/QRO nets and run for about an hour (or for how long it suits the Controller) from 1030 UTC on 3620kHz +/- QRM. We have three VK5's who have been sharing the work during the last few months:- **Steve VK5AIM #184, John VK5JO #223 and Len VK5ZF #1**, the latter operating Club Station VK5BCW. Taking propogation into consideration, the ideal result would be to have some Eastern States members joining this group - DON'T LEAVE IT TO SOMEONE ELSE, BE IN IT ! If you would like to be the sole Net Controller, please let us know, although sharing a roster would be more satisfying overall and require less individual commitment. Rostered nights can be changed at short notice if there are several people in the same city on the roster.

The Net discussions are usually quite light-hearted and of course you will hear about homebrewing, antennas, other technical matters, QSO's, band conditions etc, along with social chit-chat. Formal Club business is not discussed or Club management matters decided.

Contact Don VK5AIL or Kevin VK5AKZ (addresses on p.2) if you wish to join the Net Control group.

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MAX BRUNGER VK5OS #2

To commemorate the late Max Brunger VK5OS #2 the Executive Committee has decided that:-

** The '#2' membership number is to be held and not reissued, so that it will always remain associated with Max VK5OS; and

** The technical article award is to be renamed the *Max Brunger Award for Best Technical Article* in Max's honour and enhanced to include a special Test Gear section, in addition to the Open section.

Many members have suggested that '#2' not be reissued. The Treasurer/Membership Secretary will make an annotation on Club records and the normal practice of reusing the number will not be followed.

The inaugural **Max Brunger Award for Best Technical Article** will be given for articles appearing in Lo-Key's #32 to #35 inclusive i.e. December 1991 to September 1992. There will now be **two sections, an Open section and a special Test Gear section.** The latter will be for articles about test gear or related procedures and the Award will comprise a certificate and a voucher to the value of $25.00 for items from the Kit-Set Centre.

The enhanced Award has been made possible through the generosity of Mrs. Roma Brunger, for which we are most grateful. Max greatly enjoyed planning and building up items of test gear and this type of activity, which was a significant part of his Amateur radio activity in recent years, is worthy of encouragement.

On behalf of our Members your Editor has received a thankyou note from Roma and Family addressed to *All Max's friends in the C.W. Operators Q.R.P. Club*. Our Club was represented at Max's funeral and expressions of condolence were conveyed in appropriate ways.

Mrs. Brunger has been most helpful in sorting out some matters concerning Club papers, records and property during the last couple of months. This has been beyond what we could normally have expected under such circumstances, and has enabled our administration to proceed with the minimum of disruption. A letter has been written to Mrs. Brunger expressing our thanks.

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68/50/45/100

FROM THE EDITOR'S DESK

By Don Callow VK5AIL #75

JUNE ISSUE - I expect to include at least one article from a number sent in by **Peter Parker VK6BWI #66** - You're gaining on me, Peter ! **Rod Green VK6KRG #28** has written up a 100W amp project - You will ask:- *"How can this find a place in a QRP magazine ?"* Maybe the answer will be in Lo-Key #34. And if there is enough space I will publish an updated Index of Lo-Key. The complete, updated Kit-Set Centre Price List will have to wait even longer, but I can provide it on request at any time. If you have submitted an item, but not yet seen it in Lo-Key, the chances are it's ready and waiting for the right time and spot. **The enthusiasm of members who prepare and submit articles is much appreciated - this activity continues to be a great success.**

72, Don VK5AIL #75 oooc

Club Management *Matters*

CLUB ADMINISTRATION

The overwhelming thrust of responses from members to the invitation for suggestions about club administrative arrangements was that things should stay as they are.

At present the Organiser position is vacant and the Club administration is in the hands of the two remaining members of the Executive, who also happen to carry the main workload of the Club:- finance and related systems, membership records, Lo-Key editing & production and kit-sets/components. Both members are prepared to continue under the present circumstances - there is no crisis as occurred in 1988.

However, the Executive Committee is concerned at the concentration of work load and continuing lack of any organised backup or succession arrangements. This may be difficult to overcome because of our scattered membership and the unknown capability, available time and desire of other members to 'understudy' and perhaps ultimately take responsibility for one or more of the functions mentioned.

All four functions now rely heavily on computerisation to cope with increasing loads and maintain high standards. There are no equipment assets of any substantial value owned by the Club. This is an Executive policy which reduces the drain on Club funds to a minimum - but requires that members involved in this work have their own equipment. Things can be done manually if there is enough time available, but not without prejudicing standards.

The Executive does not intend to permanently fill the vacant position immediately. However, if you are interested in assisting with any of the four functions it would be of benefit if you would let the Executive Committee know, with details of what you have in mind. Please do this even if you are not available just yet. Also, it was decided some time ago to 'revive' the VK5 Support Group and this will be done as soon as practicable.

CLUB STATION

Over a period of time several members have queried whether the membership gets value-for-money from the operation of a Club station. In theory, a Club station gives plenty of opportunities to promote CW and QRP generally and our Club in particular. Information was sought and a review completed recently. As a result we intend to allow the Station Licence to lapse when its renewal falls due in June 1992.

Kevin VK5AKZ #43 Don VK5AIL #75

Executive Committee

OOQC

SILENT KEYS

We regret to inform members that
Jack Elliott VK3BZB #33 of West Rosebud. Victoria &
Jack Burke VK5FZ #118 of Flinders Park South Aust.
have become Silent Keys.

Jack VK3BZB ("BusyBee") had a great love of homebrewing, being active and well experienced in this field, and was also a member of his local radio club. He was a carpenter by trade, having worked on major construction projects in Victoria. Jack was well over 80 years of age when he became sk.

Jack VK5FZ took up radio at a relatively 'ripe' age. In recent years he assisted with the setting up of CW Ops Club kit-sets. Jack enjoyed his regular morning HF net with a number of Old Timers in the Adelaide area and was always very helpful to others.

EXPERIMENTING WITH VALVE TRANSMITTERS FOR QRP

By Graeme Brown VK3BXG #55

A TWO-VALVE TX FOR QRP OR QRO

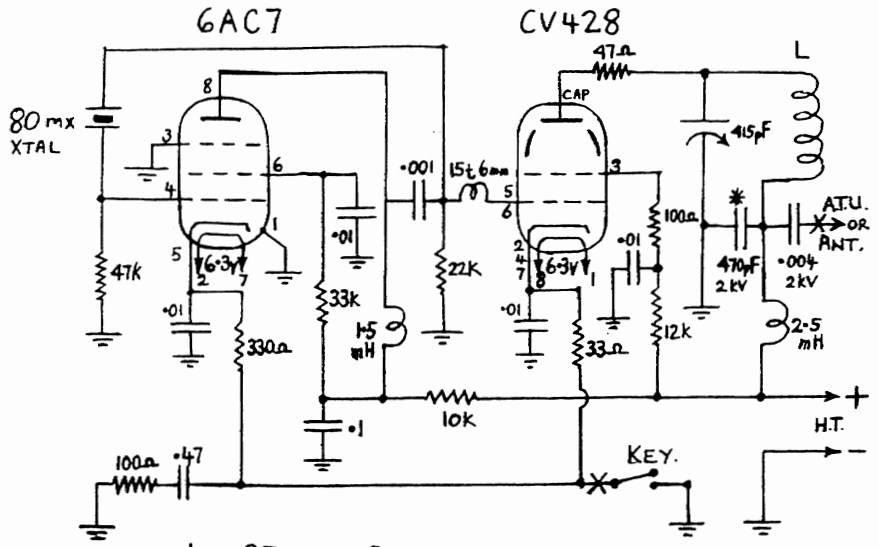
This transmitter's output tube was originally going to be a 6V6 for nostalgic reasons, but these valves are becoming a rare and expensive item these days. It was then that I remembered some years ago purchasing three new CV428's for a dollar each from "Aussie Disposals".

I deemed these expendable for the experiment and as I also had a dozen unused 6AC7's given to me a couple of years ago, so it was that my QRP crystal-locked valve transmitter was born out of the "junk-box". No new parts went into it, just the remains of components from an old black and white TV set and a B.C. receiver.

The final uses a modified pi-coupler. I have only ever seen this written up in one article and decided to use it because of the ease of tuning. It works well but it assumes that the load is for 50 Ω in the 80 metre band.

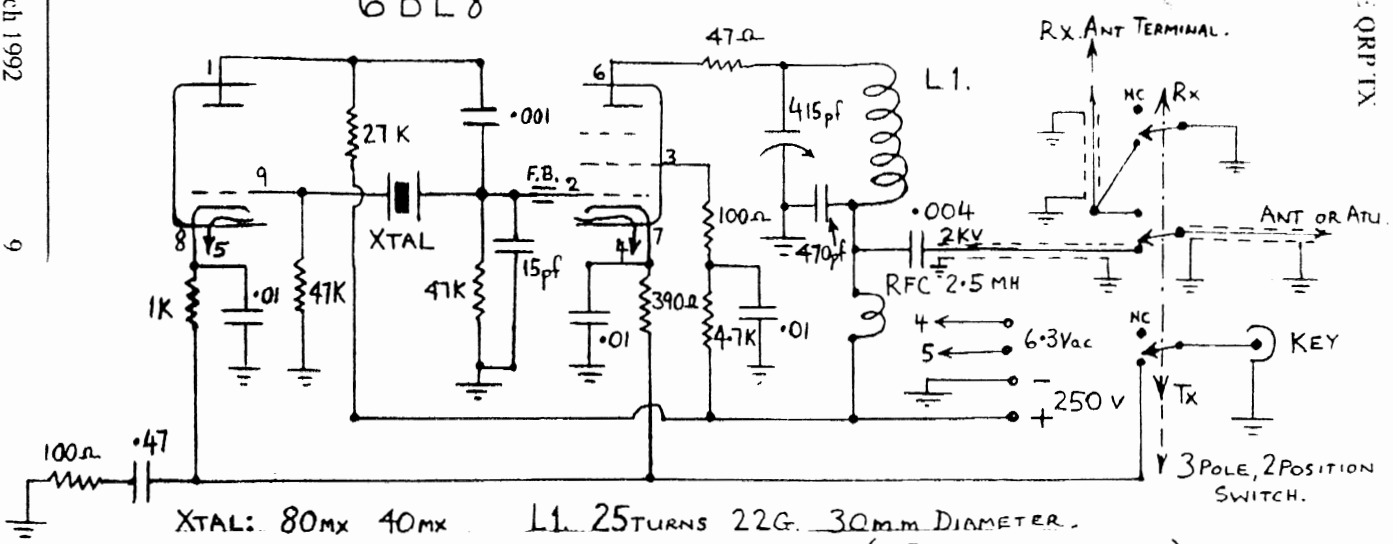
Because the CV428, which I found to be a military number for a 2E26, is designed as a beam power tetrode I have been cautious in adding parasitic suppression on its grids and plate i.e. the 15 turns RFC (wound over a 1 watt resistor), and the 100 Ω and 47 Ω resistors to stop possible spurious oscillations.

The set is manually switched from transmit to receive and the receiver is used for side tone. In the receive position, the



A TWO-VALVE TX FOR QRP OR QRO

ONE WATT VALVE ON 80 OR 40.



XTAL: 80Mx 40Mx L1. 25 TURNS 22G. 30mm DIAMETER. (35mm FILM CONTAINER)

key is also switched out of circuit to prevent an accident should the key be knocked. Similarly, in the transmit position the receiver antenna input is earthed-out to prevent receiver front end overload. I used a three pole, two position switch for this job of switching.

There are many types of valves which will substitute for the 6AC7 and the CV428. The 6AC7 is a sharp cut off RF pentode and so a 6BA6 or 6AK5 or 6BX6 etc. will do the job. The CV428 is a beam tetrode so a 6V6 or 6AQ5 or 6M5 would work in its place. Even a 6CM5 would make for an interesting experiment, in fact any relevant valve from that old scrapped black & white TV should work.

The final power out, though, does vary with the type of valve used and the high tension voltage applied to it.

My CV428 gives 8 watts at 280 volts HT, 5 watts at 250 volts HT and 2 watts at 130 volts HT.

1 WATT VALVE QRP TX ON 80 OR 40

The latest development of the previous circuit uses a 6BL8 which were very widely used in early black & white TV sets. It has a power output of just over one (1) watt when driven to its recommended ratings. The CV428 type had to be "throttled back" considerably to keep it QRP and this valve type may be hard to find these days.

With this latest model I have had good reports from around VK3 into VK2 and even ZL. It uses the same type of modified pi-coupled tuner which gives a very sharp, definite tuning and is very economical in the room it takes up. The coil dimensions given will tune across both 80 metres and 40 metres, with the crystal being the only change having to be made, and re-tune of T.1.

The 6BL8 is designed for VHF operation and because of this it still seems to be necessary to suppress the grids and plate of the pentode section to stop it "going it alone".

The rig is also manually switched from transmit to receive and also uses the receiver for a side-tone. Again, in the receive position the key is switched out of circuit to prevent accidents and in the transmit position the receiver input is grounded to prevent too much stray signal going into the receiver front end.

All capacitors must be at least 400 volt working except for the RF output capacitor (0.004uF) which is 2 kilo-volt working, as in the CV428 circuit; and all resistors need only be half watt. All components except for the tuning capacitor and coil can be salvaged from an old black & white television set.

BASIC STEREO AMPLIFIER IN VALVE (USE AS AUDIO PROBE)

This circuit is of a basic stereo valve amplifier about which some Club members expressed interest. I used 6GV8's because I had about a dozen of them at my disposal when this amplifier was developed and built about 7-1/2 years ago for a stereo cassette player. The results were very pleasing: good clean audio at more than adequate volume with absolutely no a.c. hum, using the balanced filament supply.

The 0.0047uF capacitor on the pentode grid is for an optimum or medium fixed tone level which suited my ear.

This amplifier I also use as an audio probe on the test bench and as such this could be where it is most useful.

It uses a speaker transformer with a 15Ω secondary which means in this case

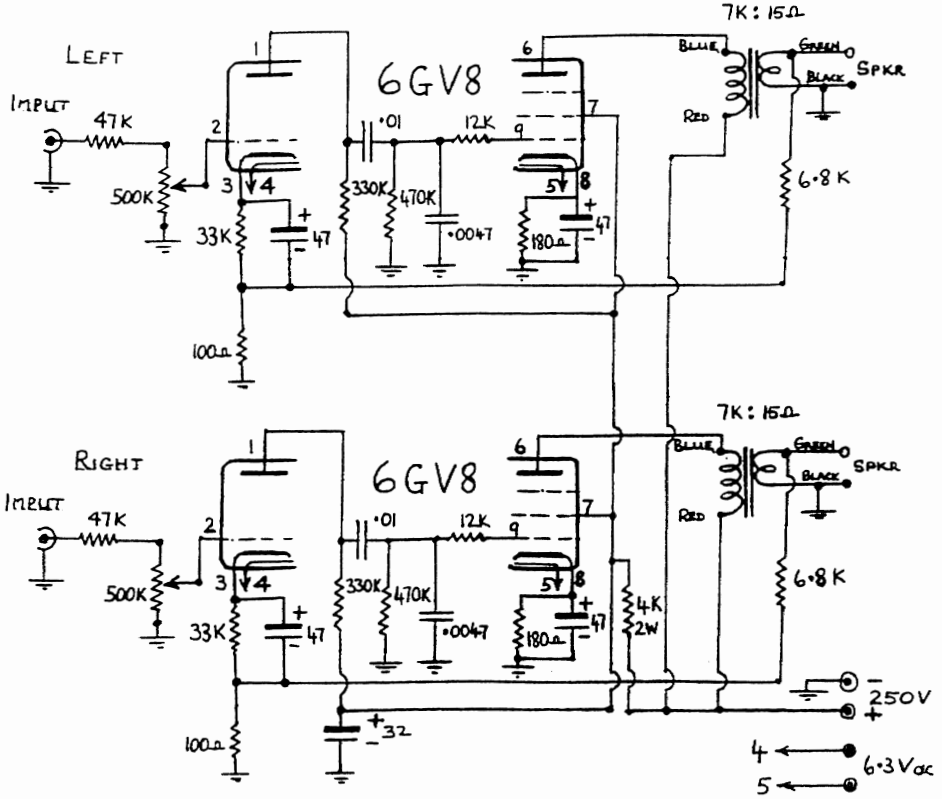
that it will work equally as well into a 4Ω, 8Ω or 15Ω speaker load without any ill effects whatsoever. But it must be connected to the load at all times when 'on'; if not, the feedback circuit will cause the amplifier to self-oscillate with much arcing in the speaker transformer with inevitable results. I don't know, but perhaps the fault could be corrected somehow with capacitors in the right place - however I never bothered to investigate further.

IN CONCLUSION

These circuits complement the power supply circuit presented in a separate article and show how versatile the power supply can be - you be the judge !

CQQC

BASIC STEREO AMPLIFIER IN VALVE



A POWER SUPPLY FOR THOSE VALVE EXPERIMENTS

By Graeme Brown VK3BXG #55

Over the past two decades we have seen a total swing away from valves to semiconductors for both commercial gear and home building and experimenting.

The old valve technology is being lost to the younger experimenters but there can be many hours enjoyment in playing around with valves, which incidentally are much more forgiving if you make a wiring mistake.

A good well filtered power supply is a good start and is very easily constructed because, valves being more forgiving, a regulated final voltage is not necessary.

The circuit uses an old black and white TV transformer; you may find it exceptionally large but this has the advantage of being able to supply plenty of current whilst not overheating. Make sure the secondary voltage is about 100 to 120 volts A.C.

Being an experimenter's power supply the circuit is designed to give two high tension (HT) voltages at the flick of a switch.

In one position the four diodes (EM404) act as a bridge rectifier and a nominal 130 volts DC shows up at the HT output; for QRP (or whatever). In the second position, two diodes D3 and D4 go out of circuit into reverse bias and capacitors C1 and C2 are switched into circuit to make a voltage doubler arrangement for QRO at a nominal 260 volts DC at the HT output.

The circuit shows a filter choke (CH1). This I used because it was available, but you may get by without the need for it if only low current is required or for R.F. experiments; but it does help with filtering for audio amplifiers if high current and power is the order of the day.

C1 and C2 must be the same values and at least 200 volt working. C3 and C4 can be varied somewhat in value but must be at least 300 volt working.

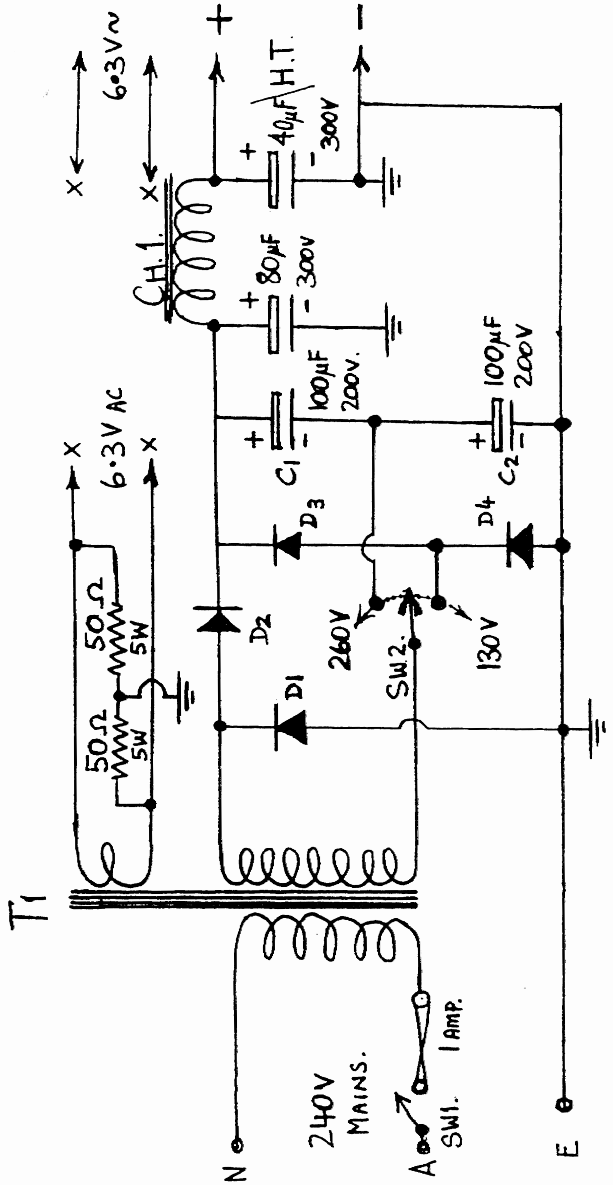
Most, if not all, circuits using valves with indirectly heated cathodes show one side of the filament connected to earth or ground. This is done for convenience as less time is required in wiring up a circuit, but it does have the disadvantage of causing the AC hum you will often hear from valve audio circuits.

By not earthing one side and connecting both sides of the filaments to the A.C. source and balancing them to earth or ground through a 100 Ω 5 watt wire wound potentiometer or two 50 Ω resistors as shown, this filament hum is eliminated. But if your circuit under test or experiment has one side of the filament to ground this power supply will work it quite happily just the same.

All components came from old black and white TV sets and the diodes and switches are available through Dick Smiths or Tandy stores.

A word of caution for the uninitiated, on a mistake valve circuits will not forgive: A probe in the wrong place in a live semiconductor circuit and you can "kill" it - A probe in the wrong place in a "live" valve circuit and it could kill *YOU.*

ooqc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THE "SUDDEN" SUPERHET - SIMPLE CONVERSION OF DC RECEIVERS TO SUPERHETS

By Basil Dale VK2AW #180

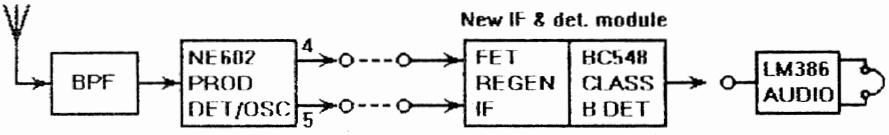
INTRODUCTION

The search for a good simple receiver continues ! The Sudden receiver, described by George Dobbs G3RJV #96 in SPRAT[1], is an improvement on the conventional DC receiver and our Club's Flexi-Sudden[2] gives flexibility using plug-in coil modules.

A high degree of selectivity may not be necessary for operation on Australian Amateur bands. The writer has used an 'Electronics Australia' Multiband Superhet[3] on 3.5 and 7MHz for some time. This receiver uses a regenerative IF stage which gives superior performance compared with DC receivers. It was thought that the addition of an IF/detector module to the basic Sudden receiver could be worthwhile and a NE602/ LM386 receiver was constructed on plain perf board. After this was working satisfactorily as a DC receiver, an IF/detector module, also on perf board, was constructed and integrated into the Sudden circuit to form a superhet with a 1.6MHz regenerative IF stage and class B detector. So, the NE602 now becomes a mixer/osc instead of a product detector/osc.

Results were encouraging and gave a definite improvement on the DC receiver. The details may be of interest to members.

Fig. 1 Block Diagram of Modification



CONSTRUCTION

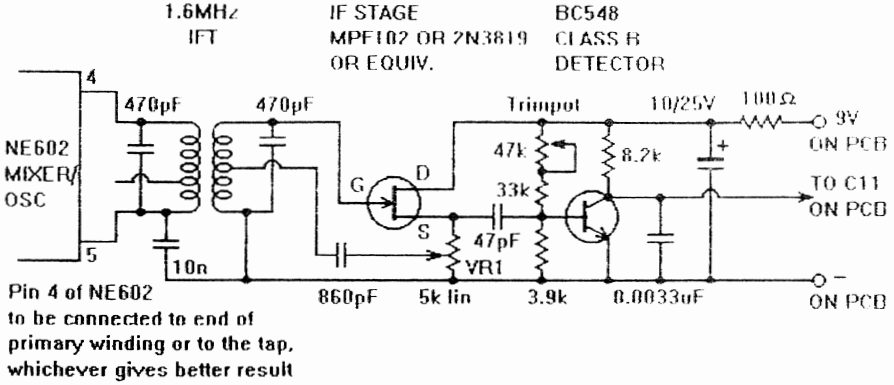
The new module is constructed according to the circuit diagram, Fig. 2. The Sudden PCB track is cut between pin 4 of the NE 602 and C11. A wire is soldered to the portion of the track connecting to pin 4. A wire is also soldered to pin 5 (no connection previously). These two wires are for the primary of the 1.6MHz IF transformer. A wire is also soldered to C11 to take the ouptput from the BC548 class B detector into the LM386 audio stage. Layout is not critical.

IF TRANSFORMER

The E.A. superhet uses a Denco 1.6MHz IF transformer, but this may not be obtainable. (The supplier, Watkin Wynne, is no longer listed in the Sydney 'phone book.) An IF transformer must therefore be wound as shown in Fig. 3. These details were kindly supplied by Ron VK2DQR #127. The IF coils were set on 1.6MHz approx. using a homebrew GDO. The actual frequency is not critical and can be between 1.6 and

2MHz. If a modulated signal generator or modulated GDO is available , this can be connected to the antenna terminal, the regen. control turned fully anti-clockwise to its non-regenerative position and each core peaked.

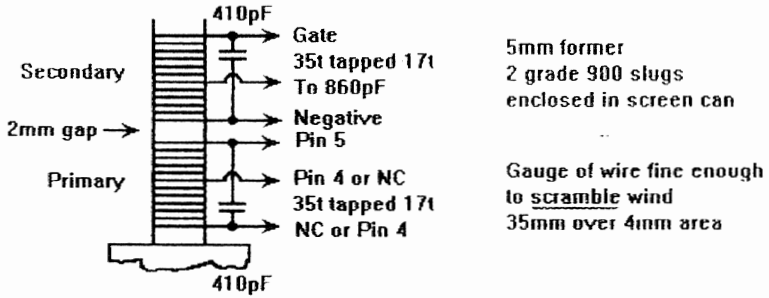
Fig. 2 Circuit Diagram of New IF/Detector Module



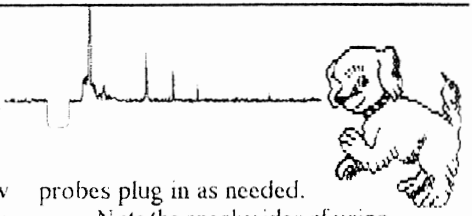
OSCILLATOR FREQUENCY

The NE602 oscillator frequency will have to be moved 1.6MHz lower in frequency to provide the 1.6MHz IF. Taking 7MHz as an example, assuming an IF of 1.6MHz, the oscillator slug in L3 of the VBFO will have to be moved into the coil to set the oscillator frequency with VC1 at maximum to 5.4MHz (5.4 + 1.6 IF = 7.0MHz; 5.7 + 1.6 IF = 7.3MHz). No changes are necessary to the BPF. An easy way is to turn the coil slug until a 7MHz ssb or cw station is received, with the IF stage oscillating, and then adjust until the whole band is covered by VC1.

Fig. 3 Winding Details of IF Transformer 1.6 - 2.0 MHz



R.F. SNIFFER



By Dave Archer VK3DVB #183

I have used this sniffer for a few years to tell me when a VFO is going, or to test a transmitter or any other source of R.F. (Circuit is opposite.)

The whole thing goes into a small plastic box with a 9v battery to power it up.

I soon found I needed two different probes: one for picking up stray fields (a two turn loop of 26 swg) and a needle point for making direct contact to a terminal etc. I fitted a stereo socket and made the two probes plug in as needed.

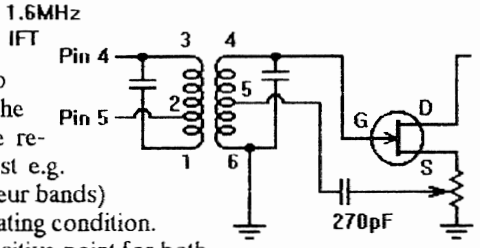
Note the sneaky idea of using a meter OR a L.E.D., by the use of S1. The meter could quite easily be other than 1mA, simply by also changing R1 and R2. I personally prefer the meter to a L.E.D. - you may decide to have one or the other and delete switch S1.

It is extremely sensitive and is a QRP "must".

oooc

The "Sudden" Superhet (continued)

Fig. 4 Connections to Denco IF Transformer. Type IFT18-1 6MHz (If available)



ADJUSTMENTS

Operation of VR1, the 5k pot, should cause the IF stage to go smoothly into oscillation to enable cw and ssb stations to be received. Just below the oscillation point, AM stations can be received but if these are of no interest e.g. shortwave broadcast outside the Amateur bands) then the IF stage can be left in an oscillating condition. The edge of oscillation is the most sensitive point for both cw and ssb. After the set is operating, the 47k trimpot is adjusted for the best operating point of the class B detector.

This IF/detector module can of course be used to convert any DC receiver into a simple superhet. If used with diode detector DC receivers, these would need to be coupled to the IF transformer through a 10nF (.01) capacitor to the primary of the IFT, one end of which would connect to ground or negative. No voltage would need to be provided through the primary of the IFT. However, if your DC receiver uses, say, a FET product detector, then the drain of the FET would connect to one end of the primary of the IFT and the other end of the IFT would connect to the 9 - 12 volt supply.

1. The "Sudden" Receiver, George Dobbs G3RJV, SPRAT #58
   (Ed. - Reproduced in Lo-Key #23 & #24)
2. The Flexi-Sudden Receiver, Don Callow VK5AIL #75, Lo-Key #25
3. "Build a Superhet Shortwave Receiver", Ian Pogson, Electronics Australia, November 1980.

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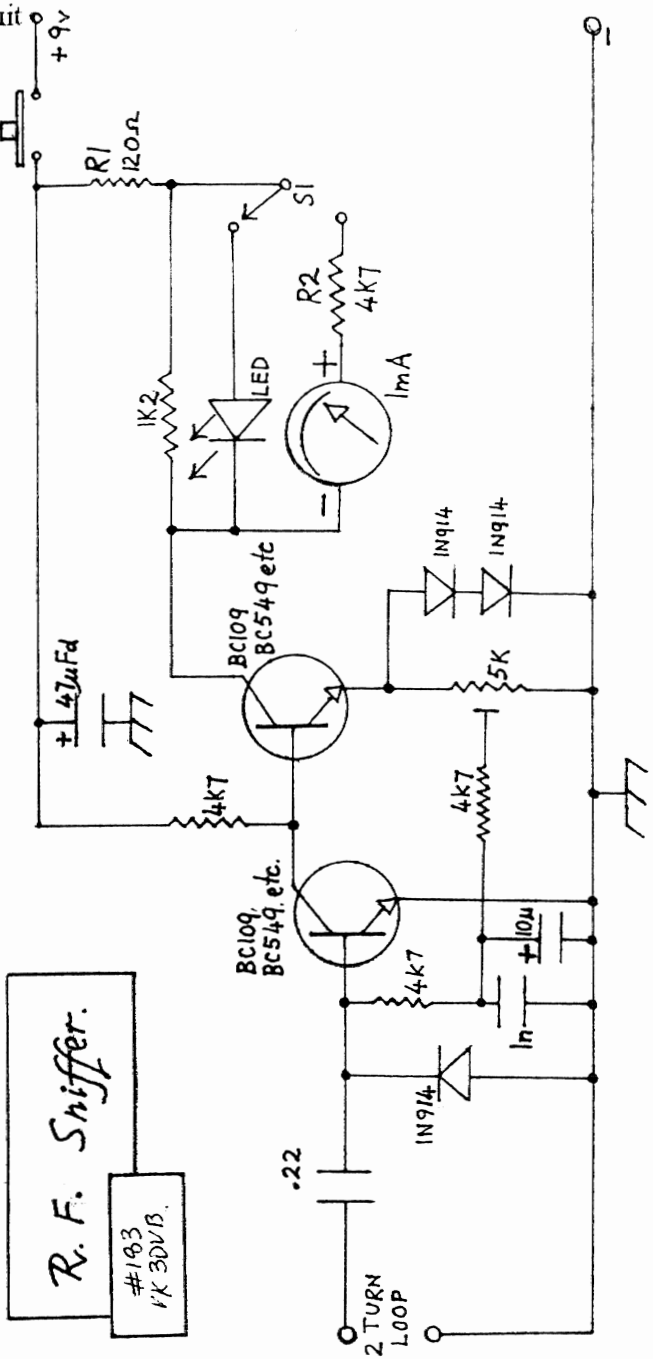
oooc

R.F. Sniffer Circuit



AUDIO AMPLIFIER STAGE

For Homebrew Direct Conversion Receiver or Transceiver

By Ian Smith VK8CW #91

CONCEPT:

A low power, low current consumption amplifier capable of lifting the output of a product detector to a reasonable listening level, either headphone or loudspeaker. Selectable a.g.c. and narrow band filter. Provision of sidetone and muting when used as part of a transceiver.

DISCUSSION: (see circuit diagram)

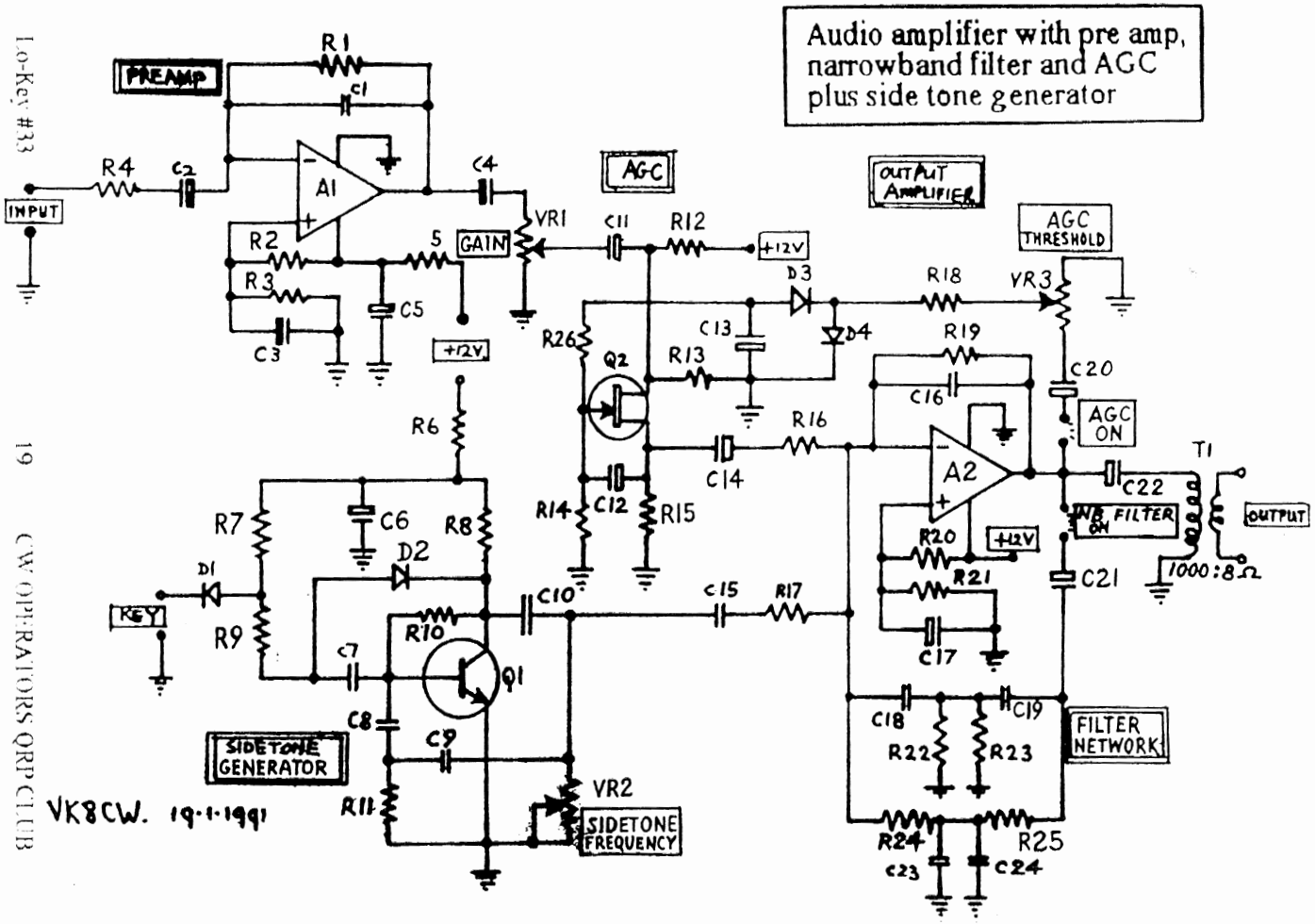
A1 and A2 are conventional op. amps. providing all the gain and output power. High frequency roll off is built into these stages. The gain of A1 stage can be increased by increasing R1 or by decreasing R4 (this decreases the input resistance) as shown the gain is 40dB.

The filter is of the twin T type which presents high impedance at the design frequency.

A.G.C. is provided by the output of A2 being rectified by D3,4 and the resultant voltage being applied to the gate of the series element attenuator Q2 fet.

Q1 is an instant start up gated RC phase shift oscillator, providing side tone.

Muting is provided only when the a.g.c. is activated. The sidetone signal produces a large output from A2 thus fully turning off Q2. The agc/muting recovery time is set by the value of C13.


Audio amplifier with pre amp, narrowband filter and AGC plus side tone generator
PREAMP
R1
C1
R4
C2
A1
INPUT
C4
AGC
OUTPUT AMPLIFIER
AGC THRESHOLD
VR1
C11
R12
+12V
R2
5
GAIN
D3
R18
VR3
R3
C5
C3
+12V
R26
Q2
R13
C13
D4
R19
C16
C20
R6
R16
AGC ON
C14
A2
T1
C22
R7
C6
R8
R14
C12
R15
FILTER ON
OUTPUT
R20
+12V
D2
D1
R21
1000:8Ω
C21
KEY
R9
C10
C15
R17
R10
C17
C7
Q1
C18
C19
FILTER NETWORK
C8
R22
R23
SIDETONE GENERATOR
C9
VR2
R11
SIDETONE FREQUENCY
R24
R25
C23
C24
VK8CW. 19-1-1991

PERFORMANCE:

Voltage gain at 1kHz = 58dB, Power gain = 113dB (measured)

Frequency response (3dB) = 25Hz to 2.3kHz

Power output = 5mW Total current (12V) = 6mA

Equivalent noise input (4.7k termination) = 3uV

AGC gives 12dB output increase for a 20dB increase in input

Narrow band filter cente frequency = 720Hz

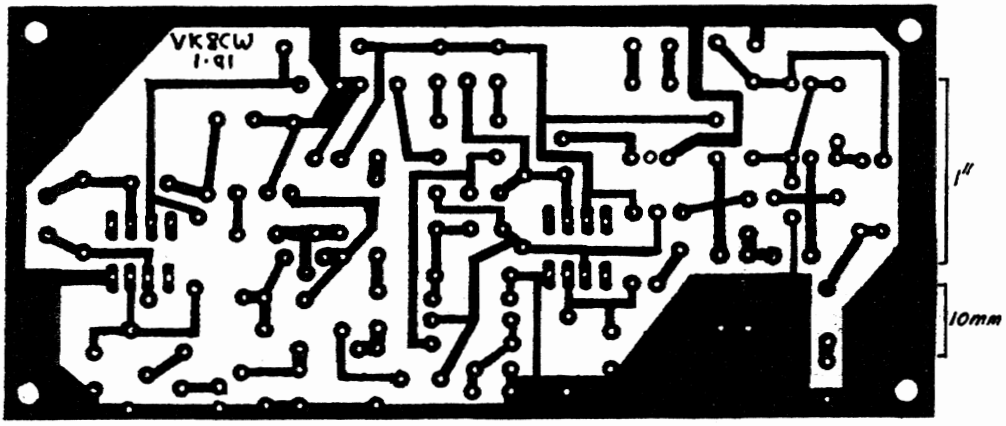
bandwidth = 55Hz

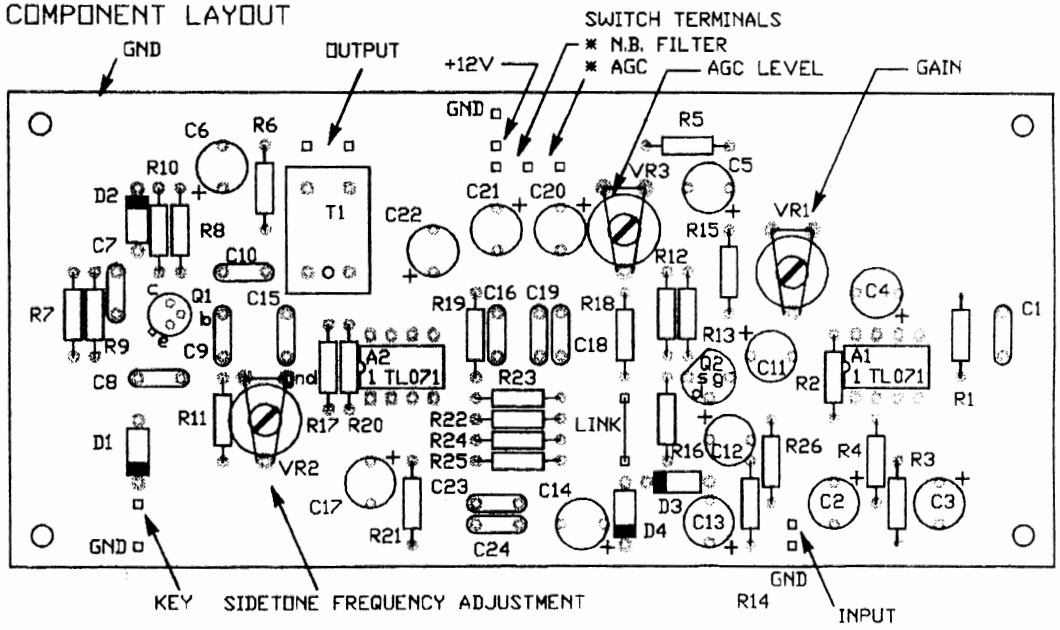
Q = 13

Sidetone frequency = 720Hz

Notes:

1. sidetone frequency must be adjusted to be the same as the NB filter frequency using VR2.
2. sidetone levelis adjusted by the value of either C15 or R17
3. VR1 can be used as a manual gain control in either agc on or agc of mode, or it can be a preset on board.
4. VR3 is set to give the best AGC threshold i.e. good large signal capacity without affecting the low signal level sensitivity.





9201 E:\EASYFILE\IANAMP.PCB DFC

PARTS LIST:

Capacitors

C1	120pF	(c)
C2,12,13,20	1uF	(e)
C3	2.2uF	(e)
C4,11,17	4.7uF	(e)
C5	100uK	(e)
C6	47uF	(e)
C7	620pF	(c)
C8,9,10,18,19,23,24	10nF	(g)
C14	3.3uF	(e)
C15	10nF	(c or g) S.O.T.
C16	47pF	(c)
C21	10uF	(e)
C22	22uF	(e)

note: (c) = ceramic
(e) = electrolytic
(g) = green cap

Resistors

VR1,2	10k
VR3	5k
R1	470k
R2,3,9,20,21	47k
R4,8	4k7
R5,16	1k0
R6	470e
R7	18k
R10,19	1M0
R11	5k6
R12	100k
R13	15k
R14	220k
R15,18	2k2
R22,23,24,25	22k
R26	10k
R17	220k or pot.

All 0.25 watt

Semiconductors

A1,2	TL071
Q1	BC108,BC548 etc.
Q2	E201 fet
D1,2	1N4148
D3,4	OA90

T1 Miniature output transformer
1k : 8e

(S.O.T. = Select On Test
i.e. finalise actual value during testing)

KIT-SET ACTIVITY CENTRE

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

The 'full' price list of kits and components appeared in Lo-Key #30, with the procedure for ordering. Some changes appeared in #31 & 32. Here are some more:-

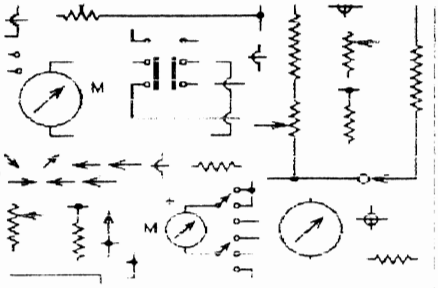
CHANGED DETAIL

C015 4/pack $1.90/pack
BA102 equivalent: BB119 varicap (varactor) diode.

NEW ITEMS

C052 1/pack $2.90/pack
BNC adaptor right-angle plug to jack. Branded "Telegaertner - West Germany - Military Type". Good quality, individually wrapped.
If you are aware of the usual catalogue prices of BNC adaptors you will appreciate the good value here.

C061 10/pack $0.30/pack
Resistors 1/4W, carbon film or better.
You nominate one value (10% tolerance; standard figures 10-12-15-18-22-27-33-39-47-56-68-82; range of 22R to 10M in stock).



'ONE-OFF SPECIALS' FOR SALE

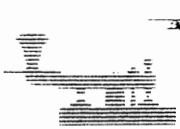
MAGAZINE PROJECT PCB'S - If you are looking - or even just thinking about looking - for any of the magazine project PCB's listed below, now is your chance to obtain them cheaply. We have only one of each unless otherwise indicated, so 'first in, best dressed'. PCB condition varies a little, but most are in excellent condition. Price is $1.00 each, plus the usual $3.00 per order for Postage/Packaging etc. The figure in brackets is the number in stock, if more than one.
The details are E. & E.O.E.

The complete, updated Kit-Set Centre Price List, with ordering procedure, can be provided on request, at any time

ELECTRONICS AUSTRALIA	ELECTRONICS TODAY INTERNATIONAL	ETI 319A	ELEKTOR
EA 77tiY7 (3)	ETI 485 Number unclear	ETI 730	83044
EA 79RO5	ETI 1402f/1402r	ETI 153	83110
EA 82ps2	ETI 561 (2)	ETI 591A	83022.10
EA 83wm8	ETI 489A (2)	ETI 731 (2)	83083 (2)
EA 83ms4 short (3)	ETI 492	ETI 733	83022-9
EA 83ms4 long	ETI 582B (2)	ETI 1517	83022-4
EA 83pc3a	ETI 678	ETI 1518 (2)	83022-5
EA 83pc3b (2)	ETI 662b	ETI 806	83022-6
EA 78up5	ETI 438 (7)	ETI 1510b	83022-8 (2 in stock)
EA 82fc8b	ETI 265 (2)	ETI 320	83022-2 (2, one partly drilled)
EA 86pc5	ETI 599a	ETI 325	82180
EA 82ef9	ETI 599b	ETI 458	82190
EA 84sp4 (2)	ETI 445	AUSTRALIAN ELECTRONICS MONTHLY	82048 (2)
EA 84mc2	ETI 1510a	AEM 6000b (2)	80PP7A
EA 80ad12	ETI 711Df/711Dr	TALKING ELECTRONICS ISSUE 8 TE clock	83014
EA 81ir4	ETI 150		83022-7
EA 83ga6	ETI 412		UNKNOWN ORIGIN
EA 79se3	ETI 433B		SJ 5574 (4)
EA 83ti12 (2)			
EA 84md12			
EA 84au6a			

CW NET NEWS

By Ted Daniels VK2CWH #89



With just one more Net night before the end of Daylight Saving, the question arises:- *"Has the change to 40 metres been a success ?"*

During this Daylight Saving period it has been possible to hold 14 Nets with a total of 38 contacts.

Last year, on 80 metres, only 6 Nets with 14 contacts could be held, so on that basis it seems it was a successful experiment.

It was interesting to note that in both years the same number of different stations (nine) participated, which indicates that only a limited number of members come up on the Net.

It seems certain that poor conditions make it difficult for VK5 and VK7 to participate, so maybe it is time for a change of Net Controller to someone in one of the southern states to give them a better go.

Accordingly, I would like to step down, say in October this year, to allow time for a replacement to be found and the new arrangements advertised in Lo-Key. **It will be a pleasant change trying to be heard instead of trying to hear others !**

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OPPORTUNITY FOR YOU TO TAKE CONTROL !

As indicated in the adjacent column, Ted VK2CWH will be having a well-earned rest from the position of Net Controller from October this year, after a period of more than four years in 'the hot seat'. This creates an opportunity for someone else to gain experience as a CW net controller or, if already familiar with this type of role, to take over the position.

IF YOU WOULD LIKE TO ASSIST OTHER CLUB MEMBERS IN THIS VERY IMPORTANT POSITION, please contact Ted VK2CWH Wombat Hole, Bylong Rd., RYLSTONE N.S.W. 2849 or Don VK5AIL (address on p. 2)

You may wish to be on a roster with others, so that you do not have a commitment every week. If so, please indicate this and we will try to set up a roster, which could have the advantage of involving stations at a spread of localities.

To assist Net Controllers we will provide an information kit, including an up-to-date list of members in alphabetical order of callsign. Ted published the CW Net operating procedure in Lo-Key #18 page 20 and we will ask Ted to update this as (and if) necessary. Thanks to Ted we have adequate time to get organised.

ooqc

Receiver Notes is a contribution received in a letter from Drew Diamond VK3XU #49.

Drew writes:-

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

In relation to the short article by John Bishop, VK5JO (#223) in Low-Key No. 32; the prototype Super-DC (AR May '90) works fully in accord with the published figures. If a builder wishes to substitute components other that those specified in the original circuit, he or she must do so with full knowledge of what may (or may not) happen. Amidon cores were used because they are more widely available than other brands.

The oscillator output waveform at T2 is quite sinusoidal. I can only assume that a powdered iron core was used here instead of the ferrite FT50-43 specified (an iron dust core will not allow sufficient inductance to be obtained). There is no need to use complicating tuned circuits in this part of the circuit- a broadband transformer is the ideal component to couple the single-ended VFO output to the balanced mixer, where each G2 is terminated with a known resistive impedance of 1.0kohm, and supply a truly balanced drive. The same applies to extracting the wanted mixing product (4.43MHz) from the mixer. The input impedance of the ladder filter is about 1.5kohm, so a 1:1 match to the similar impedance at the drains of the mixer FETs is all that is required.

The input tuned circuit must cover 0.5MHz, a pretty wide bandwidth at 3.5MHz. Consequently, to avoid the need for tracking, we must accept the compromised nature of this filter. So sensitivity will probably vary somewhat with frequency (as stated in the AR article). The builder may place the two 'humps' in the part of the band where best response is required, with adequate sensitivity (particularly with a converter) at other parts of the band. The output of the filter was terminated to obtain some broadbanding, in accordance with Solid State Design, Appendix 2, then empirically 'massaged' to provide acceptable response (for some reason I cannot always duplicate Hayward & DeMaw's results).

The sensitivity of the receiver should be adequate for normal purposes. An additional IF amplifier should therefore not be necessary, and will only complicate things and degrade the signal handling performance. I have worked out a way of adding useful AGC to the set with the addition of a few components, and would be pleased to send details of this mod. to interested builders.

Finally, any constructor who is having difficulty with one of my projects has only to spend 86 cents to get in touch with me by letter, and he/she will receive any reasonable amount of help- direct, as offered in all my AR efforts. In addition, enthusiasts who may be visiting the area are also welcome to inspect any of my projects at this QTH after suitable confirmation.

P.S. I've just completed an updated version of this receiver. It covers 3 to 4MHz then any 1MHz band from 7 to 28MHz using NE602's as mixers (much easier to use than matched pairs of FET's). Should appear in AR mid '92 .

Editor's Confession - John VK5JO asked me to read his article to make sure it could **not** be read as criticism of the original project. Maybe I didn't do a 100% job ! An interesting issue emerges. I tend to go to great lengths to try to get things going myself, without seeking any help. I learn all sorts of things this way - but it is very time-consuming. Nevertheless, if you don't have the time or if this is not your approach to things, it's certainly very handy (to say the least) to have the project's creator offer to assist any builder having trouble. As to variations from original designs, you need to really **know** what you are doing before trying substitutions - but again, the highly competent homebrewers probably get much enjoyment in meeting the challenge they present themselves. ccqc

Some Notes on Power Supplies

See article on 2-25V Regulated Supply - Lo-Key #32, p.22

Stan Dogger VK2KSD #165 writes:-

"Re the power supply in December Lo-Key, the connection of mains earth to supply earth may cause hum in DC Rx.

I have built many DC supplies, and the mains earth is connected only to the transformer frame and metal box. The DC side is left floating but a ground (case) terminal is fitted next to the output terminals.

A single pole on/off switch is also handy in the +ve as a "panic" or test switch and saves disconnecting the +ve whilst 'fiddling'.

A 0 - 1 Amp meter is more use than a 0 - 25V meter as some multi-meters don't read to 1 amp and current monitoring frees the V.O.M. for other testing.

For newcomers a 16V 1 Amp plug pack is easier and simpler/safer than a (safety) warning. It also allows the supply to be used with a 12V car or gel battery up to 9V output.

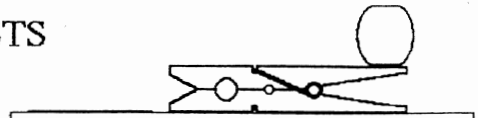
p.s There is a good case for a 9V shack !"

Editor's Note - If YOU have ideas on this subject, please share them with us. Regarding safety, I believe that a person building a psu for the first time should do so under the guidance of an experienced builder. S/he should also carefully examine constructional articles on power supplies, preferably those relevant to the situation in the builder's own country.

cuqc

AWARDS AND CONTESTS

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



Hello there all Club Members.

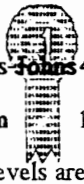
I trust that everyone had a good Summer, although those of us in Melbourne certainly did not.

Scramble 17 was, in some ways, a rather dismal series of events, with only two (yes 2!) logs being received. I am very disappointed with this result, as even though I cannot take part myself (at present), I get pleasure out of reading and passing on the results of those who did.

Some statistics of Scramble 17 may be of interest:-

Number of logs received	2
Total number of QRP stations	6
" " " QRO "	4
Total number of Club members	4

I don't know that these 'prove' anything, but they highlight the fact that only a handful of devotees support the Scrambles. To these members:- THANK YOU!



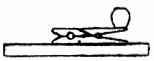
1st place -
VK4LA Glyn Gibbings ~~Johns~~ 43 points
2nd place -
VK4EV Ron Everingham 16 points

I know that QRN levels are a problem, but also wonder if the Scrambles have served their purpose. Any comments, please ?

I propose only one traditional-type Scramble for the Autumn quarter. Date is Thursday 23 April. See opposite.

Please put this date into your diary NOW and make a note for the beginning of April to dust off the key and let's make this a big success,

73 Ian VK3DID #112



Here is another opportunity to win a **Clothespeg Key Trophy**, donated by Steve Mahony VK5AIM #184.

DAY..... Thursday
DATE ..... 23 April
BAND..... 80 metres
FREQ. RANGE (MHz)
..... 3.501 to 3.529
TIME PERIOD
..... 1030 to 1230 UTC

Homebrew or similar equipment is preferred, but wind down the power output of your black or grey box if you wish. ***Try a Scramble*** especially if you are not keen on contests - you will be pleasantly surprised.

AIM: To score maximum points by working as many CW stations as possible.

DURATION/TIME: 2 Hours.

MODE: CW only. Club members to use QRP (5W max. output to antenna).

CALL: No control station to check into, just come up, start calling, and enjoy yourself. The call to use is **CQ QRP TEST** and Club Members should of course use the /QRP suffix. There is no need to exchange serial numbers.

SCORING:
QRO VK 1 point QRO DX 5 points
QRP VK 5 points QRP DX 15 points

ENTRIES: Send log extracts to me without delay please. Just show time of contact (UTC), callsign of station you had QSO with and /QRP if he/she was a QRP station, name of operator (if you know it), signal reports given and received, and points claimed.

RESULTS: Results including names of certificate winners will appear in June 1992 Lo-Key #34.

OOOC

U CAN HELP !

Steve Jackson SWL #238 has a QTH which is not the best for receiving and is likely to be a problem when he gets his Station Licence and needs to transmit.

Steve writes:- "I need some help with choosing an aerial. I live in a valley below Mangrove Mountain about 80' above sea level surrounded by hills about 500' high. I'm using an 80m long wire - copper - for the APC receiver I have. I pick up Melbourne, Brisbane etc. on a good night ...".

Maybe you have had experience in a similar situation. So, can YOU let Steve have some advice on a suitable antenna (and perhaps ATU).

Steve's address is -
RMB 4820, Gosford NSW 2250.

OR, IN THIS CASE,
ROD VK6KRG WILL HELP !

Late last year **Rod Green VK6KRG** #28 repeated an earlier offer to assist any members who are building gear to his designs and who may be having problems. Two of the Club's kit-sets are based on Rod's work: the Club Communicator 80m CW Tx and the Forrestfield 15m CW Tx. Rod has indicated that he would fix any of his designs that builders have trouble with, if they send the item to him.

So if you require assistance, write to (or otherwise contact) Rod to see how the matter can be handled e.g. if you have carefully monitored and recorded the results of testing, Rod may be able to suggest solutions by letter. Also, note that it is generally ***much*** cheaper to post PCB's rather than complete rigs. Rod's address is on page 2.

oooc

Photocopy or c u t a l o n g t h i s l i n e

CW OPERATORS QRP CLUB

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

Please post this application to:

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

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

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

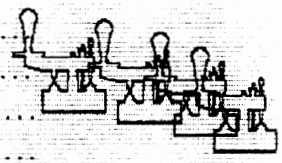
(please print)
FIRST NAME & CALL SIGN .....

INITIALS & SURNAME .....

ADDRESS.....

.....

.....



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

SIGNATURE . . . . . #33 March 1992
A receipt and your membership number will be sent with your next *Lo-Key*.

95/50/0/60