



No.103
Sept. 2009

Lo-Key

VK QRP Club



Lo-Tone

Editorial

'Filling-in faces' is one of the new sections in *Lo-Key* this month. It's an opportunity for all members to contribute in some manner to their own magazine. Why this particular section? The answer in part, is the following. A quick scan of the records reveals that the Club spans many international regions, and all Australian States. All of us, it is apparent, are held together by our common interest of QRP operating and the quirks of electromagnetic propagation. But because of the geographical distances which separate us it is highly unlikely that any individual will meet more than a few other Club members face-to-face. Indeed even a QSO on the Club's 'natter net' might remain impossible for some of our members located in remote parts of Australia or overseas. Probably then, few of us know little about our fellow members. Yet *Lo-Key* provides us with a chance, at least in part, to disclose some of our background and a few personal details. If you're not sure what to write, I've posed a few questions for you to answer. Send the details with a high resolution photo (as retrieved from your digital camera will be OK) to my email address. I've given a few of my answers to the questions as an indicator of what you might attempt. Over to you.

Murray VK3EZM

Please Note. It's Subs time again, see p22.

This Issue

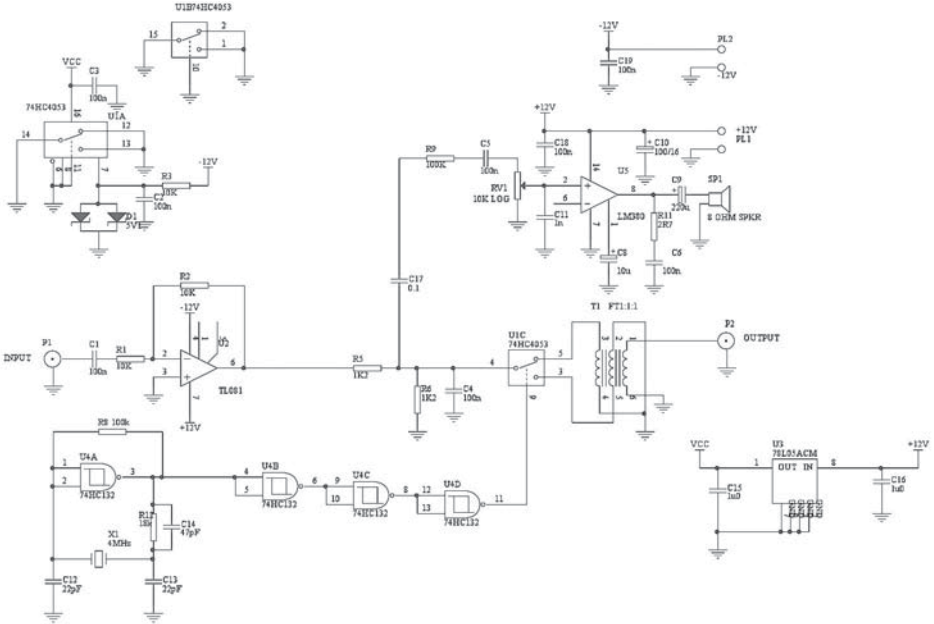
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On the covers

Front. Free to members. See 'Bits-N-Kits'

Back. Gerard's Mini HF and operating.

A Double-Sideband Test Unit

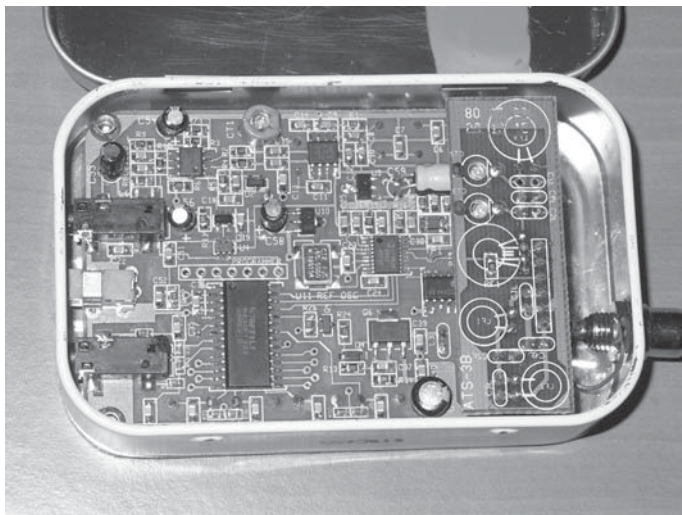


Rod Green VK6RG

For some years now I have wanted a circuit which would generate a Double Sideband signal on a convenient HF frequency for test purposes. I was recently approached by a friend and colleague who wanted one, and asked if I would go about designing it. Since there are now two people needing this equipment I thought that it might well be of use for others.

I have done a lot of direct conversion work, and I have a spectrum analyzer which does not tune below 9kHz. I thought the DSB generator could be used to monitor audio which was shifted up in frequency so that the analyzer could see it. My colleague also wanted an additional feature which could monitor the output of a low powered SSB exciter as an audio monitor. This was easy, because it is only necessary to tap off the balanced mixer (which generates the DSB signal) in the reverse direction. The DSB test unit was born!

The Quest for Mini HF (cont.)



Gerard Lawler VK4TGL

Here is part two on my quest for a mini HF station which I could take on camping trips, without adding too much weight or volume to my load.

After much deliberation I purchased an ATS3b from the USA. It is a 6 band QRP CW transceiver which fits in an Altoids tin (plus external storage for the unused band plug-ins). A small padded envelope arrived containing the circuit boards, components and a CD. Clearly I had to read the manual (on CD) and investigate soldering techniques for surface mount components on the web. I found the one of the more helpful websites to be <www.curiousinventor.com/guides/Surface_Mount_Soldering>. There is also a supportive Yahoo group for the ATS3.

It appeared I had the following options: traditional hand solder using fine solder; paste using solder paste; or cook, using solder paste and a toaster oven. I read an account recently from a amateur who used the oven option. The first time he used it he discovered that he had not disabled the pop-up mechanism properly, and so it fired his board across the room. I decided to hand-solder using traditional fine solder. I wanted to take my time so that I could get it right, and to get a few weeks

entertainment from its construction. I took four weeks to populate the board, spending 2 or 3 hours for a couple of nights each week.

Construction Recommendations

General

The “flight and hide instinct” of surface mount components — given half a chance, they will take flight and will never be seen again. As per Murphy’s Law, the probability of this happening is inversely proportional to both the components size, and its ease of replacement.

The recommendations from a number of sources are:

- Don’t use tweezers. Use a tooth pick dipped in beeswax.
- Work with the board and components inside a high-sided baking dish.
- Leave the component in its packaging until you are about to place it. This also helps in identification as some components (especially the capacitors) lack markings.

The workstation

- Use a static-safe workstation. Semiconductors can be destroyed by static electricity.
- Good lighting and magnification are recommended. I also used an LED headlamp and smaller more powerful hand held magnifier to inspect solder joints.

Soldering

- Double check. Get it right the first time as desoldering is difficult.
- Presolder one pad on the board with a small amount of solder, place component, melt it into the soldered pad, do the other pad, go back and touch up the first pad with more solder if required.
- If the component has more than two pads solder one corner pad first. Rework it until you are happy, then solder the pad on the opposite corner. If all is still lined up OK, solder the rest of the pads.
- With very fine pitch components (e.g. some

IC's) do the corner pads as per above, then solder the remaining pads, not worrying about solder bridges. Then go back over the leads with solder wick to remove the excess solder (and solder bridges).

- Solder flux seems to be important but I don't quite know why ! Anyway, I fluxed all the pads as per recommendations.

On initial testing I found there was no received audio. So I spent a couple of days looking at the circuit diagram and testing voltages compared to the chart of expected values. All checked out OK, so I made an audio signal injector. This was made from the audio output from an AM transistor radio put through a heap of resistance and connected to a pin as a probe, with a lead and clip to ground. While listening to the audio from the ATS3b on earphones, I worked backwards through the audio path, touching pads with the probe. The audio dropped out around U5, the audio switching IC. So I tested the voltages on the pins of that IC again. All the voltages were OK, but I noticed with much joy, that the audio came good in the earphones (which by chance I still had on), when I checked the voltage on pin 1. On closer inspection I found that a perfect-looking blob of solder was sitting on top of the pin, but there was a small air gap between the pin and the pad. I heated up the soldering iron, touched up that joint, and voila a working radio! Steve did warn in the instructions that "99.99% of the time, the reason a kit does not work is due to soldering issues".

As usual, the most difficult part of the project for me was the enclosure. However I had an Altoid-style tin which I had brought back from Alaska. I ended up cutting a thin sheet of aluminium to fit over the base of the tin, cut the correct size holes in it for the front panel, and glued the tin to it.

It helps make the enclosure more rigid and reduces the chance of the pcb flexing. It also gave me a flat surface for a photo of Alaska. A work of art !

I've packaged the rig in a metal biscuit tin, the lid of which serves as the ops desk.

Also in the tin are:

- Battery pack
- Palm Paddle mini CW paddle (from Germany)
- Earbud earphones (with inline volume control)
- An audio cassette case with suitable padding,

holding the spare band boards

The tin fits into a shoulder satchel together with:

- A Z-match tuner (ZM-2) made by Jack VK2CJC.

- Paper and pencil
- Wire antenna
- Throw rope with lead weight
- Plastic garbage bag. To sit on, or to protect the gear if the weather suddenly turns bad.

All this weighs in at 2.4 Kg

It all works well. I've not received any bad reports on my transmitted signal. One of my early (contest) contacts was to the Ukraine on 20m, so it probably transmits as well as any other QRP rig. The receiver sensitivity seems on a par with my FT-817, if not a little better. The audio band pass is quite narrow, but without any impression of ringing. The tuning is a little clunky, with 50Hz steps. The side tone was too loud for me, so I modified the board by replacing R12 (330 K) with 1 M). There is no volume control, so earphones with an inline volume control are an advantage.

I now need to work on a perfect portable multiband HF antenna! It could take a while. I may need to live to 100, or at least until solar cycle 24 kicks in, which ever comes first. (Photos on back cover. *Ed.*)

High Level Mixer

Pascal Nguyen VK2IHL

The mixer was built in 1998 as part of a high dynamic range 'RX98' 2–30 MHz HF receiver. A single balanced mixer was designed using 4 common red Leds and a CMOS 4069UB as a BFO. The circuit consumes an average of 18 mA. Details and the circuit can be found on Pascal's website

<www.pan-tex.net/usr/r/receivers/smixerpic..htm>

Net Notes, Awards, and Contests

Contests

Greetings members. Firstly, my apologies for not giving you the QRP Hours Contest results in June, but space was not available. The results are on page 20, and on page 18 are details of the other Club contest, the QRP DAY. Please mark up your calendar now.

These contests of 2, 3, or 4 hours are popular and good training for potential testers, especially amongst the "F callsigns". It is good that there are some who are motivated and often do well in these events. However, I am always disappointed by lack of support from our own Club members. This could be easily overcome if you will all get involved even for one hour. Please think about this and help to make the QRP DAY Contest a truly Club event!

MPK Award

The other club function that could do with your support is the Milliwatts per Kilometre (MPK) Award. This is simply a certificate for any contact at levels from 1 mW to 5 watts. Obviously, the further the distance between stations the better – it is the pleasure of making the QSO, exchanging cards and getting a certificate for your efforts! Check the web site for full details..

CW on the Internet?

I would be genuinely interested to know if any of you use either "CQ100" or "Hamsphere" – VOIP-style programmes for radio enthusiasts on the Internet? The exchange of picture is very popular on these programmes – in other words, SSTV. The popularity has spawned many developments in the mode, so that digital TV is now as easy as running a photo programme in conjunction with either of the above, and pressing "Send". However, voice and CW nets are just as easy as on traditional amateur radio, all without too many of the hassles of QSB/QRM/QRN. I would love to hear from you if you do use this medium.

Ian Godsil VK3JS

Club calling frequencies

1.815 3.530 7.028 10.106
14.060 21.060 28.060 MHz

CW Net

Net Controller: Ian VK3JS
Tues. nights 1000 UTC 3528
kHz +/-QRM

In Summer (Southern
Hemisphere) QSY to 40
metres if necessary.

Call: CQ QRP Net de VK3JS

Power: Any level

SSB 'Natter Net'

Net Controller: Bob
VK2AVQ

Friday nights 0930 UTC
Summer & 1030 UTC Winter
(Southern hemisphere)

3615 kHz +/- QRM. Power:

Any level

If condx poor, we may shift
to 7095 +/- QRM.

Rejuvenating and Recycling Sealed Gel-cell Batteries

Peter McAdam VK2EVB

I have a habit of visiting our local recycling centre from time to time and often see sealed lead acid batteries stacked up for recycling. I have bought many of these to re-claim for about \$2 a battery. While this so-called rejuvenation does not always work, I have been rather successful if I choose batteries very carefully.

Sealed lead acid or gel-cell batteries are often replaced at regular intervals to avoid failure. In un-interruptible power supplies, or UPS's, that use the 12 volt 7 or 10AH batteries replacement every 24 months is common. The larger 12 volt 26AH, either in UPS's or electric scooters for the aged, are often replaced after a similar period. The reason for this may be under performance, failure to charge properly, or shorter discharge times. But it is not unusual that only one or two batteries in a large bank are the culprits and the rest are still in reasonable condition.

Using an old screwdriver and a multimeter I have a simple technique to choose a suitable battery:

- (a) Look for the most recent date code on the battery. It is usually stamped in the plastic and looks like, 040554, which could be 2004 May batch 54 or 2005 April.
- (b) See if the battery is swollen, or straight and square. A lump on a side would mean it has been over charged, boiled dry, or is badly sulphated—so it is useless.
- (c) Check to see if the voltage of the battery is 12.2 to 12.5 volts or more. Any less and it's probably not worth the trouble.
- (d) Short the battery terminals for 1 to 2 seconds, using the insulated-handle screwdriver. The screwdriver shaft should get hot, so don't burn yourself.
- (e) Check the terminal voltage of the battery again. If the voltage is still above 12 to 12.1 volts then all cells are working and this battery is worth trying to recover.

Most of the batteries I have found to be of the valve regulated variety. This means they basically stay sealed unless there is a pressure build-up in one or several cells during charging periods, at which times the valve releases the pressure. Often these valves are just rubber caps

held in place by the plastic lid glued or welded over them, making them easy to open to replenish the fluid in each cell. The replenishment improves the charging capacity and extends the battery life. I use distilled, de-ionized water from the supermarket for this purpose.

Beware—only a small amount is added, as too much may cause the fluid in the cell to bubble or explode out of the battery when charging.

Using a small-blade screwdriver I pry a corner of the plastic lid on the battery up so I can slide it around like a can opener. This gently snaps the plastic spot welds or glue that hold the lid in place. Carefully work around until the lid is free and able to be removed. This lid will be glued back later so try to avoid any splits or cracks in it. You will now see six rubber caps covering the cell vents. Remove these so that distilled water can be added. I use a syringe to measure and insert the water. Small 12 volt 7AH or 10AH batteries will need 7 to 10 ml per cell. Bigger batteries will need more *but there must be an air space left in the top of each cell*. If I overfill a cell, I empty the syringe and use it to remove the excess fluid, leaving about 10 mm between the fluid and the top of the cell.

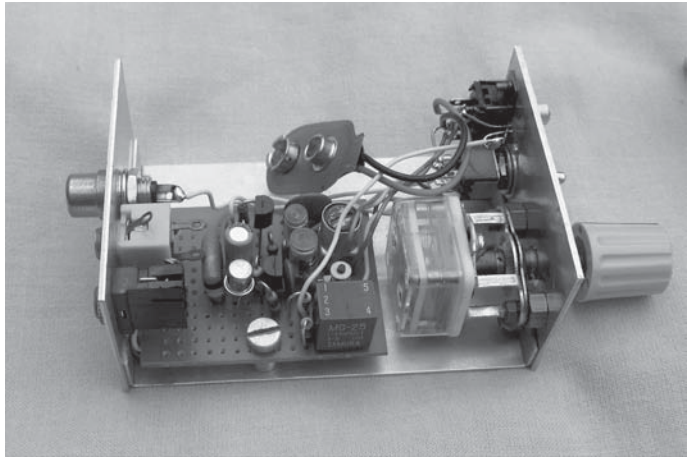
Once you have done the same to all cells it is time to charge the battery. Put the battery outside, or in an open space, away from children or pets, and charge it with 14.5 volts DC at no more than 2 amps (1 amp is better) for 24 or so hours. Monitor the charging current, which should decrease gradually as the battery charges, and monitor the terminal voltage, which should increase to about 14 volts or slightly more.

If the charge current drops to almost nothing and the voltage is about 14 volts the battery is fully charged. Hopefully no fluid will have vented from the cells but there might be small vapour droplets around the vent. *If a large amount of fluid has escaped then either too much was replaced, or the cell in question has a problem and the battery is really not reliable.* Before resealing the cell rest the battery for about six hours and check the terminal voltage again.

continued page 15

Bits-N-Kits

Barry Samuel VK5BLS



Greetings to all you ‘home-brewers’ out there. It is stock take time again and I must say that I have not been kept very busy sending out bits to members. However that must mean that you are getting your parts elsewhere! While the suppliers such as Dick Smith and Tandy’s etc., have diminished their stock of small components, others have taken over. We are now purchasing our parts via the internet more than ever. It is great to be able to get your bits from across the other side of the world!

We have many other things quite unique to our club, such as past issues of *Lo-Key*. We have most of these dating back to No.1 from March 1984. There are also construction manuals, including the TCF 3.5 MHz SSB/ CW QRP Transceiver , the Flexi-Sudden multiband Rx, the Simple Electronic Keyer, the Sensitive SWR Meter and the Forrestfield 21 MHz CW QRP Transmitter. Look on the website <www.users.on.net/~zietz/grp/club.htm> to see the details and what else we have in stock.

As I have been writing in previous editions of *Lo-Key*, we have a number of partially completed items and kits donated by Malcolm VK5BA. I will give them away to

VK members as time goes by. They would be great fun to finish and then pass on to a young or older beginner in order to kindle their interest in amateur radio. This month's project is not for the Foundation Licensee, as it is a home brew transceiver, but would be great fun to get on air by other amateur licensees. This txcvr is not quite finished as the key jack is not connected and it has no documentation (lost some somewhere back in time I guess). It uses an MK484 IC for the receiver, possibly VFO transmitter, and 9V battery for power, so it must be QRPp. It is solidly mounted in an aluminum box and seems to be all there. Can you do it? See the photos. It is yours for the cost of a post satchel (\$5.50). Please contact me if you have any queries. Happy home-brewing!



Worth a Click

Morse Keys

Entertaining the thought of having a go at constructing your own Morse key? Check this site <www.morselabor.de/42396.html>. The web site sprechen Deutsch, but pictures are universal—right? There must be hundreds of examples of the homebrew art, all lovingly illustrated.



John Kirk VK4TJ

“Where Do You Go From Here?”

Finally! Something to give to the new Foundation licensee that takes him or her past that first awkward QSO with some very practical hints about setting up a station. I had actually started to compile something like this to give to my own Foundation students, but I am outgunned, outclassed and made redundant by this very comprehensive ‘ebook’. It has a pronounced American accent and a peculiar bias toward ‘buy’ over ‘make’ for first antennas, to the point of recommending mobile whips (bought) over clearly superior bits ‘o wire (made), but beyond a doubt fills a previously unmet need. 40 pages, and it’s free! <www.k5dze.net/Bookshelf.htm>

COQC QRP Day Contest 2009

Ian Godsil VK3JS

0800 -1200 UTC Saturday 17 October 2009

Sponsored by the CW Operators' QRP Club in Australia and open to all AR operators, the objects are:

1. to work as many stations as possible in each hour;
2. to encourage contacts between VK, ZL and P29 stations;
3. to encourage the use and enjoyment of low power equipment, whether commercial or home-brewed;
4. to test the efficiency of your station under QRP conditions;
5. to compete for a certificate for best hour and/or best three hours.

Club calling frequencies

1.815 3.530 7.028 10.106
14.060 21.060 28.060 MHz

Entrants are encouraged to compete for all four hours, but to submit their logs on the basis of 'best three hours'. Logs will also be considered for highest score in any individual hour.

Bands: All HF bands (no WARC) may be used, although it is envisaged that the bulk of operations will be on 80 and 40 metres.

Category: Single Operator only.

Modes: CW (incl. PSK31), Phone, Mixed.

Exchange: A three-digit serial number beginning at 001 and incrementing by one for each contact.

Repeat Contacts: In order to make greater use of available band space and time, repeat contacts with the same station will be allowed once each hour of the contest on each mode (i.e. a station may be worked each hour on CW and Phone). *Please note: RS(T) not required, but if given should be an accurate statement of signal strength.*

Scoring: Stations within VK/ZL/P29 score as follows:

VK-VK	1 point	ZL-ZL	1 point
P29-P29	1 point		

QRP Hours Contest 2009 – Results

Compiled by Mike VK2IG

Callsign	Points			Certificates	
	CW	SSB	Mixed	Place	Call Area
VK1ACE	8			3rd place CW	Highest CW VK1
VK1DSH	5				
VK2ASU		8		3rd place SSB	
VK2DSL			5		Highest Mixed VK2
VK2IG			(27)	Check log	Check log
VK2TEZ		14		1st place SSB	Highest SSB VK2
VK3GDM	10			1st place CW	Highest CW VK3
VK3JS	9			2nd place CW	
VK3JY	8			3rd place CW	
VK3TX	6				
VK3WF			18	3rd place Mixed	Highest Mixed VK3
VK4EV			5		
VK4JAZ	2				
VK4SN			31	1st place Mixed	Highest Mixed VK4
VK4TJ			15		
VK4XY			25	2nd place Mixed	
VK4ZW	5				Highest CW VK4
VK6FBVB		1			Highest SSB VK6
VK7JGD		13		2nd place SSB	Highest SSB VK7
ZL2NJ		4			Highest SSB ZL

- 20 logs submitted, the vast majority by email.
- 147 logged contest exchanges – 70 CW, 77 SSB
- At least 49 stations participated as follows: 3 x VK1; 12 x VK2; 16 x VK3; 11 x VK4; 2 x VK5; 1 x VK6; 2 x VK7; 2 x ZL
- The logs show that some stations which did not submit logs may well have won a category or call area certificate despite relatively low scores!

It's Subs Time Again!

Annual accounts are included with this Lo-Key. There is no change in the subs level for this year. Although members can join at any time we make adjustments so that everyone works on a Calendar Year for membership subscriptions. Please send subs to the Treasurer, Kevin Zietz VK5AKZ (address on page 2 in Key Roles).

Please check the printout of your account details and let us have any changes when you return the form.

You can include subs payments if you are ordering components. Our subs scale relates to Australia Post international postal zones and is:

- AU\$15 for VK members
- AU\$16 for Asia-Pacific postal zone (e.g. ZL, Papua-New Guinea, India)
- AU\$18 for 'Rest-of-World' DX.

At this stage we do not need to increase subs but we continue to keep a close eye on finances.

Pay your subs *now*. Don't leave it until after Christmas — too easy to forget! Maybe the money involved is too small to create a mental impact? If you don't pay subs you will not continue to get *Lo-Key*. Simple!

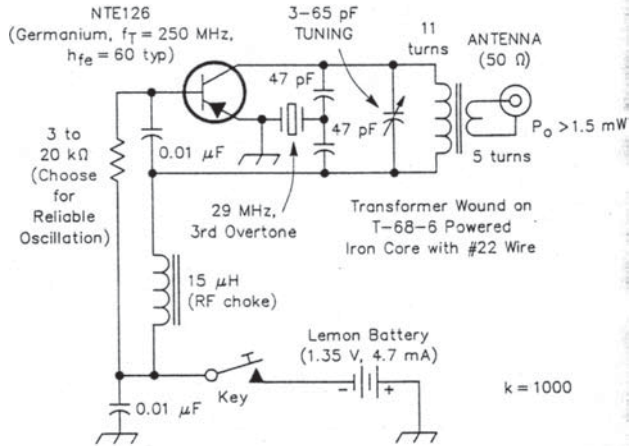
DX members – PayPal

We can arrange this but you *must* email me to get the account email address etc. My email address is: <kevin.zietz@adelaide.on.net>. This is *not* the email address for actual payments - I will let you know the one to be used. Treasurer, Kevin Zietz VK5AKZ

VK members can pay using internet banking.

It's faster and cheaper for you to pay subs (or any payment) if you already use internet banking with an Australian financial institution. Just do a transfer – no hassles with sending letters!

Power Supplies with a Difference.



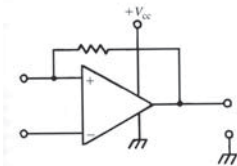
It's 17 years since Bob Culter and Wes Hayward described their "Lemonized QSO", with a QRP transmitter of 1 to 5mW, powered by a lemon juice battery¹. The two cell battery produced 1.35 volts with a 4.7 mA output, and using the circuit shown above enabled the authors to have a two-way QSO over a distance of about 3.5 kilometres. The transmitter could operate with supply voltage of 0.33. However a new power supply might bring yet another challenge to Club members and indeed any QRPer. A recent article in *Elektor* outlined a power source available from potted plants. If you're not an avid gardener, now may be the time to contemplate the idea of a home garden to give yourself a new hobby, increase your popularity with the XYL, and supplement your amateur radio. Each cell is made from a plant in a normal terracotta pot placed on a insulated base. The cell negative terminal is a metal rod driven into the soil, and the cell positive is a pin pushed through a branch, or twig, of the plant. Alligator clips enable connections to be made to the terminals, and reportedly a potential difference of about 0.4 volts can be measured. The article notes that the voltage source can supply a power of approximately 0.8 microwatt. Just how the potential difference is produced is still a matter of speculation. The most likely explanation is

Feedback

Your comments and corrections

Although technical corrections should be located in this section, I can report two delightful typographical errors printed in the June 2009 issue.

The errors were on pages 2 and 26. My thanks to some keen-eyed members. *Ed.*



Application for Membership

Ordinary Membership of the CW Operators' QRP Club Inc.

Please print

First Name:

Surname:

Callsign: (*swl's are welcome*)

Address:

.....
.....

Email Address:

Please enclose the annual membership fee: VK AU\$15, Asia-Pacific AU\$16, Rest-of-World (incl. USA & Europe) DX AU\$18.

I agree to my details being held on the Club's data base and my name, callsign, city, and country, being published.

I do/do not want CW Ops emails.

Signature:

Sponsor (*If any*): (*insert member's name & callsign.*)

You will receive a new member's pack and membership number. Subs are due on 1st Jan each year. We will adjust the amount on your account in September. A receipt will be given only if you ask when making a payment.

Please mail this application to:

Kevin Zietz VK5AKZ, Treasurer CW Ops QRP Club, P.O. Box 1018, Pasadena, SA 5042, Australia

