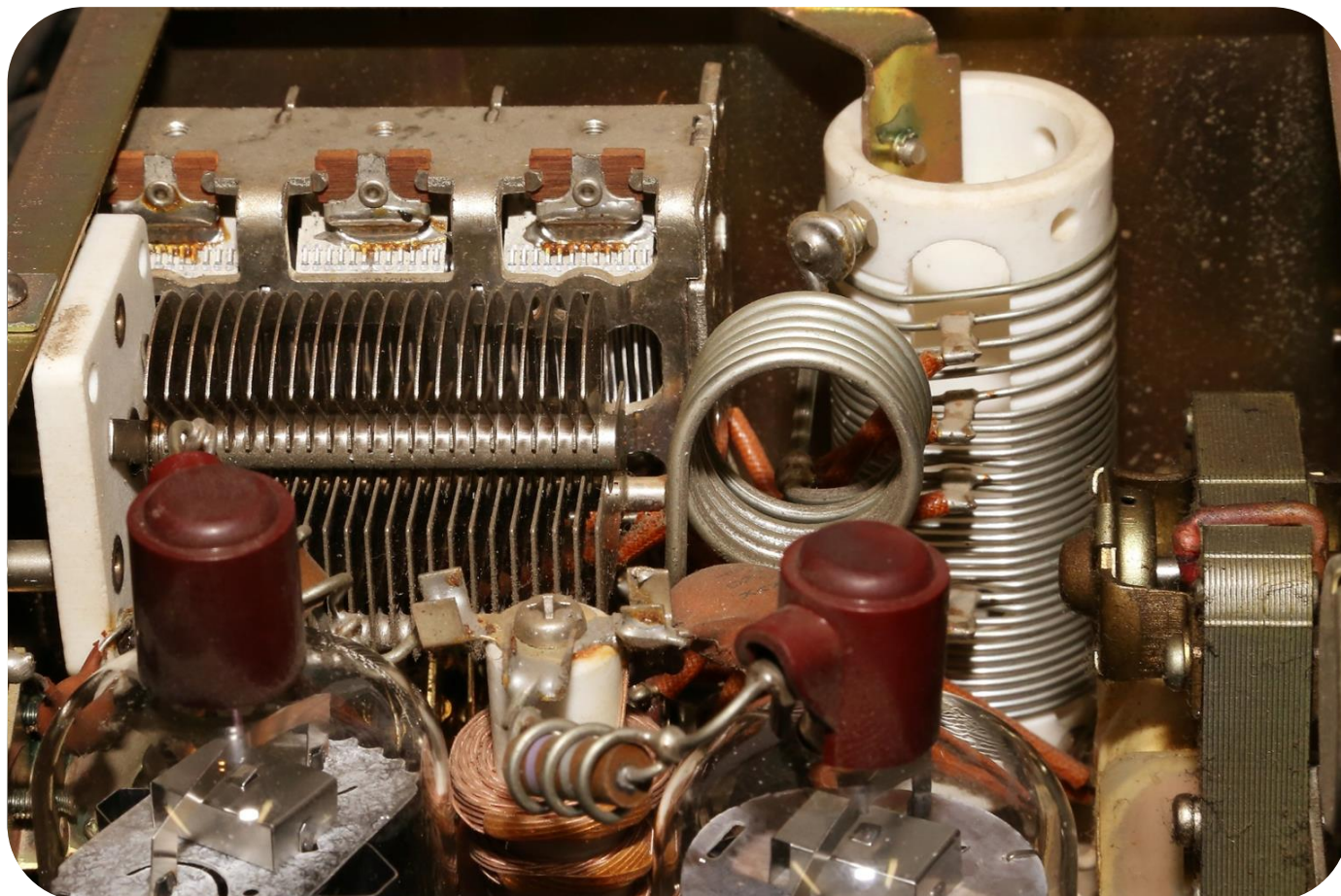




GATEWAY

**The Official Magazine of the Gippsland
Gate Radio & Electronics Club Inc.**

July 2019



**Death by Power Board
Fun With Counters, Pt 2
Trees & Orange Roots
And More**

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Note: - club meeting minutes are on the club website

Event Queue

July:

- 19th General meeting – Guide hall
- 20th GGREC Hamfest
- 20th Trans-Tasman Low-Band Contest (courtesy WIA)
- 22-23rd WIA Winter VHF-UHF Field Days (courtesy WIA)

August:

- 2nd Prac night – club rooms
- 16th General meeting – Guide hall

October:

- 13th Yarra Valley Amateur Group HamFest (courtesy WIA)
- 19-20th JOTA 2019 (courtesy WIA)
- 27th Ballarat Amateur Radio Group, BARG Hamvention (courtesy WIA)

The GGREC is planning to hold some Club Events. These are the Summer Field Day, the John Moyle Memorial Event and possibly the Winter Field Day. Dates will be forwarded at a later date. The Clubs participation in these events means that, besides having fun in setting up and operating our gear, we also promote our club. Furthermore the club is equipped with a complete set of portable gear. Why not use it? Please consider to be part of these events. The Committee of the GGREC

Gateway is the official journal of the Gippsland Gate radio & Electronics Club.

It is published in good faith for its members and other interested parties. The articles here in do not necessarily represent the views of the committee or the membership.

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President's Report - Tony Doyle VK3QX



From the President

To GGREC members,

Another month has passed and we are getting very close to our Hamfest.

We've started buying the groceries and making all the final arrangements and are looking forward to a great event.

This month Bruce was to continue with his receiver project for Prac Night but injured his back at the last minute. Hopefully he is on the mend and we will see him at the next meeting.

Prac Night ended up being a mixed bag with DMR chat, Rob (VK3BRS) replacing some final valves and retuning a radio and myself checking the interference and "sweeping" the antenna on the RGW repeater.

We ended up having a good night and bid farewell to Helmet (VH3DHI), who will by now have set off on his latest expedition to warmer climates for the winter.

Whilst no interference was noted on RGW during the Prac Night testing, we believe that was just the nature of the beast.

The paperwork for the new RGW frequencies, to facilitate the 7MHz split, has now been filed with WIA and we are eagerly awaiting a response.

The new repeater frequencies are likely to be TX438.425MHz / RX431.425MHz, all going well.

Remember, we are still on the lookout for nominations for the Treasurer position and hope that we are able to get a volunteer before the next GM so that Al (VK3BQO) can provide some training and step down.

I look forward to seeing you all at the next GM, the night before the Hamfest.

73,

Tony Doyle (VK3QX)
GGREC President

From The Editor – Trees & Orange Roots



Yesterday the sun was out (hard to conceive considering the storm later in the day) and the green waste bin was beckoning to be filled, as bin day rapidly approached. So after giving the grass a quick cut, attention fell on a tree root that was serving no purpose other than harbouring weeds that the mower could not access. A few weeks back I had run a circular saw through the top of the stump to help in breaking it up. So I got stuck into it with a mattock to break it up into manageable chunks for the green waste bin. In levering out one chunk I became aware of another root hooked around the mattock. Boy was I surprised when I found that not only was this 'root' exceptionally smooth, but it was also bright orange and made of PVC.

Orange PVC is normally reserved for electrical wires (white for water, and yellow? for gas), Now I have seen all the ads on TV about what can happen if due care is not observed when digging holes in your nature strip/roadside etc., but not in ones back yard, especially when one is far from any building. The only place I expect electrical cables in my backyard is between the house and the backyard radio shack, these being mostly covered in concrete.

So where was it going, is it live? I tested it with a mains power detector; however I didn't really trust it's "OK" response. I could see it was leading away from the house, but where was it going, especially as I was now about a meter from the back fence, was it going across the fence line into the neighbours – to his shed – only another meter. So onwards with the mattock, now carefully scooping soil from above the conduit, till I was all but at the fence where an elbow sent it along the fence line. This right angle joiner had an inspection cover, so I removed it to find that the conduit was empty, fyew

Paul VK3TGX

July Contest Report

Hi and welcome to the contest report for July 2019.

The weekend of the 22nd and the 23rd of June was the UHF/VHF Winter Field Day here in Australia, at the moment I don't have any reports from folks who participated. If you are a club member or know someone who did participate, please feel free to contact me and I will make sure it ends up here. Once published here you'll be famous, think of the benefits that will bring. Imagine being able to start a career as an AR influencer on the social media platform of your choice.

The big contest for the month and certainly the biggest in the English speaking world is the ARRL Field Day 2019. According to the ARRL website (<http://www.arrl.org/field-day>) approximately 40,000 radio amateurs leave the shack and head out into the field to set up radio stations big and small. Like all field days these stations must run off emergency power for the duration of the event. During the field day operators can work 160,80,40,20,15 and 10 meters they can also work bands 50Mhz and above on all legal modes and power levels.

The key thing about field days is that operators challenge themselves to set up and maintain emergency communications for 24 hours. The ARRL Field Day like all things North American, once they get going on the idea it gets bigger and bigger and they push the envelope further and further.

If you are interested in the scale and diversity of the event here is a curated list of YouTube videos:

DARC, Dallas Amateur Radio, Field Day 2019: <https://w5fc.org/2019/07/02/arrl-field-day-2019-videos/>

VE3TWM - Mr "Outdoors on the Air" from Canada. Portable under canvas setup and by the looks of it he had a rushed run up to his deployment. He discusses his end fed antenna and gets on the air. <https://www.youtube.com/watch?v=Q1ztnqjPC2c>

Columbus (GA) Amateur Radio Club, W4CVY. <https://www.youtube.com/watch?v=v4ahVwkuFEI>

K4NN, Signal Hill Radio Club and informal association of friends.

<https://www.youtube.com/watch?v=Zio8Wb4LFPk>

This is a fabulous video which shows a lot of home-made towers and supports and is very well narrated.

Heading back to VK for a moment, the John Moyle Memorial Field day is the equivalent contest here in VK which also encourages field day operation for the purposes of emergency deployment practice.

VK3YE, The unstoppable Peter Parker in his equally unstoppable shorts and bare feet, <https://www.youtube.com/watch?v=5PoVG9foH8>

Redcliffe Radio Club from 2018, <https://www.youtube.com/watch?v=A1Js6os8GfI>

Finally from our former colonial masters this is the RSGB National Field Day, here is a video from the Nuneaton & District Amateur Radio Club, it features interviews and gives a good historical context. It is also very British with cups of tea and a meal of fish and chips.

<https://www.youtube.com/watch?v=2mTsCPs8A6E>

From the shack of TIN:

A field day setup by yourself is a compromise between simplicity of deployment and efficiency of reception on the bands that you wish to work. Focusing on reception is important because building a reasonable transmitting antenna with the aid of a tuner is not overly complicated and is well documented. The biggest issue is that such an antenna is likely to not be a good receiver or it may have a polarization that makes it prone to picking up QRM. One solution could be to use a separate receiving antenna so with this as a plan I will be experimenting with using receive loops in various configurations combined with the LZ1AQ Active Antenna Amplifier over the next month.

(<http://active-antenna.eu/amplifier-kit/>)

I will keep you all in the loop, as they say.

Updates:

The results for the John Moyle Field day are as follows:

- 24 Hour Portable Multi, VK2IY, VK3ER, VK4IZ and VK3KQ
- 24 Hour Portable Single, VK2IO, VK2KCM and VK2HGB
- 6 Hour Portable Multi, VK2LE, VK2BV, VK2CLR, VK3MH, VK4QD
- 6 Hour Portable Single, ZL3VZ, VK3MH, VK3HY, VK5PAS, VK3PI
- 24 Hour Home Station, VK3SIM, VK2ZDR, VK5LJ, VK2XAX, VK3MY, VK3DEK
- 6 Hour Home Station, VK4SN, VK4ADC, VK6LB, VK2PR

For full results please visit: <http://www.wia.org.au/members/contests/johnmoyle/>

The results for the Jan-Mar period of the Ted Powell Memorial DX Challenge are out with David VK3BDX scoring first place, Chris VK3AWG in second and in third place was Grant VK5GR. The Ted Powell Memorial DX Challenge was developed by the Fishers Ghost ARC and was created to memorialize Ted's passion for working rare DX. The scoring is interesting and is computed such that a contester with a few higher ranked entries will out score a contester with a lot of lower ranked entries. For more details see: <http://vk2au.org>

Coming up:

The next Australian contest is the "TT" the Trans-Tasman Low Band Contest which is held on the 20th of July 2019.

See <http://www.wia.org.au/members/contests/transtasman/> for details and rules.

Contests to start planning for:

Remembrance Day Contest (17/18 Aug).

See: <http://www.wia.org.au/members/contests/rdcontest/>

OCDX contest, first and second full weekends in October for phone and CW respectively.

See: <http://www.oceaniadxcontest.com/index.html>

73 Megan Woods, VK3TIN.

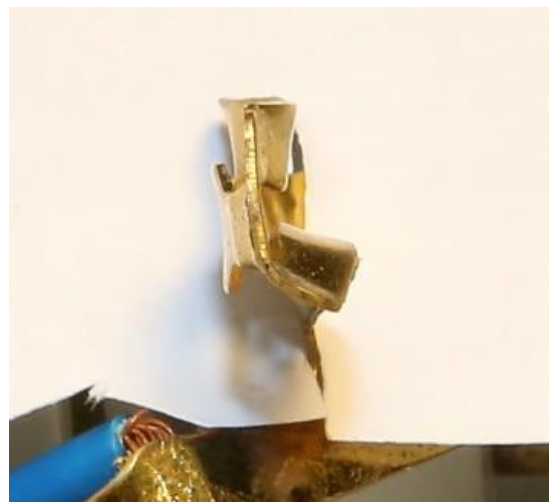
Death by Power Board



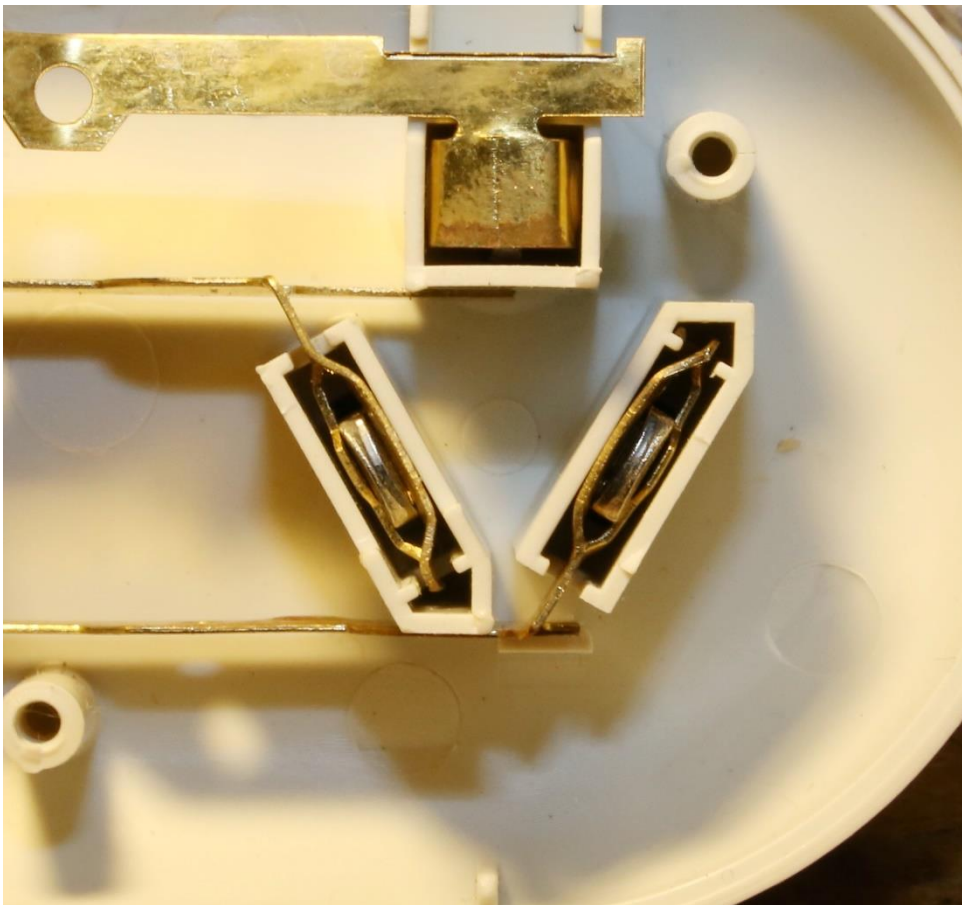
The 'other day' a lady from church gave me this power board, it's actually one of those energy saving devices that is supposed to save you electricity by turning off ancillary appliances. So for example, on a Hi-Fi rack, you'd plug the amplifier into socket 2, if the internal circuitry detected that the amp had been turned on, it would then power up the last 4 sockets, where you would plug in your turntable, CD player, Tape machine, etc. etc. (the first socket is an always on, but with no sense circuitry, for gear that must stay on) The lady had been using it with her TV, however it turned out to be the culprit as to her having trouble controlling her air conditioner. I am assuming that unit was radio controlled (another LIPD), and that the switch-mode supply in this power board was causing interference.



However when I opened it I was shocked (but not surprised) to find that two of the sockets were quite badly damaged, the socket contacts were quite mangled and all but pushed out of their housing.



To the owner, unless you are extremely observant, you would never know. You bend down, push in a plug and all seems well. The trouble is that to make a successful insertion you have to have the plug almost precisely in alignment as you push it home, there is almost no room for error. Then after the contacts fail, and you start drawing current through these now very iffy connections, how long will it be till we start having a bit of arcing, heated contacts, and the makings of an electrical fire. This, house fire etc., is what I meant by 'Death by Power Board.'



Here is a view of a plug successfully inserted, as you can see there is no room for movement, fine you may think, holding the plug firmly in place is good, however the problem is getting it there in the first place.



If the plug is not inserted squarely, then it can easily catch on the edge of the brass contact. All the user feels is a bit of resistance, so they push a bit more, and end up bending the contact and pushing it out of its housing.

Also, you should note, there is little in the way of spring action, so after a dozen or more inserts, or a somewhat worn plug is used, the contact tension is soon lost.

How far do these spring back and forth, all but zero, so how are they supposed to retain contact tension?



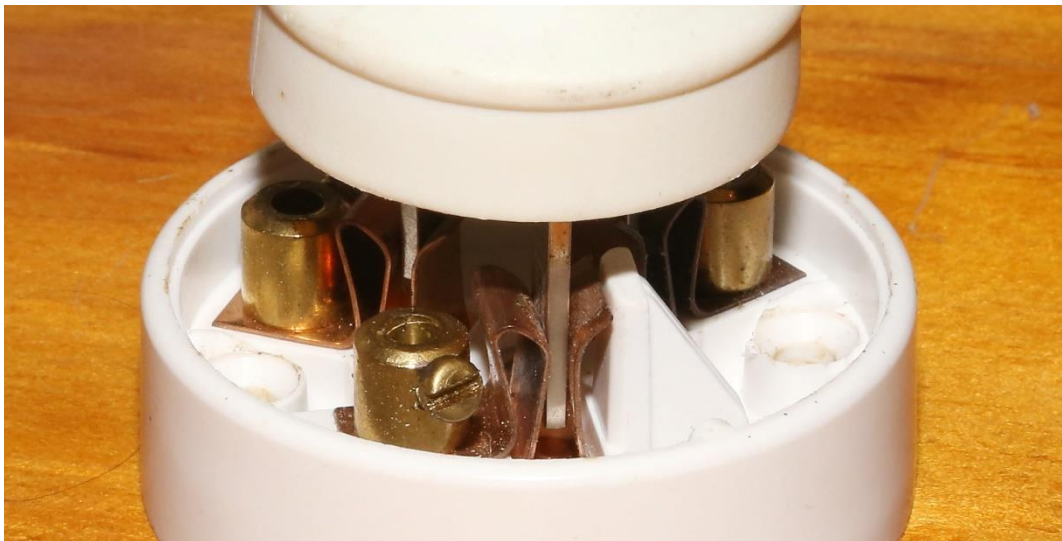
Here is a plug in one of those damaged sockets, apart from not feeling the plugs prongs make a double 'bump' as it passes the lower folded out sections, it is a tad proud of the face of the board. Now who runs their fingers around the base of the plug, or carefully looks across the board to make sure it's in all the way – Almost no one, except me, as I have grown accustomed to this cheaply produced junk. And what are your options, usually not much, as so many are built the same way.



Now compare it to this now very old but much more serviceable 'Ring Grip' brand surface socket.

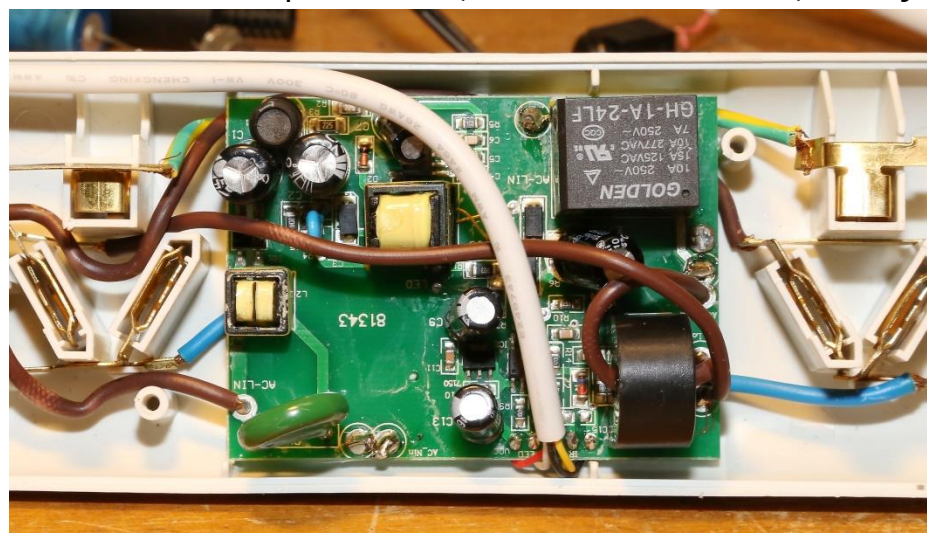
(\$1.28 from McEwans)

The brass contact has obviously been formed into a nice curved leaf spring, with lots of room to play with when the plug is inserted.



This plug was easily inserted without the lid to guide it into place, all but impossible with the 'new style board'

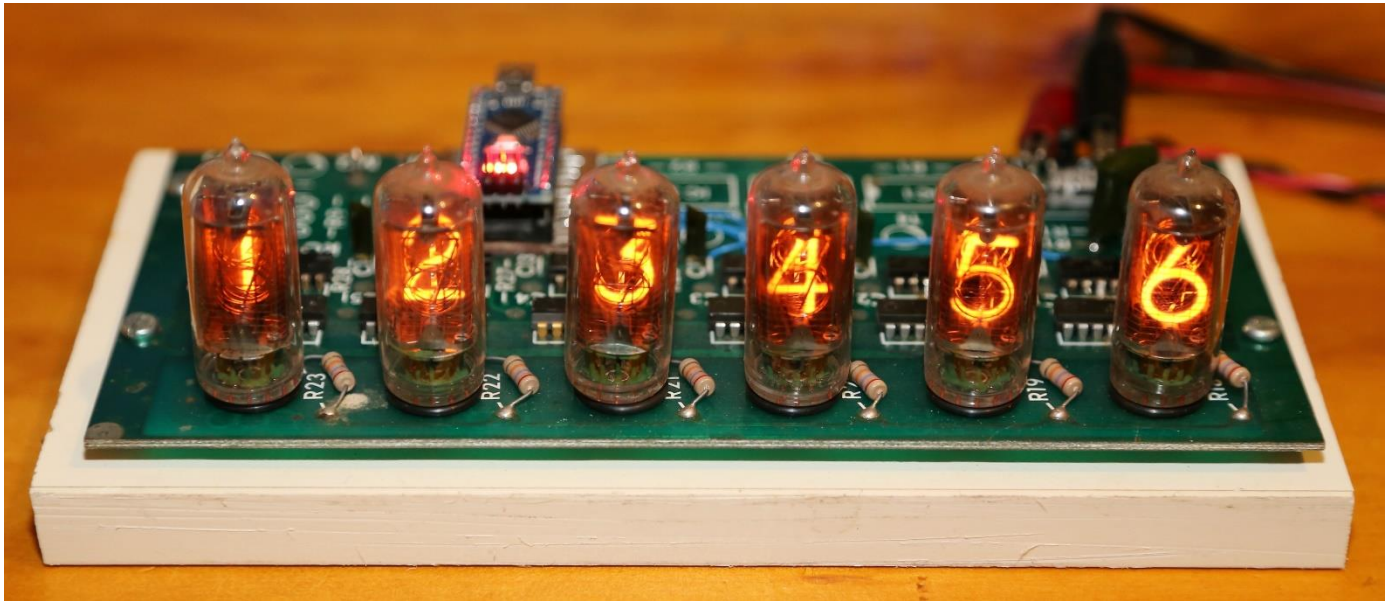
Now back to the reported fault, here is the electronics, so they are going to 'save the planet' by



giving us more cheaply produced electronics. These power boards are supposed to eliminate what is called 'Phantom loads' by turning them off. In the end you are just replacing one phantom load, the appliance, with another load, little to nothing being gained. Add to that that so much of modern gear needs to be powered on 24/7 or it's useless; take for

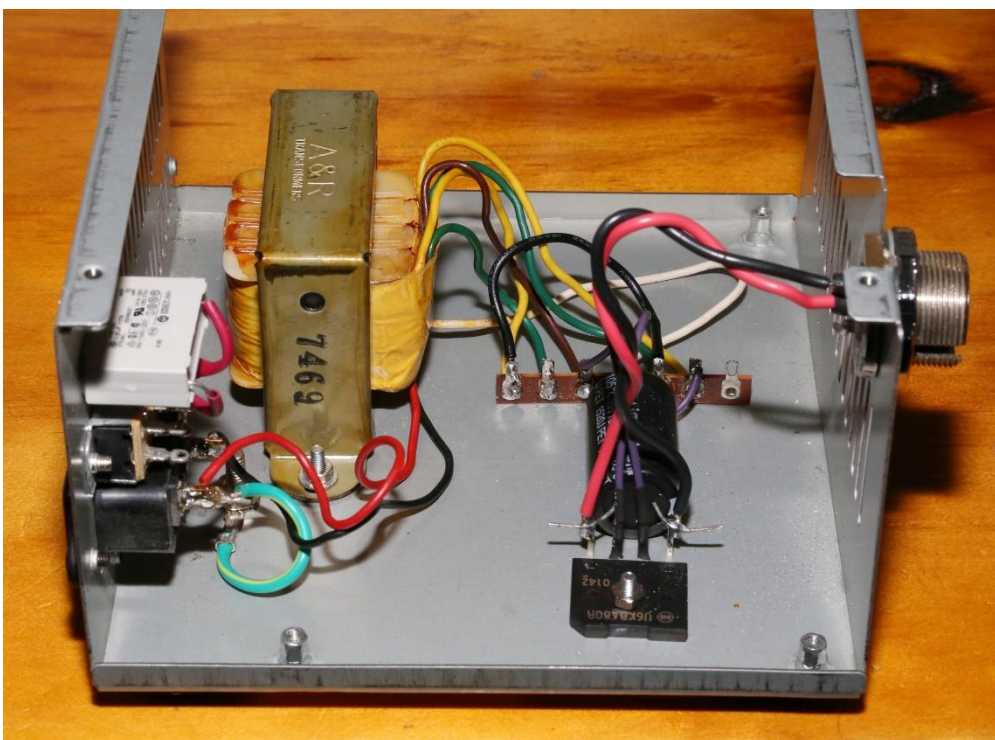
example your Wi-Fi / NBN access point, or a Google/Amazon/Apple voice assistant.

I usually rip out the electronics and fit a mechanical relay for Arduino etc. control, but seeing all this lovely quality, I'm tempted to just create some more land fill, one's only option considering all the 'broken' recycling companies out there.



Graeme's 'Clock' (counter)

This is Graeme's Nixie tube board finally up and running, I removed several unneeded support IC's and mounted an Arduino Nano in their place to control it all. I then screwed it to a scrap piece of MDF board to make the handling of it much easier, both so I could place it without worrying about shorting out the bottom of the board, and secondly so I would be much less likely to touch the high voltage Nixie tube supply of 180V.



Speaking of the 180V supply, here is the temporary supply I built into an old computer power supply box.

I tend to hang onto a few of these boxes as they are handy for knocking up various, mainly 240V mains powered devices. I usually throw the switch-mode supply boards and keep just the IEC inlet socket and the 12V fan.

Initially I just had a hard wired lead exiting the box to carry the 180V rail

to the Nixie board, however this was proving a touch dangerous because I couldn't easily isolate the HV/B+ from the Nixie board to allow me to work on it. So I rummaged through my junk box and found an 'ancient' plug and socket that I am extremely unlikely to miss-connect to anything else mainly as I don't have any more of them. I think they were used back in the '60's as audio connectors; I seem to remember seeing them on the microphones in very old Beatles black and white film clips etc.

I was initially going to just use the mini USB socket on the Arduino to provide the 5V, and the above supply for the 180V B+ supply, however those 12 TTL IC's were pulling about 350mA and were loading what was coming out of my mini USB lead down to about 4V. Whilst the Arduino was happy (they are good to 3.3V, maybe lower) the TTL IC's were not, so I had to reinforce the 5V with my benchtop supply. USB is supposed to be able to deliver half an amp (more in later USB versions/specs) however the 1.5M USB lead was probably letting me down somewhat.

Actually I made a slight boo-boo when I fitted the Arduino, I connected the TTL IC's to the Nano's 'Vin' pin, thinking just of 5V, so when I first powered it from the USB, the TTL IC's were only getting 3.3V, they were being fed 'backwards' though the 5V regulator on the Nano, so I just put a wire link between the 5V pin and the Vin pin, as I will not be using the on-board reg, as there is no way it could handle running the 350mA TTL load. I've already popped one of those regulators, having the full grunt of my radio shack's 13.8V supply fed into the Atmel processor IC did not do it any favours.

```
162
163 void SetCountOld(long loops){
164     digitalWrite(reset_counter,HIGH); // PD3
165     digitalWrite(reset_counter,LOW); //reset counter
166     for (long x=1; x <= loops; x++){
167         digitalWrite(clock_counter,LOW); // PD2
168         digitalWrite(clock_counter,HIGH); // clock counter
169     }
170 }
171
```

This is the code I originally used to 'clock' an arbitrary number into the display.

Using it on my 4 digit counter as per the last months article, along with that counter's latches (code not in this snippet)

proved quite successful, however using it on a 6 digit counter without latches made for quite a slow process, vaguely acceptable on 4 digits, assuming frequent updates were not needed, but on a 6 digit display, updated once a second, absolutely useless.

```
151
152 void SetCountOld(long loops){
153     PORTD = B00001100; // digitalWrite(reset_counter,HIGH); // PD3
154     PORTD = B00000100; // digitalWrite(reset_counter,LOW); //reset counter
155     for (long x=1; x <= loops; x++){
156         PORTD = B00000000; // digitalWrite(clock_counter,LOW); // PD2
157         PORTD = B00000100; // digitalWrite(clock_counter,HIGH); // clock counter
158     }
159 }
160
```

So I changed the code so I am now directly addressing the micro's I/O ports, not via the Arduino 'digital.Write' library. when you ask the library to do a write, there is a heap of code that gets run in the background, not only does it have to look up what port and bit this pin is attached to, it also has to first read that port, make the one bit change needed, then write it back to the port, usually referred to as a 'read-modify-write' operation. Normal port reads are usually 8bits, as in one byte at a time, some processors can do single bit, but it is far from universal. This Arduino function is extremely handy when the other bits of a port are being controlled by other chunks of code that this routing knows nothing about, but when sheer speed is needed, definitely not the way to go. In this case there is only the counter connected to that port, so I can safely directly write to all the pins, avoiding any 'Read/modify/write' sequences.

Now I can clock in a 6 digit number, and update the display once a second.

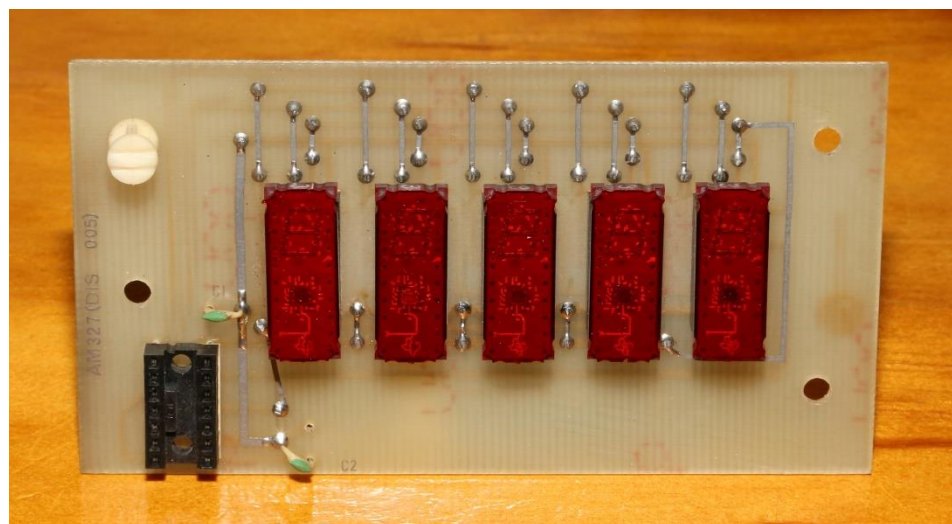
I later did some experimenting with an 'update' routine, rather than just resetting the whole display every update, it would see what the difference was between the old display number

and the new number, only clocking in the difference. In the case of a clock this works really well 99% of the time, the only place where it fails is when we go from '12:59:59' to '01:00:00', this is one place where 24hour time wins out, as going from '23:59:59' to '00:00:00' involves only the reset line with no rapid clocking at all. However I have other idea's other than a clock, so it's time for 'Plan B'. I'm going to cut a few tracks and make it into 3 separate 2 digit counters, this will neatly all fit into port D of the micro, so I can use 3 versions of the above 'bit banging' code to address each section separately. Port D on the Arduino loses 2 bits, these are used by the hardware UART (serial port) in the Nano, leaving just 6 bits, 2 (reset & clock) for each of the 3 counter sections, perfect. I don't have to worry about upsetting the serial comms with my direct port writes, as these pins are redirected internally with hardware, so nothing I do with my port 'D' writes will have any effect, that port pin re-assignment is handled by another internal Atmel micro register that I am not talking to. In the end, this will speed up the display 10,000 times, as I don't need 10,000+ clocks to access the last two digits (or the first two, depending how you look at it)

And there is more...



Whilst doing through Graeme's belongings, I came across this device, as far as I know it was originally a radio isotope metal thickness measuring device, however on powering it up I was immediately drawn to the displays. (Strange that!)



Normal, as in present day, LED displays have a LED die that is buried at the bottom of a well, or light pipe that channels the light up to form the segments you see. You see a 'bar' for each segment, whereas the light is actually coming from a single point source buried deep in a pile of translucent

plastic. In the early days the LED dies were not that bright so this could not be done, so instead they made the segments directly out of LED chips, or as in the case of these displays they fabricated elongated LED dies, so not as many were needed.



In this zoomed in image, you can easily see the two LED die's used for each segment. Instead of looking at a pile of illuminated plastic, you are looking directly at the LED chips themselves, and I find they look quite nice, and kind of desirable, vaguely like Nixie's in that you are looking at the glowing bits.

If you look at the displays on the board, you can fairly easily see the segments at the top of the packages, the square black blob a bit below half

way is actually the driver IC, see left, used to run the display. So all you need it 5V and some TTL compatible signals (i.e. Arduino) to make them go.

There is but one catch, these, Texas instruments TIL306's are actually single digit counters, there is no direct access to the segments etc. You can access the BCD data to feed the count into other circuitry, but the BCD is output only, no input options, oh well, here we go again.

I do have some nice HP displays that take BCD data to drive them, but hey, they are not 'counters' so are kind of 'off subject' here, But I'm sure I'll do another page or two later on with them.

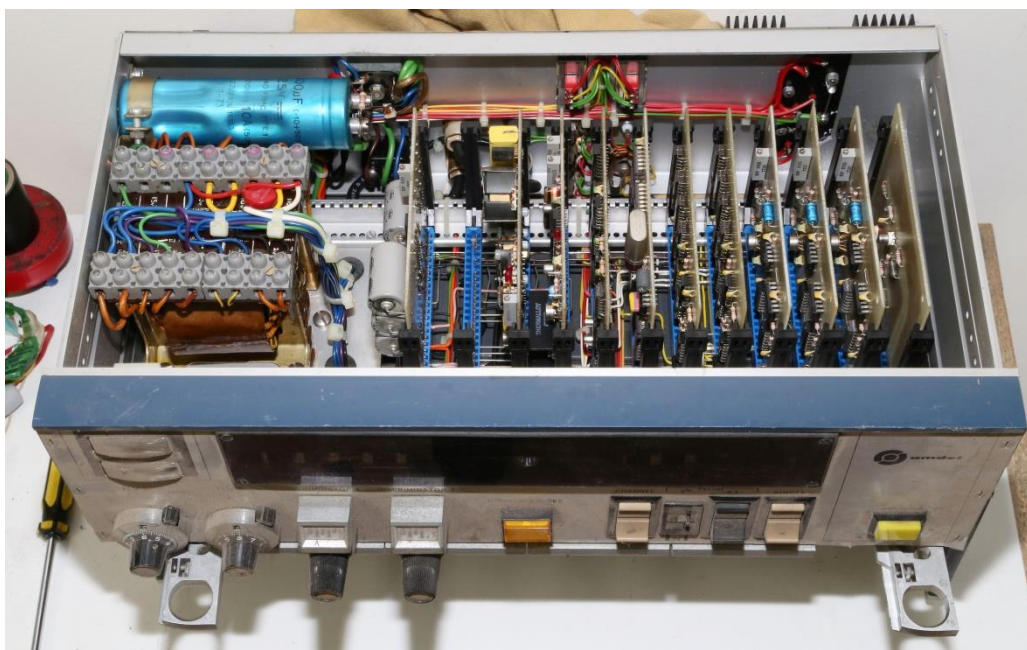
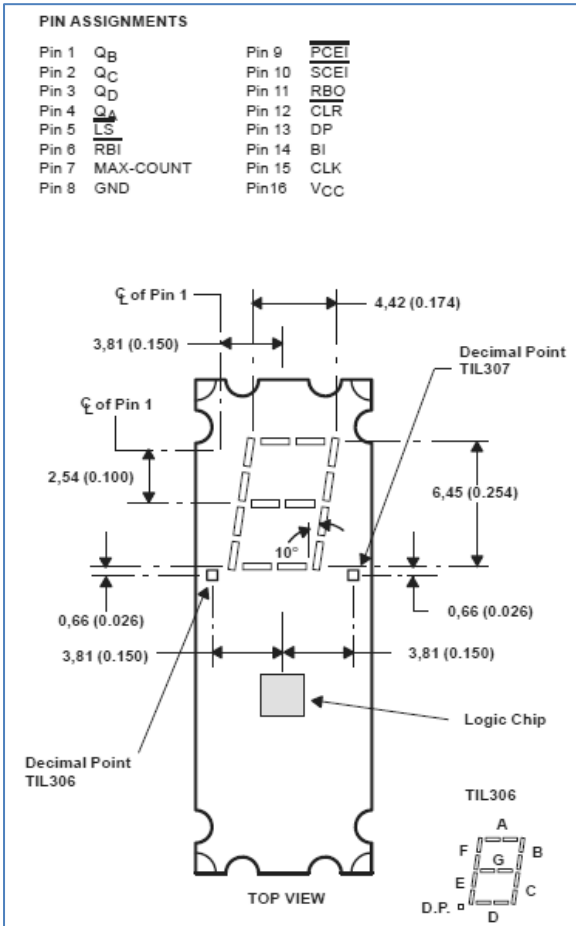
It sure does look like everyone did everything with counters in the day, even early calculators, the prelude to modern computers were just glorified counters. To add a number you clocked both numbers into a counter, wow there is the result. To multiply you clocked in the same number 'X' times....

I have a mechanical 'calculator', it's basically a suped up old school mechanical 'odometer' as found in older

cars, gas meters, etc.

Here is an internal view of Graeme's old box, boy is it well made, and slides open with no tools needed.

It's a pity they don't make modern gear the same way.

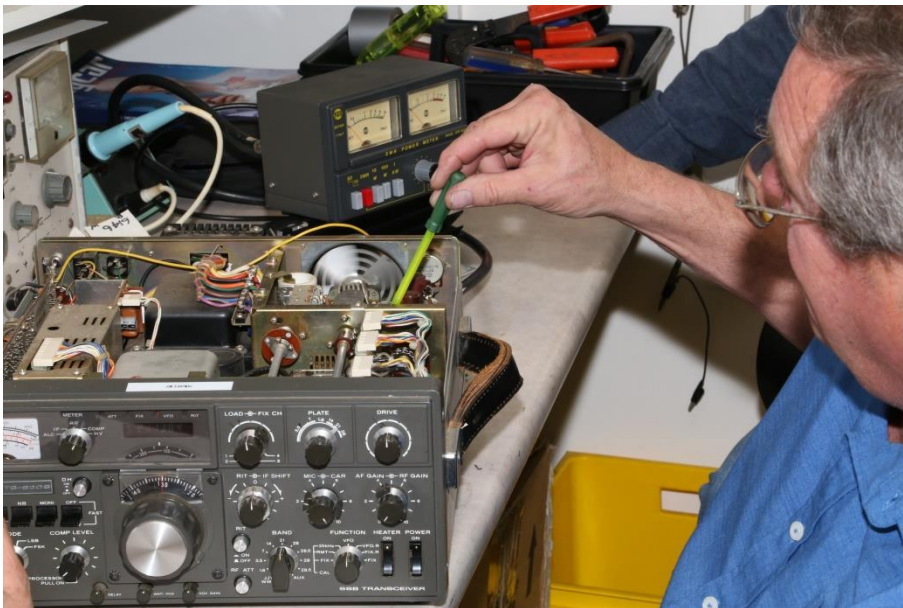


Paul VK3TGX

Prac Night Update



What was Rob doing wrong? – a non insulated tip (Do you remember this from last month?)



Now this is how it should be done, both to avoid detuning the radio by hanging that big chunk of metal off part of the PA output tank circuit, and to also avoid getting a lethal boot from the high voltages present in a valve output stage.

In the first pic, Rob is using an electrical screwdriver, so the lethal bit is removed, however the detuning effect of the metal screwdriver's shaft remains.

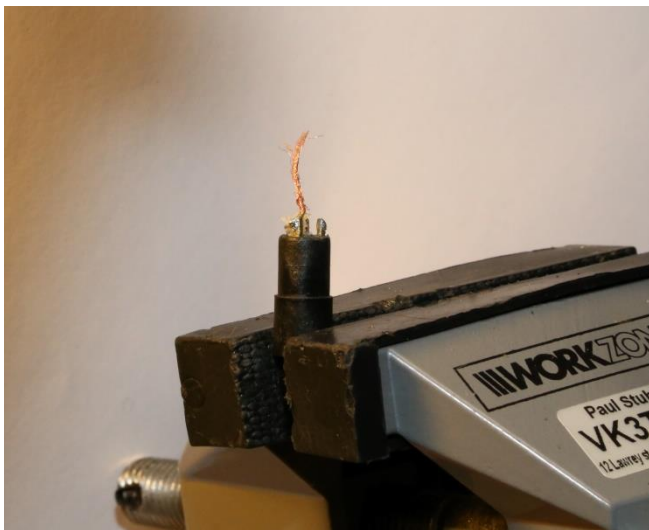
From The VK3TGX Repair Bench

The Impossible Wire...

Recently I was asked to sort out a dead MirPro lapel radio microphone system for church, actually they were after a whole new system and asked me to source one, unfortunately I've been awfully busy of late, so I opted to patch the old one together to keep them going for another week or two.

On inspecting the system, it was found to have succumbed to the standard fault, a broken lead from the lapel mic back to the belt pack transmitter. The main problem for me was that the plug was all but moulded onto the end of the lead, I could probably get a new one from Jaycar but buying a plug for only a dozen or so uses before it is all thrown out seemed a tad crazy, so I got stuck into the old plug.

It looked like a normal professional plug, but with something a bit tougher than hot melt glue encapsulating the wire termination. So I cut the lead just past where it entered the plug, assuming that was where the break was then I proceeded to dig down through the hot melt to get to the solder joints.



As I went I was using my multimeter trying to get continuity between the outer shield and what looked like the earth pin, Pin 3, on a mini Cannon plug. I kept getting closer, but could not see the break in the shield. I eventually got 99% of the resin/glue etc. off to reveal a wire soldered, a tad roughly, but soldered anyway to the plug solder bucket.

I could now buzz from the inside of the plug's contact to the actual solder, Ah continuity, but from the solder to the bright copper wire nothing!

So what was I doing wrong?

I connect one probe to the solder, the other end to the copper and receive no joy.

After much stuffing about it turns out that these are not thin strands of copper wire at all, Yes they are copper, but they are all individually coated with enamel, i.e. lacquered/enamelled winding wire, usually found in a transformer.

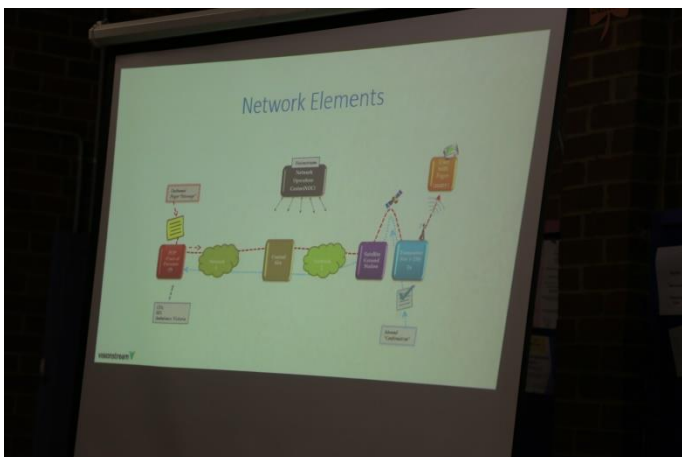
I have terminated many a shielded cable in my time but I have never come across one where the strands are all individually insulated from each other. And boy are these strands fine, and boy did I have fun trying to get a good picture of them for you to see.

I have opened the leads of earphones from mobile phones, these are quite often made of three or four strands of enamelled wire, I thought those were thin, but these are far thinner, as a shield with two inner cores covered in red & white plastic, quite a common

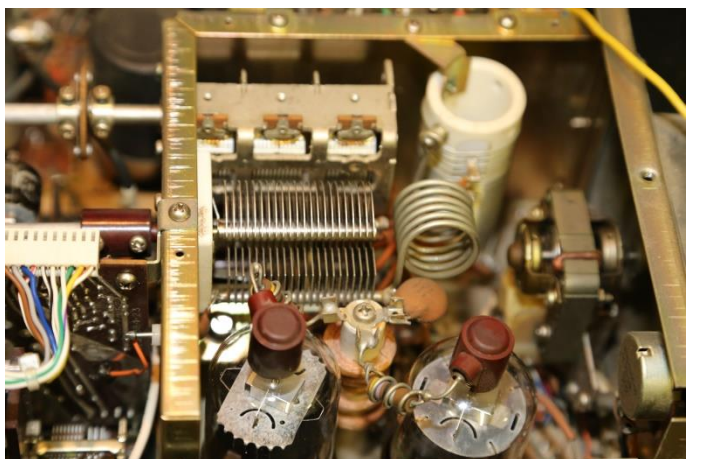
colour scheme for microphone wire. In the end probably the stands of the white and red leads are also constructed of individual enamelled wire, I didn't bother checking, I'd spent far too long on the job. A hot iron soon fixed all that lacquer and it was back working again.

Paul VK3TGX

A group of approximately 15 people, mostly men, are seated in a room with brick walls and blue doors, attending a presentation. They are seated in rows of blue plastic chairs. In the foreground, a white table holds a projector. The room has a casual, community-like atmosphere.



Prac Night 5/07/2019





Club Information



Meetings 20:00hrs on third Friday of the month at the
Cranbourne Guide Grant Street Cranbourne
Prac nights first Friday in the Peter Pavey Clubrooms Cranbourne 19:30hrs
Visitors are always welcome.

Office bearers

President	Tony Doyle	VK3QX	Web Master	Mark Clohesy	VK3PKT
Admin Sec	Rob Streater	VK3BRS	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Albert Hubbard	VK3BQO	Property Officer	'committee'	
General 1	Helmut Inhoven	VK3DHI	Assoc. Secretary	'committee'	
General 2	Leigh Findlay	VK3FACB			

Call in Frequencies, Beacons and Repeaters

The Club Station VK3BJA operates from the Cranbourne Clubrooms.
6m Repeater Cranbourne VK3RDD, In 52.575 Out 53.575 CTCSS none
70cm Repeater Cranbourne VK3RGW, In 434.475MHz Out 439.475MHz CTCSS 91.5Hz
VK3RGW Repeater supports Remote Internet access (IRLP), Node 6794.
70cm Repeater Seaview VK3RWD, In 433.575MHz Out 438.575MHz CTCSS 91.5Hz
Simplex VHF - 145.450MHz FM, Simplex UHF - 438.850MHz FM
VK3RLP Beacons 1296.532MHz & 2403.532MHz (currently inactive)

Membership Fee Schedule

- Pensioner member rate \$40.00 Extra family member \$20.00
Standard member rate \$50.00 Junior member rate \$25.00
Fees can be paid by EFT to BSB 633000 - Account 146016746
• Always identify your EFT payments
• Membership fees are due by each April Annual General Meeting (AGM)

Magazine Articles to editor@ggrec.org.au Cut off, 10th of the month
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