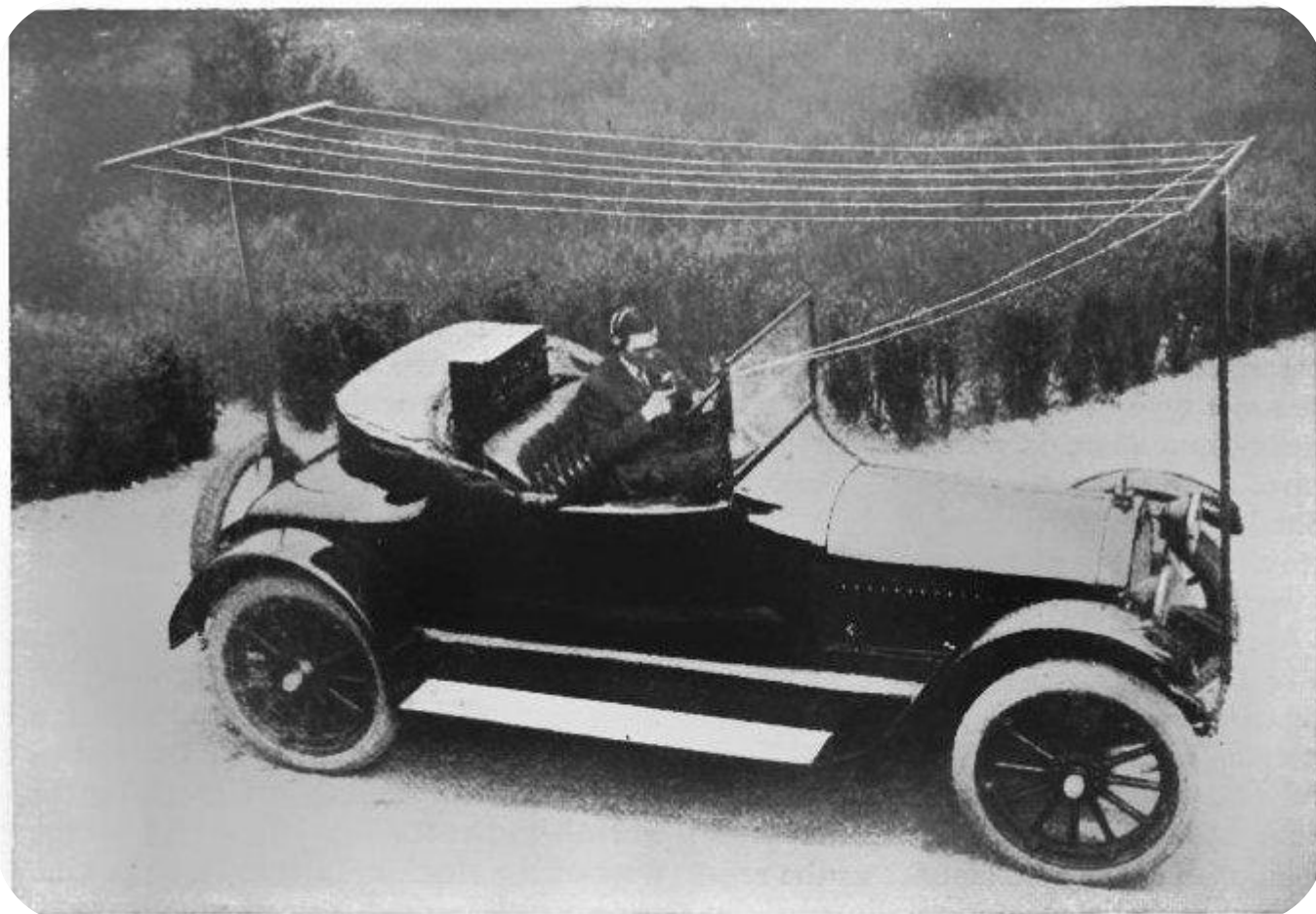




# GATEWAY

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

**August 2020**



**Buckle Up, 5G is Almost Here!**

**Powered Speaker Repairs**

**Silicon 'Rot'?**

**And More**

## Contents.

- 3 – Presidents Report & meeting link
- 4 – From The Editor - Curly Repairs
- 5 – Letter to Members
- 6 – Camera Streaming
- 9 – Powered Speaker Repairs
- 10 – Interesting YouTube Videos
- 11 – Buckle Up, 5G is Almost Here!
- 13 – Silicon 'Rot'?
- 14 – Vintage Computing
- 16 – As Seen on Google Teleconference
- 18 – Club Information

Note: - club meeting minutes are on the club website

---

## Event Queue

### August:

- 21<sup>st</sup> General meeting – 8:00 -  
Followed by the AGM, [Via video link, see club emails](#)
- 29-30<sup>th</sup> 40th Alara Contest, Courtesy WIA

### September:

- 4<sup>th</sup> Prac night, [Via video link, see club emails](#)
- 18<sup>th</sup> General meeting – 8:00, [Via video link, see club emails](#)

**Club run events are only possible with the involvement of ALL members.  
Without volunteers to coordinate and participate in club events the club will fail to prosper**

# President`s Report - Tony Doyle VK3QX

Hi Members,

I hope you are coping as well as can be in the current Stage 4 lockdown.

This was devastating for those who have lost their jobs and an inconvenience to most and we can only keep reminding ourselves that it can't go on forever and its sole intention is to minimise the spread of the disease and keep us safe, despite the views of the various conspiracy theorists out there.

The lowering numbers yesterday and today are a promising reflection of the efforts the majority of the population are putting into the social distancing, masks and lockdown measures. Hopefully, we can see the results of this effort with some easing of restrictions through September. It will, obviously, still be some time before we can hope to think about the resumption of physical meetings again. Hence, the reason the Committee decided to hold the AGM directly following the August GM. As you are aware, the current Committee are acting in caretaker mode pending the delayed AGM. The current members of the Committee, for their own various personal reasons, have made the difficult decision to not seek re-election at the AGM. This was announced and discussed at the July GM to give plenty of time for Members to consider nominating for election to these critical positions. It is disappointing then, that the Committee have not received even one nomination. In this magazine you will find a letter written by Helmut, on behalf of the Committee, imploring you to consider nominating to secure the future of GGREC. I won't seek to repeat those sentiments here.



Last Friday night (Prac Night) we held another general chat on Google Meet, in which we just got together for a Chat. This event was well attended with 10 members joining in.

For the benefit of the new Committee, please have a think about some ideas for these nights and share your thoughts with them as we need to find ways to remain engaged during these trying times. As stated last month, if you have done something which you think would be of interest to the members, Google Meet supports slide shows. Similarly, perhaps you have used your time to work on a project which you could share as an instructional session. Google Meet will allow you to present photos, text documents etc. but doesn't support streaming video as yet.

The Club is for our collective benefit and we need ideas from its Members to keep it interesting.

For anyone who didn't get the emailed invitation to the July GM, here it is:

**Meeting ID** <http://meet.google.com/ikn-xuqk-hby>

**Phone Numbers (AU)** +61 2 9051 5161 PIN: 192 258 759#

This will be my final report as GGREC President.

It has been an interesting and somewhat challenging experience, especially trying to manage the Club demands with full time work added with the increase in workload due to the horrendous fire season we've not long endured and are still in the process of dealing with and now the Covid-19 pandemic.

I can only hope that the new Committee are able to inject some fresh new energy into the Club to bring it out of the Covid-19 crisis stronger than ever.

I hope to see you all at the GM/AGM on Friday Night, via Google Meet.

73

Tony

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.

Any material that may be copyright has been included with permission where available.

If there is an issue with copyright please contact the editor



# From The Editor - Curly Repairs

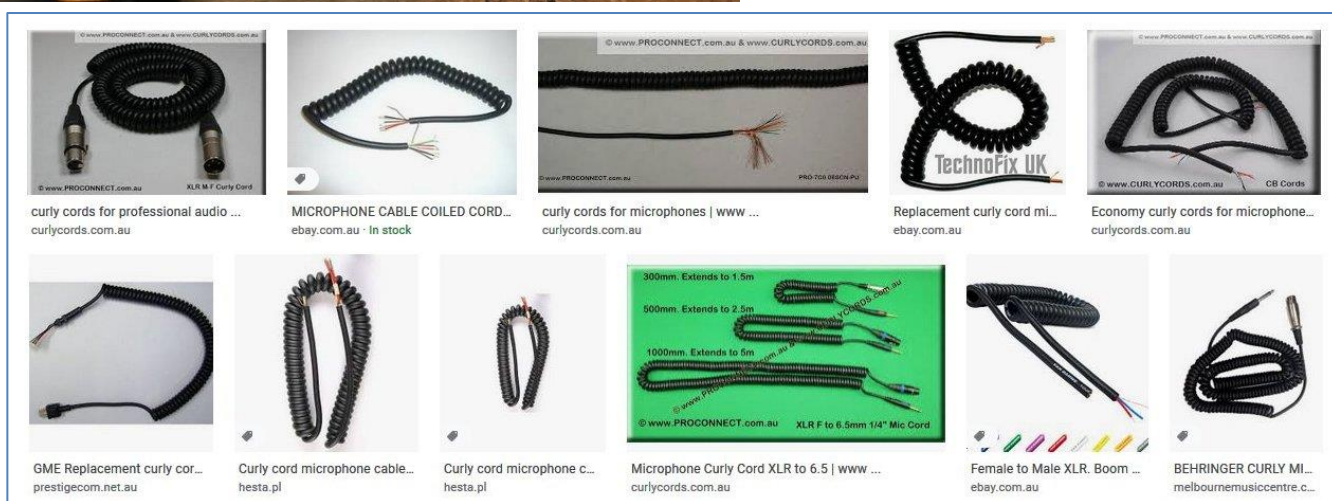


Looks familiar?

It seems Philips PRM radio's seem to be suffering somewhat, however it is not isolated to them alone.

I also have a much newer Yaesu microphone that has a similar problem, not with the curly cord, but rather with the rubber strain relief where the lead enters the mic, it has somewhat crumbled away.

Whilst some operators have made doo with wrapping tape around the problem spot, the proper course is to replace it.



In this case, Google is probably your best bet, jaycar searches found nothing, Altronics was a better bet, however with only 1, the \$30 asking price was a little on the high side I thought. For an ultra cheap solution, a curly cord intended for a telephone handset may suffice, however note that these are not shielded, the mics in phones traditionally output high level signals, and were basically balanced – so no problems. Have a close look at your cord before making a selection, some have a single shielded wire for the actual audio, with a few extra wires added on top for power, PTT etc., that are not inside the shield. Moving from one style to another may impact your rigs audio. Quite a few mics send digital data back and forth, for keypads etc. etc. you definitely don't want this to mix in with the low level mic signal. One option is to simply replace the mic, however before doing so, have a close look at your old one, Philips PRM mics for example have a pre-amp board, and power is actually back-fed up the audio wire from the rig. Hooking up a dynamic mic, for example to this, is bound to have issues, possibly smoke. Now comes the microphone plug, if you have the older 4, 5, or 7 pin solder on types then lucky you, quite a few rigs are now using RJ45 plugs, usually found on network cables. These are cheap and well suited to mass production, however they don't come as a solder on connector, only as a crimp-on, so you will need to borrow/buy a tool. Unfortunately the holes where you are supposed to insert network cable wires are generally not well receiving of wires from a curly cord. One solution is to solder on a short tail of the 'proper' wire, then crimp these in, however you will have to make it all super compact, or have a join 'lump' outside the plug. I was going to write a how-too, but with so many variations I can only hand out these tips.

**Reference: Upcoming AGM**

**This concerns all members of the Gippsland Gate Radio and  
Elelectronics Club**

***Next week, on the 21 of August 2020, the GGREC will hold our monthly General Club Meeting. This time it is in conjunction with the Annual General Meeting to be performed after the after the General Club Meeting.***

***The current committees announced on last month's meeting that it will not stand for another election. This means that all committee positions become vacant and a complete new committee has to be elected by the members of the GGREC.***

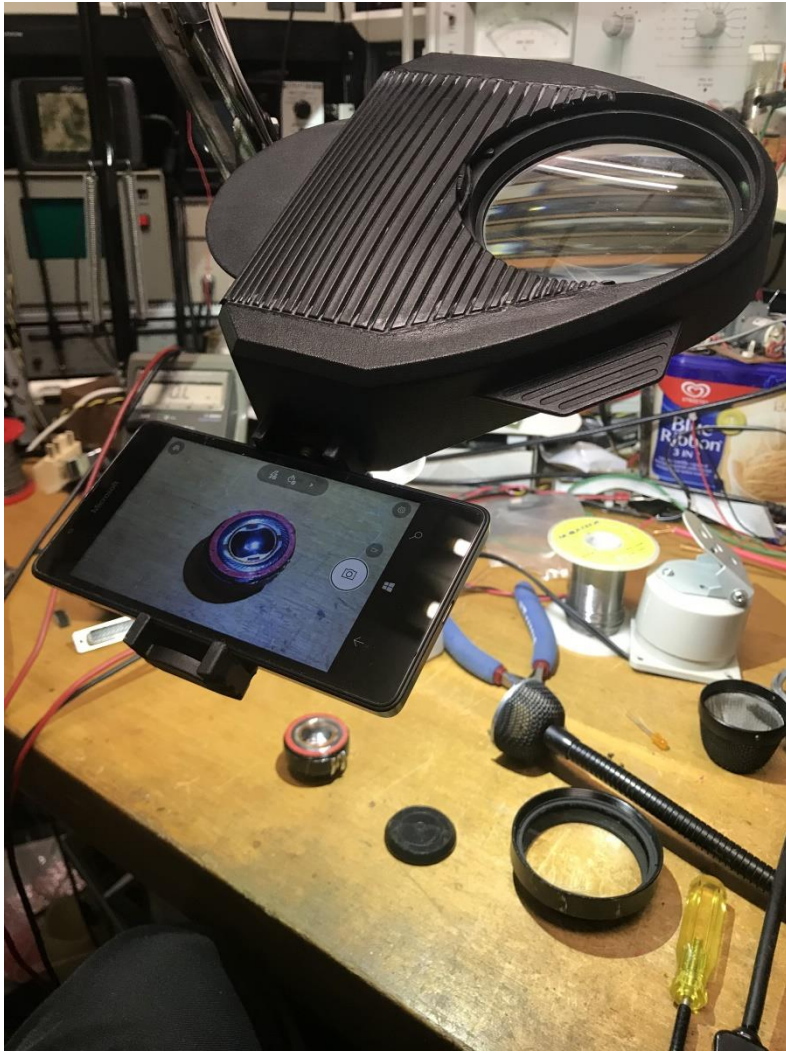
***In past elections it was always difficult to complete this task. However, the GGREC has NO OPTION but to elect a new committee. The committee consists of President, Treasurer, Admin Secretary and two General Committee Members. Therefore the outgoing committee asks that members consider taking up one of these positions. Surely our club which exists for more than forty years will find a way to elect these five members.***

***Please bear in mind that the club requires a Committee otherwise the club CAN NOT function. As a consequence, it is then possible that the club could be wind up in time to come.***

***Your current but outgoing Committee.***



# Camera Streaming



Looking to spread 'your good work' to the masses? (or just the club)

There are many ways to do this, from the club's Google meet hook-ups to simply recording yourself then uploading it after you are happy with the results.

You can pretty much do the lot with just a mobile phone, although a PC does make it a lot easier.

Recently I modified my workbench 'maggie lamp' to include a camera mount, or rather a hole so I can screw a mount in place as needed.



This is a \$17 phone 'clip' I bought from my local camera shop, however I noticed that Officeworks also stock a similar device. So grab one of these clips, or just fabricate something yourself from some aluminium etc. Whilst these lamps are not the most stable things out there, it is a cheap option, assuming you already have one. For a much more sturdy setup, try a Manfrotto magic arm, these are very stiff, however you cannot just push it out of the way, you need to release the lock, move it to a new location then re-lock it. The magnified lamp of mine can just be pushed to a new location, however it then needs a little assistance to stop wobbling – which could make your remote audience a tad 'see sick', however in this case almost nothing has been lost, so give it a try.



Originally, the magnifier lamp came with a 240V incandescent bulb, that I swapped for a fluorescent unit, however it was an extremely tight squeeze, and those CFL's are far from super-efficient, so it all ran a tad too hot for my liking, so I really wanted a fix of some kind or another.

This project sealed the fate of that CFL, it was hard up against the end where I wanted to

attach the camera mount, so I ripped out all the 240V wiring and lamp socket and replaced it with a simple strip of aluminium, that has a near 90 degree bent in its end to stiffen up the side wall where the camera mound hole was to be drilled. The LED module is a 4 chip design, and a 5.6 ohm 2W resistor gives a current of about 250mA from the shack's 13.8V power supply.



It only runs warm, unlike the CFL, and at just 4W is way more efficient. The module is rated up to 20W, so there is heaps of room to give me more light, although I'd have to get serious with the cooling, maybe even needing a fan, for now 4W is fine.

Here is another view of the 'assembly' minus the mobile phone. I can fairly easily use any camera, so long as its weight does not overwhelm the arm that supports it all.

Actually a phone is kind of ideal as it gives you a local display of what you are looking at, otherwise I'd be looking over at my computer screen – although showing it all on a large screen (TV?) could be of benefit to those of us with failing eyesight. I'm getting closer to that one every day.

The only downside was I was working on it whilst joining in on the 10:00 morning net, I kept losing the plot as far as what we were all talking about. When it was my turn, I had to bring up something else as I had 'lost it'.

So what is next – apart from a charge cable for your phone (Video really chews through battery charge), not much. You can just capture a video directly to your phone, maybe edit it a bit, then upload it somewhere, like Facebook, or YouTube, and let us all know about your latest conquests. Have a look at Big Clive's YouTube channel, this bench view is basically all you ever see. <https://www.youtube.com/channel/UCtM5z2gkrGRuWd0JQMx76qA>



Big Clive currently has 650,000 subscribers, and this particular clip, that runs for about 14 minutes, has had 39,769 views, whilst only been up since 15 Aug 2020. – 4 days

Not bad for a bench view only video.

A lot of his videos are various devices picked up from local el-cheapo stores, or mail ordered from China, so his costs are not that high. (click on the picture to view this video)

Now to go further, you probably will need to send the camera pictures to your computer, I am currently using a program called iVcam, it is available for both iPhone & Android, from the app store, the PC end (and general info) is at <https://www.e2esoft.com/ivcam/>

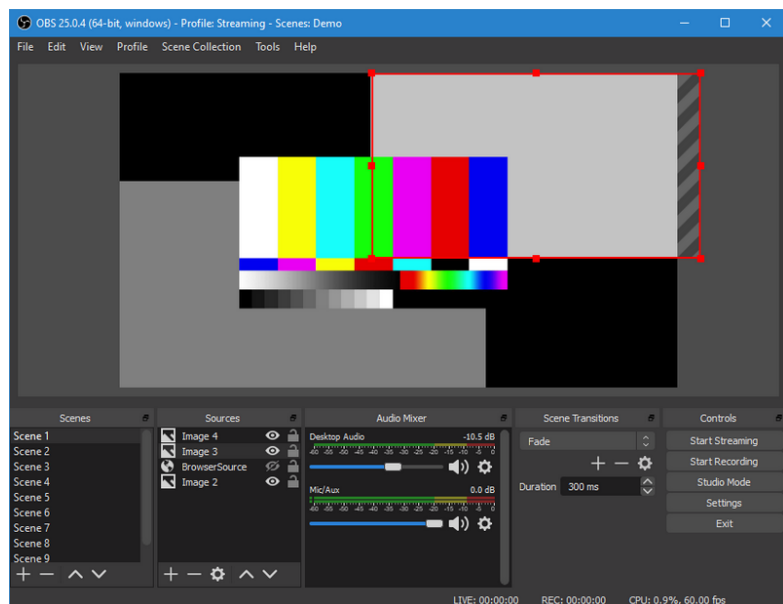
The computer end is for Windows & Mac only, sorry no Linux, have a look at

<https://alternativeto.net/software/ivcam/> for alternatives – I have NOT tried any of these.



The only downside so far with iVcam, is that to remove adverts etc., you need to pay for it. You only have to pay for one end, so say you pay for the phone end, it will work with any computer, or if you pay for the PC end, you can load the app onto multiple phones to use with that PC.

On the computer end, it appears as a webcam, so any software you have that wants to use video from your computers camera should work. When you see me on the Google meets platform the club has been using, and the previous Zoom platform, my video has been via iVcam. I have a small home grown camera stand made from a treadmill motor's flywheel at the back of my study desk where I mount my phone. (or my DSLR etc.)



Probably the next step up is to use a free program called 'OBS studio'

<https://obsproject.com/>

This runs on Windows, Mac, and Linux and allows for multiple camera's and audio sources, it can also grab the output from many computer programs and allows you to mix and match them all together for a show.

This output can then be both directly streamed and or recorded to your hard drive. Quite a powerful bit of code for free.

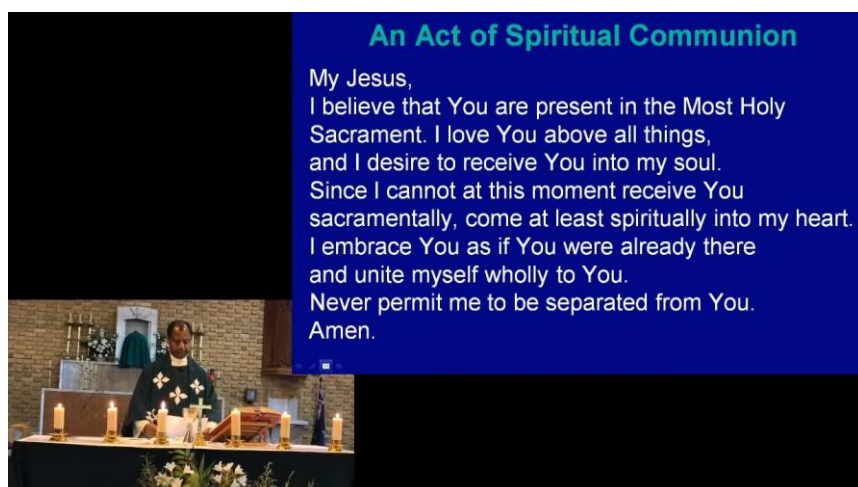
Here is a shot from my church's live stream, done with OBS studio.

The camera is my iPhone 7 and the text is from Microsoft Powerpoint that normally drives a projector.

I have several OBS 'scenes' setup that I can quickly toggle using the computers function keys (F5 – F12)

This is all streamed via YouTube.

Google kind of recommends using something like OBS studio for anything more complex than a single head in front of a laptop.



### And for even more complexity

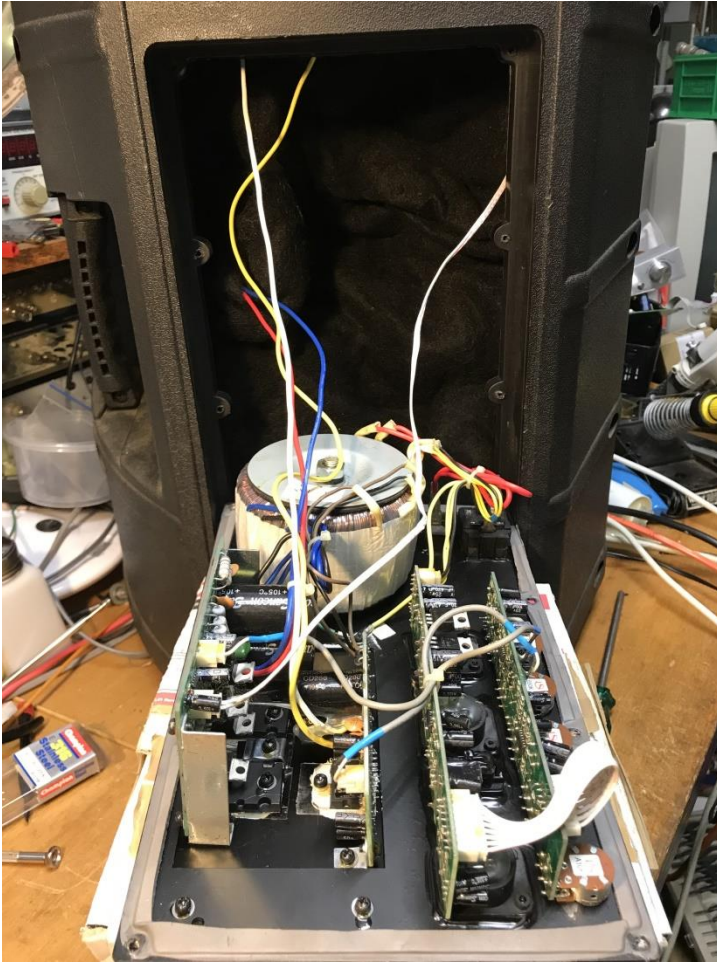
OBS studio can also (via an add-on) be made visible to the computer as a webcam, so all this can be shared via Zoom & Google meets. Audio can be a little trickier for this webcam scenario, but can be solved either via a 'virtual audio cable' or an audio mixer, either a virtual one, or a real one.

You can also use two PC's, one running something you want to stream, like say a computer game, and use the second PC to do the actual streaming, with maybe a camera or two to show the gamers in full flight, getting 'stuck in'

*Paul VK3TGX*



# Powered Speaker Repairs



For some reason powered speakers seem to be becoming more popular.

For a one speaker setup, they can make things a lot simpler, however if you want to go stereo, then things can get complicated real quick, not only have you got to get your audio to the speakers, but now you also need to run an extension cord over to each speaker as well, as well as a mixer etc.

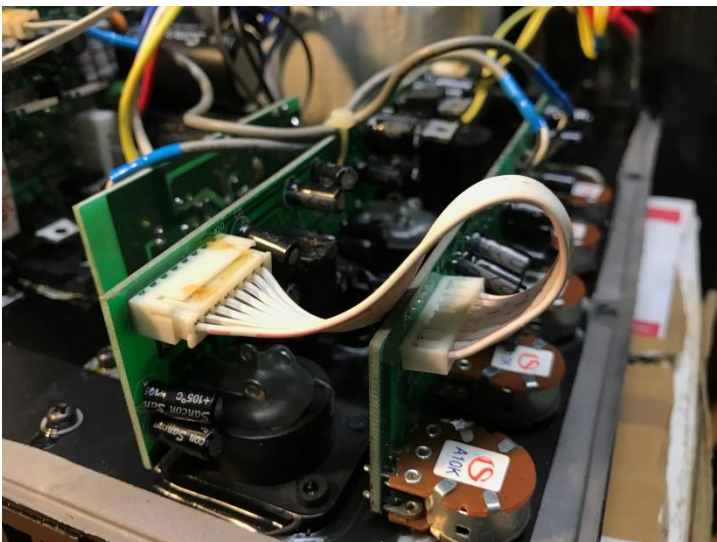
For home use, wireless over Bluetooth from a tablet/phone, battery powered speakers make it dead easy, however for a band performance etc., 240V is probably the way to go, as running a 1000W speaker off a battery does present a few issues.

Having the electronics in the speaker does allow you an alternative way to correct speaker/box deficiencies, even to the point of having direct feedback from the actual speaker cones, basically turning it all into a closed loop servo controlled system.

Anyway, I'm kind of getting well ahead of myself here, about the only gain hear, apart from an all in one PA system, is it uses an active crossover, with separate tweeter & woofer amplifier's. There's nothing high tech or Hi-Fi in this thing whatsoever, it's only audio attribute is loudness.

It was passed my way, with it having a faulty 3 pin cannon socket – the owner also supplying a new socket (a bit bazar, as one has to look inside first before purchase, to get the right type)

The faulty channel has two inputs, balanced via that cannon socket, and unbalanced via RCA sockets. So I connected it up to a computer and left it alone playing music.



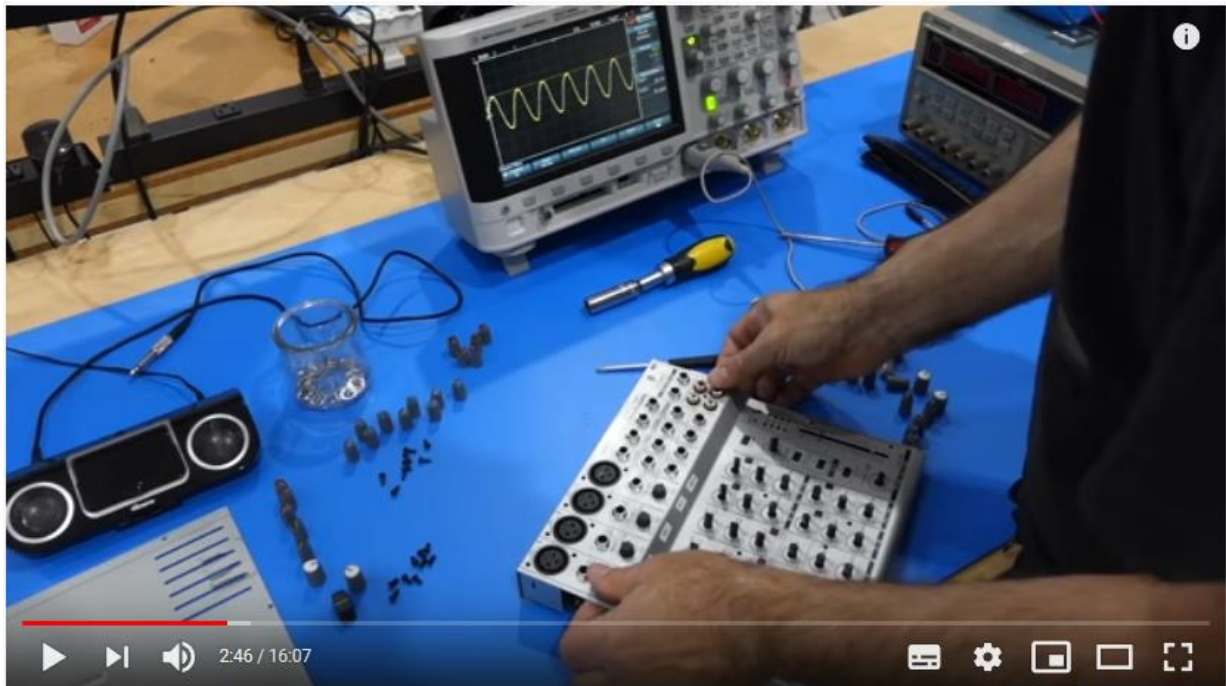
It soon became evident that the fault was on both inputs, the owner probably not using the RCA's so unaware. So I popped the lid and soon found the fault was extremely intermittent, like it could run all week perfectly ok. (bugga)

Eventually I touched this cable, it faulted **once**, so I ripped out the plug/socket etc. and hard wired it, spotting some of that magic 'gorilla snot' glue on some pins....

Time will tell if I nailed it....

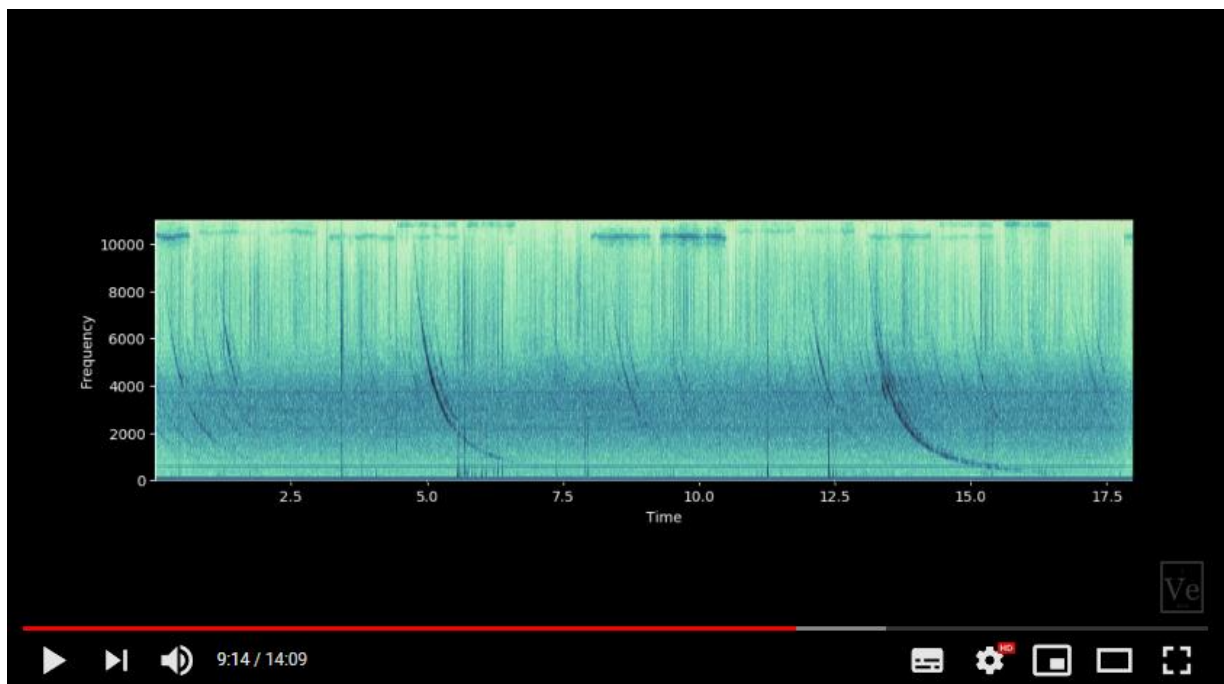
*Paul VK3TGX*

## Interesting YouTube Videos



Modern Tech Fail: Behringer Eurorack UB1202 Repair

<https://youtu.be/ZilcEagVCdI>



Half the universe was missing... until now

[https://www.youtube.com/watch?v=Kp\\_kqamkYpw](https://www.youtube.com/watch?v=Kp_kqamkYpw)

With good radio propagation type 'stuff' from [7:34](#)



## Buckle Up, 5G is Almost Here!

What comes to your mind when you hear “5G?” Well, I would’ve guessed 5 grams. In fact, when I asked a few of my friends, each replied with equally bad guesses, like 5 grand, 5 gigahertz, and more. The term “5G” actually stands for 5<sup>th</sup> generation! Before we dive into 5G, it would be beneficial to talk about what came before.

Cellular mobile communications began in the 1980s. When the technology emerged, the first-generation network carried voice only. In the 1990s, we started text messaging between devices; this was called 2<sup>nd</sup> generation. In early 2000s, 3G technology was born. With 3G came the ability to make calls, send texts, and surf the web from a “smart” wireless device. We currently have 4G, which includes all the functions of 3G, plus the ability to easily download or upload video and audio files. It's obvious that the mobile and wireless technologies have come a long way, but what's coming up next? What can we expect from 5G? How much of an impact will 5G have on the future?



## I'm grateful for 4G... BUT...

The download speed of 4G networks range from 10-100mbps, and the frequencies below 6GHz and the 4G towers are non-directional. This means that the 4G towers are firing data in all directions. As you can imagine, this is a wasting a lot of power and energy by beaming radio waves to locations that are not requesting internet access. With all of these factors combined, it's safe to say I would need at least 10- 20 minutes to download a full length, high definition movie.

## Out with the old... In with the new

Can you imagine clicking the download button and seeing your movie become ready to view within seconds? Probably not. That's because it's not possible with the 4G networks we have. On 5G, the time it takes for two devices to communicate with one another is expected to be 50x faster than on 4G. Download time for a high definition, full length movie will be *seconds*, not minutes.



I know it sounds too good to be true, but this is possible because 5G is expected to support up to 1 million connected devices per .38 square miles. This is compared to around 2,000 connected devices per .38 square miles with 4G. The 5G networks will more easily understand the type of data being requested, so they will be able to switch into a lower power mode when not in use or when supplying low rates to specific devices. Then they will switch to a higher-powered mode for things like HD video streaming.

The standards of 5G rely on high frequency band usage. This enables more concentrated, faster data relaying, but has certain limitations and penetration challenges that will affect “early 5G” deployment. These high frequencies are easily absorbed by humidity, rain, and other objects, meaning that they don’t travel as far.

Initially, 5G coverage will be limited to outdoor, pedestrian-centric areas where frequencies can easily reach users. There will be an increased number of new towers in a variety of locations such as rooftops, small cell backhaul locations, and light poles.



## What will it take?

In order to make 5G possible, many more towers and data centers will be built to support the higher frequencies, faster speeds, and lower latency. New technologies such as small cells, beamforming, and full duplex to name a few, will be implemented.

Small cells are basically miniature cell phone towers that can be placed in inconspicuous places like light poles and the roofs of buildings. Small cells transmit data using millimeter waves, which get their name from their narrower than average wavelength. They occupy frequencies in the 30-300GHz range, which high enough to avoid interference from surrounding signals, but too high to pass through physical barriers.

## Let's talk Automotive

We can see the use of 4G in cars today with GPS, in-car WiFi, and connectivity to multiple devices.

Some of the newer models even provide a traffic light service using the 4G LTE. When the vehicle approaches a connected traffic light, the driver sees a display of how many seconds until the light changes green.

When 3G and 4G networks were developed, the developers only had consumer voice and data in mind. Therefore, 5G is being developed with machine-to-machine interface in mind, so there will be more connected devices and vehicles.



Some companies launched 5G services in 2018, but it is not very significant yet, although they have bragging rights! Most of the big changes will only happen years after the initial announcement. The first 4G cell phones were introduced in 2010, but revolutionary applications such as Airbnb, Uber, and Snapchat all came years after the announcement. 5G is an investment for the future. You can expect to see big things from 5G in the coming years. For now, take a seat, buckle up, and get ready, because 5G is almost here.

*"By 2035, 5G will enable \$12.3 trillion of global economic output and support 22 million jobs worldwide. Much of that growth will come from the digitization of transportation, agriculture, manufacturing and other physical industries."*

– Ronan Dunne, Executive Vice President and Group President, Verizon Wireless

Expurgated version. Original from Design Spark.

<https://www.rs-online.com/designspark/buckle-up-5g-is-almost-here>

Mike Vandenacker

# Silicon 'Rot'?



Oh darn, the magic smoke letting out genie has struck again, and now **again**.

Sounds familiar? (Hint, see last month's mag)

Well about two weeks after I fixed my TRS-80, 8 bit box, it died again. The video went awry again, but this time it had lost horizontal sync.

I initially thought it just needed a tweak of the screens controls – unfortunately not accessible from outside the cabinet – my fault, not Tandy's, being a part of my hacks years ago.

Anyway, before pulling it apart, I had a feeling that maybe it's not the monitor, so as before I plugged in an external screen, and yes, that screen was also not happy.

I started having a sinking feeling about that 4069 I installed, there are two of them, but silly me only bought one. I was initially going to get two, one for stock, however on seeing how the local store staff both stored and handled CMOS IC's, I only bought one.

So with stage 4 restrictions implemented in voice only, and the government still deciding on what is to close etc., I raced off back to the shops to grab another 4069, yes still just bunged into a plastic tray, no anti-static foam, and no anti-static bags to sell them in – come on guys, static damage and the necessary precautions have been known for years – get with it.....

I was not totally convinced it was the IC, however I'd be kicking myself for weeks if it was and I had just sat on my backside and not bought one while I could. (as in easily)

With the lid off, it didn't take too long to find that I had zero horizontal sync pulses. After been somewhat confused by the circuit diagrams I had downloaded, (All the pin numbers in this part of the circuit are wrong – a different revision?) I landed back at the horizontal sync 4069. It had output, but it was all over the shop, randomly jumping from what appeared to be normal, and 'wiggling' down to half level – pity I didn't take any scope shots. Whatever it was doing, the following TTL IC didn't want a bar of it and was just ignoring it. I almost got sidetracked by the fussy TTL IC, but then I came to my senses and just replaced the 4069, job done.

So this looks like some form of time related degradation going on inside the two CMOS IC's, Years ago I heard of the term 'metal migration', have a look at this website – way in-depth.

<https://www.sciencedirect.com/topics/engineering/metal-migration>

Both IC's are of the same age, probably from the same batch etc. so it has to be something like this, as I cannot imagine any other reason for them both failing, basically in synchronism, as the two chips are quite widely separated on the board, and nothing else has died – yet....

Years ago at Telstra, I was repairing NEC data mux cards, that took in 4 x 2Mb data streams and outputted an 8Mb stream. The 2Mb line driver IC's were starting to fail at an almost alarming rate. They were long out of production; however we did secure a small stock of spares. Guess what, most of them were also dead. It didn't matter whether they were installed/used or new in an IC tube, their time was up and that was that.

*Paul VK3TGX*

# Vintage Computing

TRS-80 model 1



I have become rather interested in old computers of late, they bring back memories of late night tinkering sessions, and the fact that anyone could take a soldering iron to them and modify, or add extra circuitry with little restrictions.

On modern machines, running at GHz frequencies it is extremely hard to do much – you tend to be limited to making USB toys, but even here you have to get a special interface IC to talk USB, the same goes with the PCIe expansion slots, you cannot grab a couple of TTL IC's from the local shop and start playing.

I've been into my old TRS-80 that many times it's not funny, the first picture here is pretty much how it appeared when I bought, (~1980's) I then added an expansion box under the monitor to give me three times the memory and floppy disk drives instead of cassette tapes.

I eventually got sick of the three box arrangement, also having the processor's data and address buss strung between two of them was proving to be a rather unreliable arrangement. So I rebuilt it into a 19inch rack case, the original plastic case then been just the keyboard.

However, I soon tired of this arrangement, and decided the later Tandy models was the look I wanted,

so I ordered a model 4 case from the Frankston Tandy store, and set about putting it all in there, have a look at the previous story about silicon rot.

In those days, I worked for Telstra, and they had quite an active lot of engineers working for them that frequently built all sorts of bits and pieces, however the majority of them were 6800 based, whereas my Tandy was a Z80 based machine. So I had a great desire to get a suitable box to develop 6800 code on. One of the blokes at work had built a SWTS 6800 up from a kit of parts – however he made his own case, aluminium clad wood, a tad odd, but it worked.

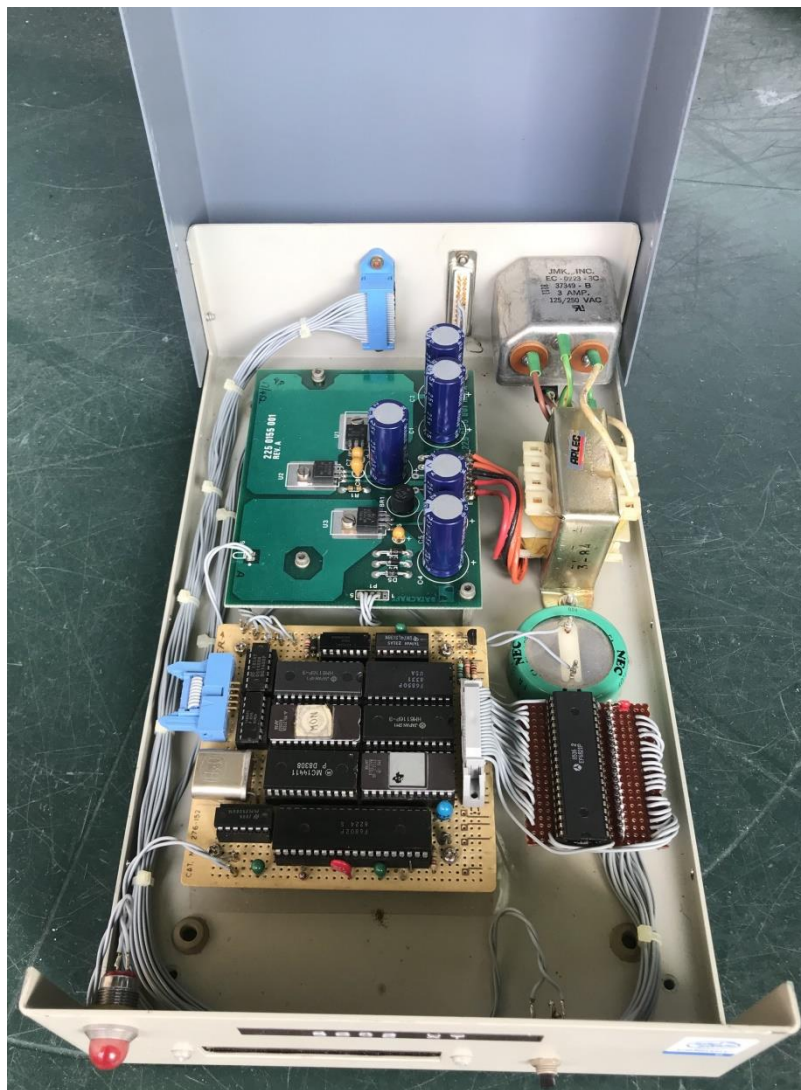
- The second pic is an 'official' SWTS 6800 box, the innards were the same however



Commodore VIC20





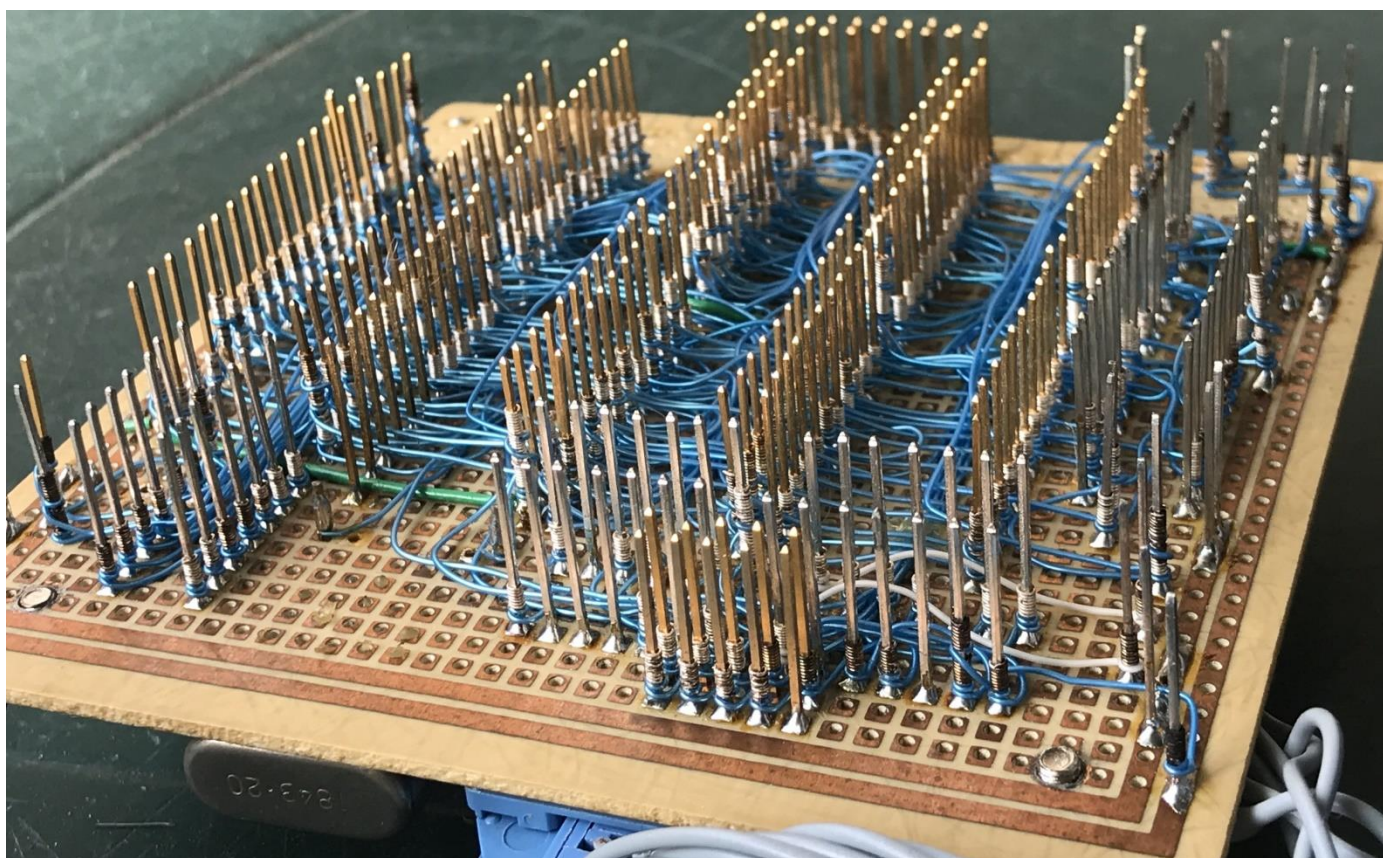


I wanted one, however they were not cheap, so I decided to clone it. I didn't directly copy their design; rather I started out with their memory map, and built hardware to comply. The first build (see left) was a bare bones minimal job, that talked to a dumb terminal – it had a 'monitor ROM' that allowed me to enter code into ram, then run it. It also has a parallel data port out the back where I could hook up various creations, like relay boards etc. It was mostly wire wrapped – see bottom pic, with a touch of vero board, for the parallel port add on.

The second build was much more ambitions, with 32K ram, (16 x 2K RAM IC's) 3 serial ports, and a floppy disk controller. This was spread across three circuit boards – and all wire wrapped again, of course.

Maybe it'll make it into next month's mag, along with the VIC20 story.

*Paul VK3TGX*



Underside of the processor card



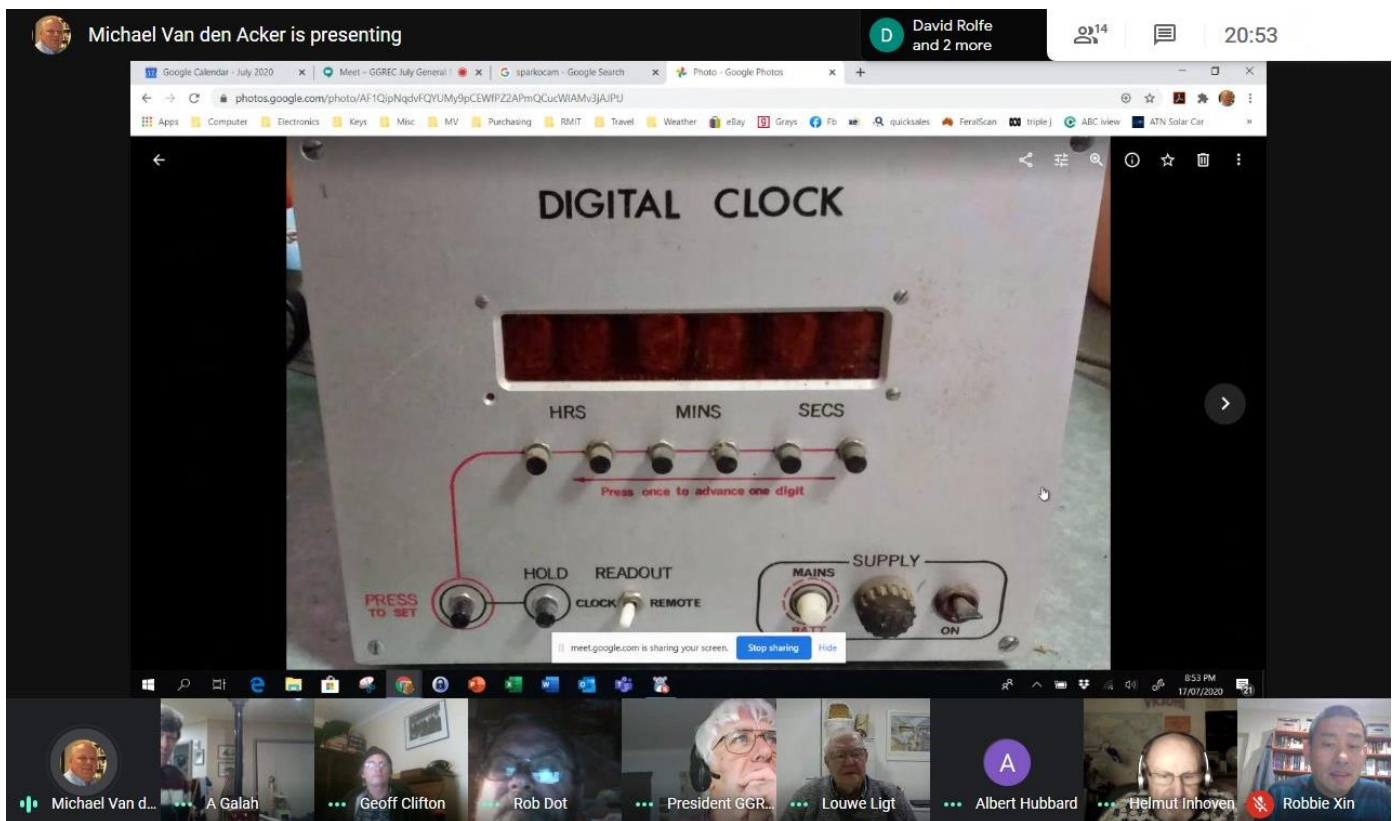
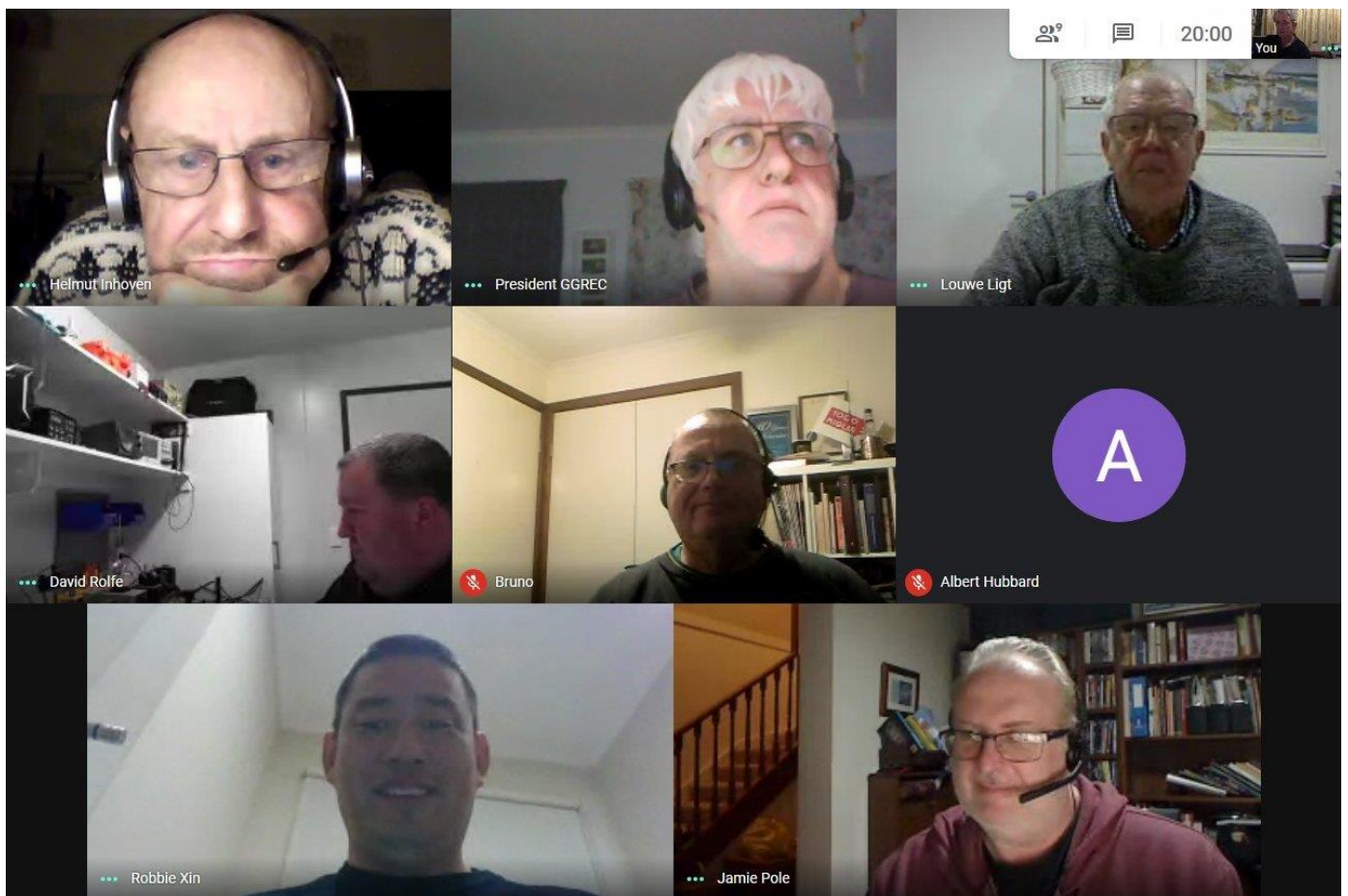
# As Seen on Google Teleconference

Meeting 07/08/2020 (Natter/Prac Night)



Now this is how you do it – Luxury Luxury

# General Meeting 17/07/2020







## Club Information



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

All physical meetings suspended due to the coronavirus restrictions

### Office bearers

President	Tony Doyle	VK3QX	Web Master	-	-
Admin Sec	Rob Streater	VK3BRS	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Robbie Xin	VK3FAMT	Property Officer	'committee'	
General 1	Helmut Inhoven	VK3DHI	Assoc. Secretary	Rob Streater	VK3BRS
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](mailto:editor@ggrec.org.au) Cut off, 10<sup>th</sup> of the month  
All other Club correspondence to: [secretary@ggrec.org.au](mailto:secretary@ggrec.org.au)  
or via post : GGREC, 408 Old Sale Rd, Drouin West 3818  
GGREC Web Site & Archive may be viewed at: [www.ggrec.org.au](http://www.ggrec.org.au)  
Website errors, contact web master: [webmaster@ggrec.org.au](mailto:webmaster@ggrec.org.au)  
Facebook Page [www.facebook.com/GippslandGate](https://www.facebook.com/GippslandGate)