



# GATEWAY

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

**July 2020**



**Vectronics 1.5 KW dry dummy load**

**Broken TRS-80 Computer**

**PVR Repairs**

**And More**

Cover photo, Antenna's Antenna's Antenna's, courtesy of facebook.

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Note: - club meeting minutes are on the club website

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## Event Queue

### July:

- 3<sup>rd</sup> Prac night, [Via video link, see club emails](#)
- 17<sup>th</sup> VK & ZL Trans Tasman lowband contest – courtesy WIA
- 17<sup>th</sup> General meeting – 8:00, [Via video link, see club emails](#)

### August:

- 7<sup>th</sup> Prac night, [Via video link, see club emails](#)
- 15-16<sup>th</sup> RD contest – courtesy WIA
- 21<sup>st</sup> General meeting – 8:00, [Via video link, see club emails](#)

<p style="text-align: center;"><b>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</b></p>
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# President`s Report - Tony Doyle VK3QX

Hi Members,

How quickly things have changed again!

Just when we thought we were starting to be able to resume life under a new Covid-19 normal, here we are in hard lockdown again.

Don't get me started on the cause of these current outbreaks and the resultant reasons for the introduction of these new restrictions.....

I was about to release the club's Covid-19 procedures governing the use of the club rooms and in readiness for the eventual hall reopening.

This point is now mute for the next 6 weeks or more as we will need to wait and review the government advice once we see how these new clusters of infections play out.

Under the current restrictions there is no valid reason for attendance at the club rooms. This activity does not form one of the 4 valid reasons for leaving home.

Last Friday night (Prac Night) we held a general chat on Google Meet, in which we just got together for a chat, and some of the newer members used the opportunity for a bit of a Q&A session (or an opportunity to have a nice glass of red in good company).

Please have a think about some ideas for these nights and share your thoughts with the committee as we need to find ways to remain engaged during these trying times.

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:

[meet.google.com/zfe-qcdn-keq](https://meet.google.com/zfe-qcdn-keq)

Phone Number:

+61 2 9051 3269

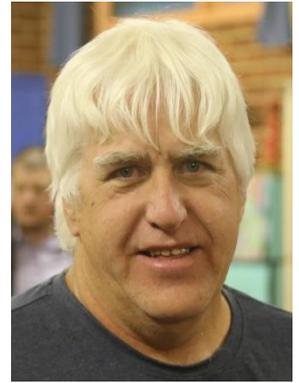
PIN: 644 373 716#

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

Stay safe.

73

Tony



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If there is an issue with copyright please contact the editor

## From The Editor – Speakers



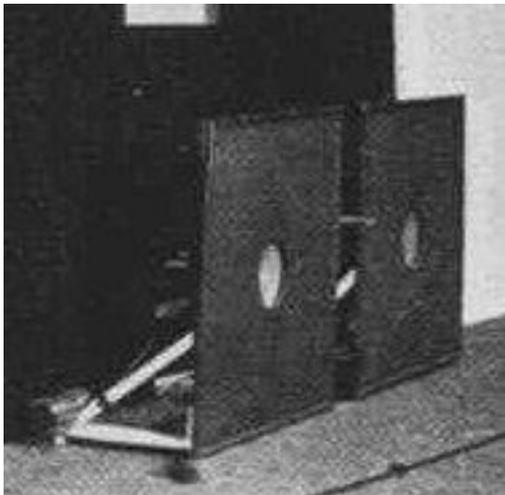
For a while now I have been playing around with speakers, this is my latest acquisition, from a Philips radio-gram from the early sixties.

I have kind of been after an 'antique' speaker for a while, something made out of solid timber with a bit of ornate carving on it, carved legs etc. etc.

Old valve radios are usually a good collectable, however as most of these are AM only, I am not that interested. Yes many of them have aux audio in (in the form of a ceramic turntable input) however I'm trying to keep it simpler. I already have a central amp feeding audio around the house, so just plugging in there seems a simpler route. That and fixing old valve gear can quickly turn into a can of worms.

Maybe I'll bump into a magical old radio and I'll change my view, then again maybe not – especially considering the asking price for such sets.

I thought it would be interesting to try and get this going kind of like it would have been back in its day, do a frequency sweep and do some general comparisons with today's gear. To make it more authentic, I actually have an old single ended valve amp that is probably in keeping with the set that initially drove this speaker. My initial thought was a much more modern 50W amp, A Silicon Chip magazine SC480. However on second thought, it would probably blow this speaker big time, as your average domestic set back then was lucky to give you 5W a channel.



I have a few other 'things' to try, one being to build a 'dipole speaker', there was a design a while ago in Silicon chip, they are so darn easy to build, so why not. A dipole speaker is a really fancy name for a good old fashioned big baffle board with a driver in the middle.

Here are two, propped up in front of a Baird TV demo setup, a 'few years ago' (28/07/1930) in England.

They do lack bass, as the back radiated sound easily wraps around to the front killing the low end, however they are supposed to have a very clean sound as there are no box resonances/boom to taint the sound.

So the other day when I found myself in Jaycar, I thought I'd grab a speaker or two, I used to like 8 inch full range drivers for general low tech stuffing around. They are not high end by any imagination, but good enough for me. Boy was I disappointed, no longer available. All they had were bass drivers (and tweeters) that had this extra semi flat/concave 'front' looking at you. This was glued onto the cone – Yuk, I can't see this working without adding lots of colouration to the sound. Yes times are a changing, not for the better I fear.

*Paul VK3TGX*

# Vectronics 1.5 KW dry dummy load

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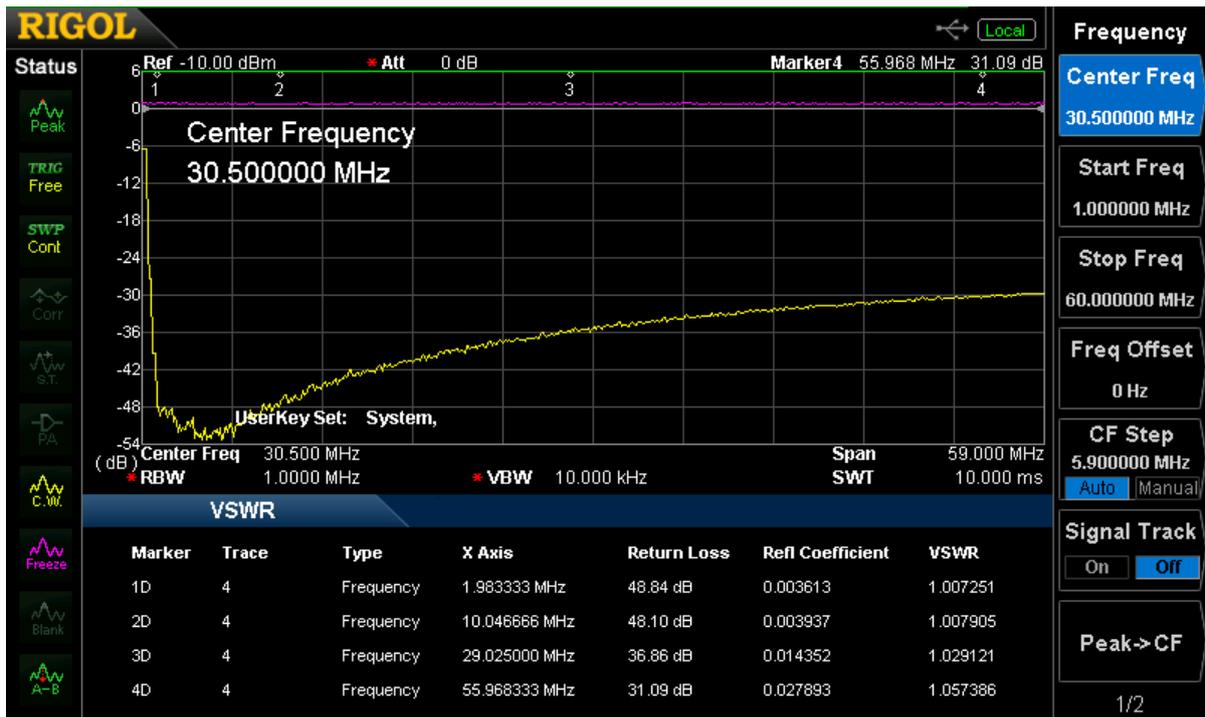


Having a few transmitters here at the shack that can comfortably exceed the 400 watt limit I needed a suitably rated dummy load to be able test them at full power, something that I didn't have available. If you remember a few years ago we ran a project at Prac night making some 250 Watt dummy loads which turned out quite well, but even these were not up to scratch for what I wanted to test. I actually tried a 250 watt dummy load on about 3/4 of a KW and the results were not surprising. Twas a thing of beauty to watch the 250 watt dummy load chip slowly vaporize whilst emitting a soft violet glow and giving me enough time to shut the transmitter down before any damage was done. Ok, I needed something better...

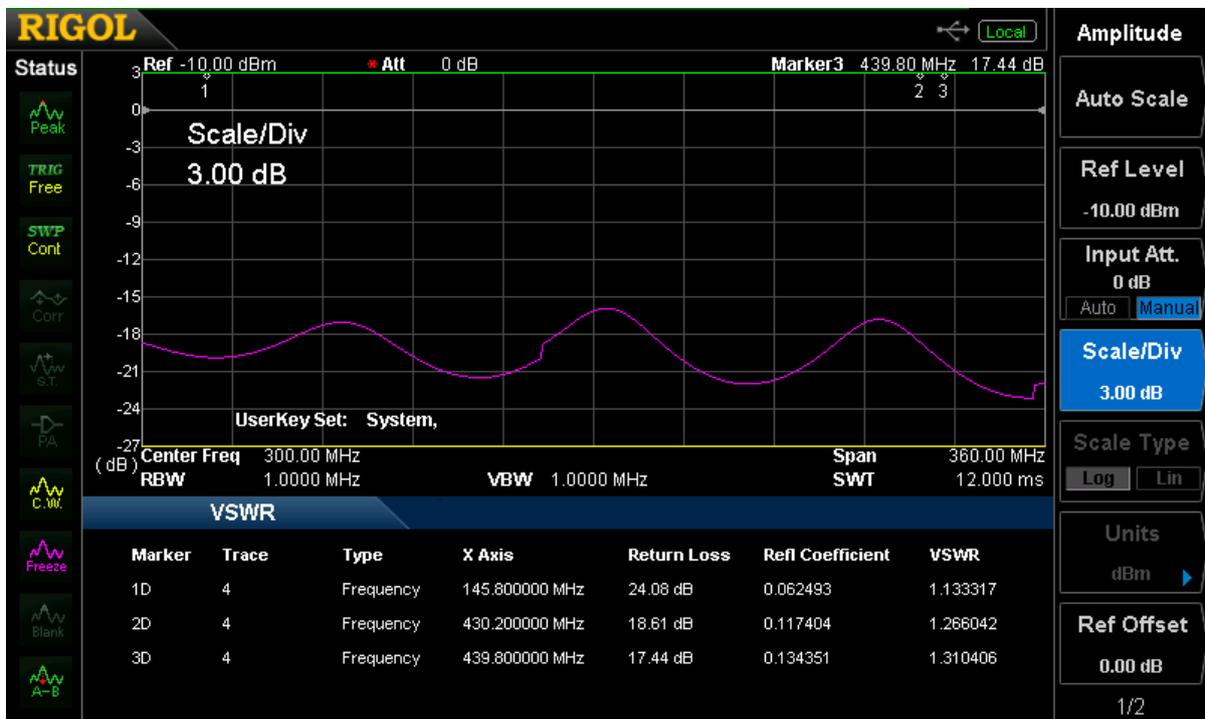
After having a look around in the usual places I was still undecided on whether to purchase a wet dummy load or a dry one. Both have their good points as well as their bad points, size, mess etc. so I finally chose an aircooled type from Vectronics. Some of you will notice it is identical to the Mighty Fine Junk line of gear ( which it is 😊 )



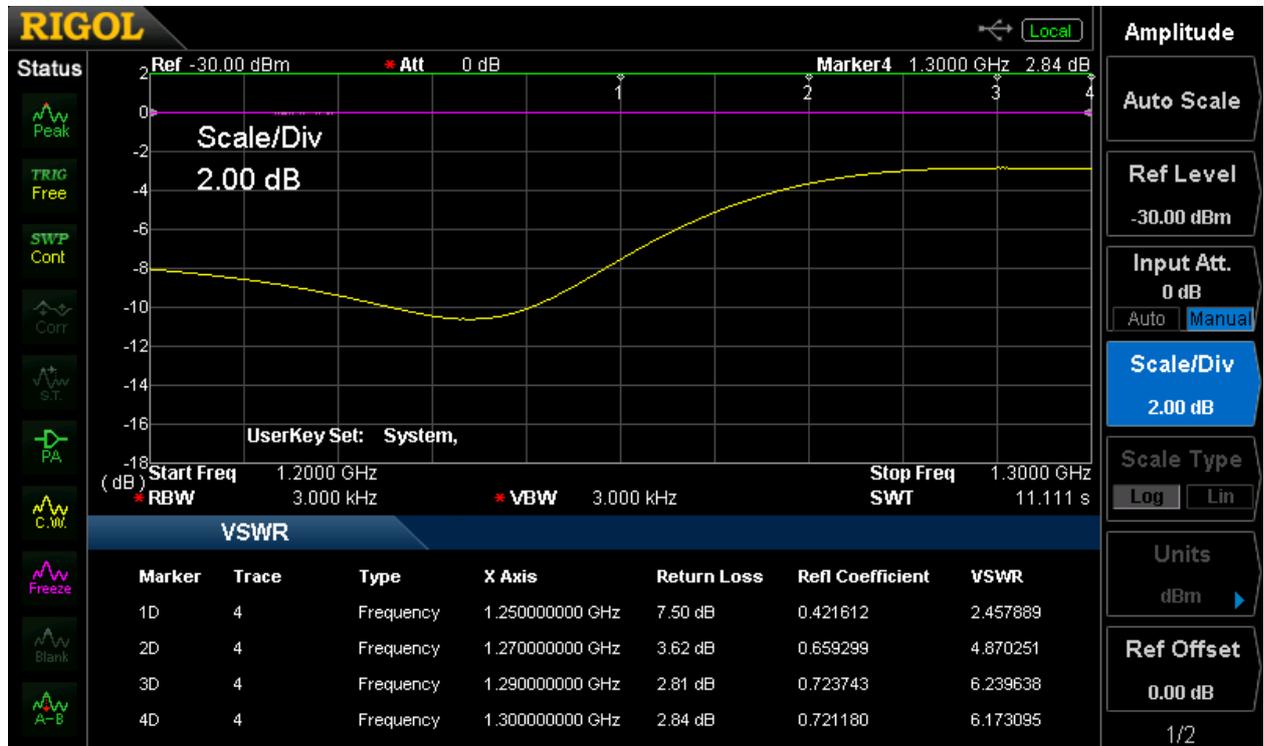
Before using the dummy load I carried out some sweeps of it and confirmed that it would be ok to use at some fairly substantial RF power. Below are the results.



On the above sweep I “marked” four frequencies of interest; they were 2 MHz, 10 MHz, 29 MHz and 56 MHz. All four frequencies showed a VSWR lower than 1.05 to 1. We were off to a good start !



On the above sweep I tested 2M and 70cm, 2M came in with a VSWR of 1.13 to 1 and 70cm came in with a VSWR 1.31 to 1. Just for fun I swept the dummy load at 23cm to see what the results would be. As I expected, no good, after all the load is only rated up to 650 Mhz.



Next was to put some power into the dummy load, 120 watts @ 2M FM should be a nice test. After 5 minutes of continuous transmission the dummy load was only just warm. At 340 watts PEP on HF for 5 minutes the dummy load was the same. I'll have to clear some bench space before I go up a notch in power levels but it would appear at this stage that dummy load will be fine if kept within it's ratings.

Something to think about, apparently these dummy loads make a reasonable "antenna", that is, signals can be heard whilst it is connected to your rig. With this in mind it will probably be a bit "leaky" on transmit so caution needs to be exercised when transmitting. For the price ( \$125 ) the Vectronics dummy load is a handy addition to the shack.

Cheers and 73,

Rob VK3BRS

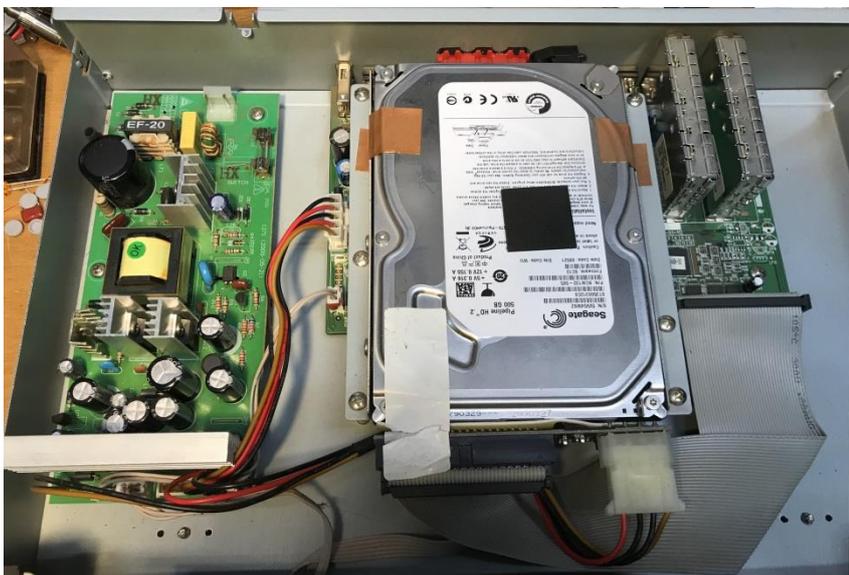
# PVR Repairs



Time for some more repairs, well I feel better off in my shack/workshop rather than mingling with shoppers that still have not heard of covid-19 social distancing.

This unit appears to have succumbed to a power failure, well that's what its owner reported to me. I kind of suspected the power supply, capacitors in particular slowly degrade over time, however if the power is left on, they can tend to offer just enough for the equipment to keep running. However faced with a few hours of no power they soon loose whatever little they have and the equipment will never run again.

When I was working at Telstra, I was told about how they were rolling out optical fibre to many country towns, that for years had been serviced by microwave links. As the fibre was connected the microwave links were turned off, but not decommissioned & dismantled. The idea been that these could serve as backup should the fibre fail. However all the techs knew that this gear would never work again. So this problem is not just limited to consumer gear, it covers most systems that are just left turned on.



This PVR does have a standby button, however it does little, and does even less to the power supply that just pumps out 3.3, 5, & 12V as long as it is plugged in.

Another view inside, there is not much to it; admittedly a fair bit is hidden under that 500 gig HDD.



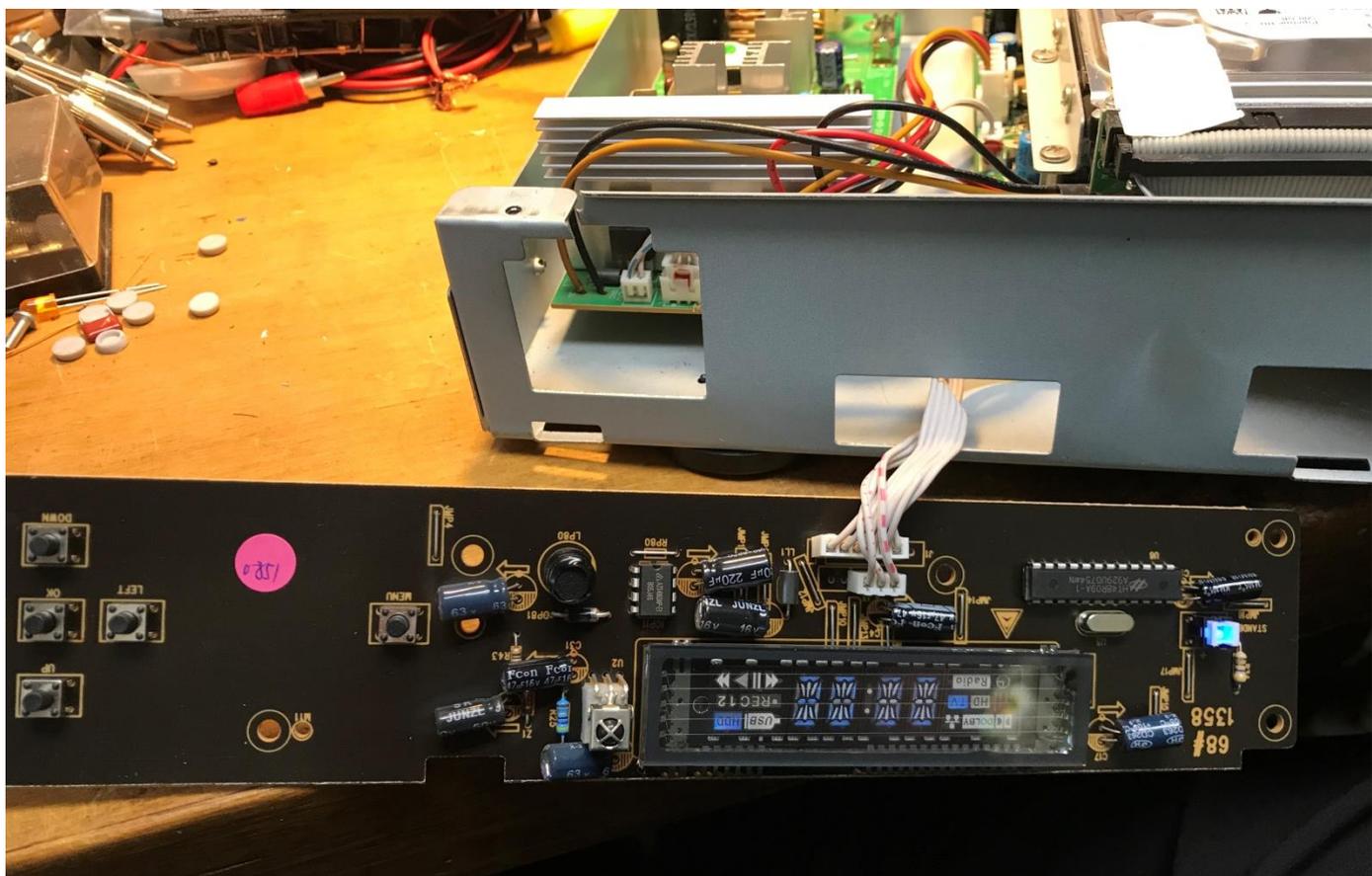
And here is the power supply, luckily easily extracted. The output cable to the main board had me a tad confused, it had two red wires, nothing unusual, a common trick done to lower the resistance & up the current, however my meter indicated that they were not connected to each other, unlike the two black wires.

So I disconnected everything and powered it up, a somewhat risky manoeuvre as sometimes these supplies lose the plot and the rails shoot through the roof, followed shortly by lots of smoke signals. Luckily I got away with it, and discovered that one red was 5V, whilst the other was 3.3V. Usually denoted by different wire colours, not this time, however they did shout a different colour for the 12V rail (yellow)

I then powered it up with just the hard drive and its adapter board, the rails were a bit down, and a look with my oscilloscope showed signs of 100Hz ripple appearing. Now the only caps that will be affected by the 50Hz mains are the main filter cap, and another small 10uF 50V cap. Small electro's like this (small values, with high voltages) tend to die the first, so replacing that one soon had it all working.

This just left one problem, the front panel had a display, of some sorts to say what the machine was up to, was extremely dim. So have I missed something?

So off with the front panel for a looksee. This display is a vacuum florescent type, fairly common in this role, and usually fairly long lasting. However this one had either been severely cooked, or a supply rail or two were amiss.



As you can see, it is awfully dim. Looking at the front panel you could almost think it did not have a display at all, it is that dim



Being a vacuum tube, there are two supply rails, one for the filaments, usually a few volts, and another, typically about 30V, or there about's. Funny, I had just been playing with the supply and I didn't spot any higher voltage rails.

In this unit, they were using a small step up supply with an 8 legged IC, an inductor a diode, and the obligatory filter cap to give us the high voltage. This all appeared ok with no ripple when inspected with my 'scope, so this part is ok.



Closer inspection of the display however revealed that it was absolutely clapped out. You can see what looks like a metalized plating between the 'HD' and the first digit. That area is another square indicator, like the 'HD' one, that says 'TV'. It appears to be always on. The phosphor is all but gone, and what's left is masked by that plating. The adjoining digit does have top and bottom segments, again masked and totally hidden.

The likelihood of getting a new one is zero, so sorry, no fix here. Yes I could bodge in something, but the owner will not like the bill for all the hours involved, so that's it, job done.

*Paul VK3TGX*

## Interesting YouTube Videos

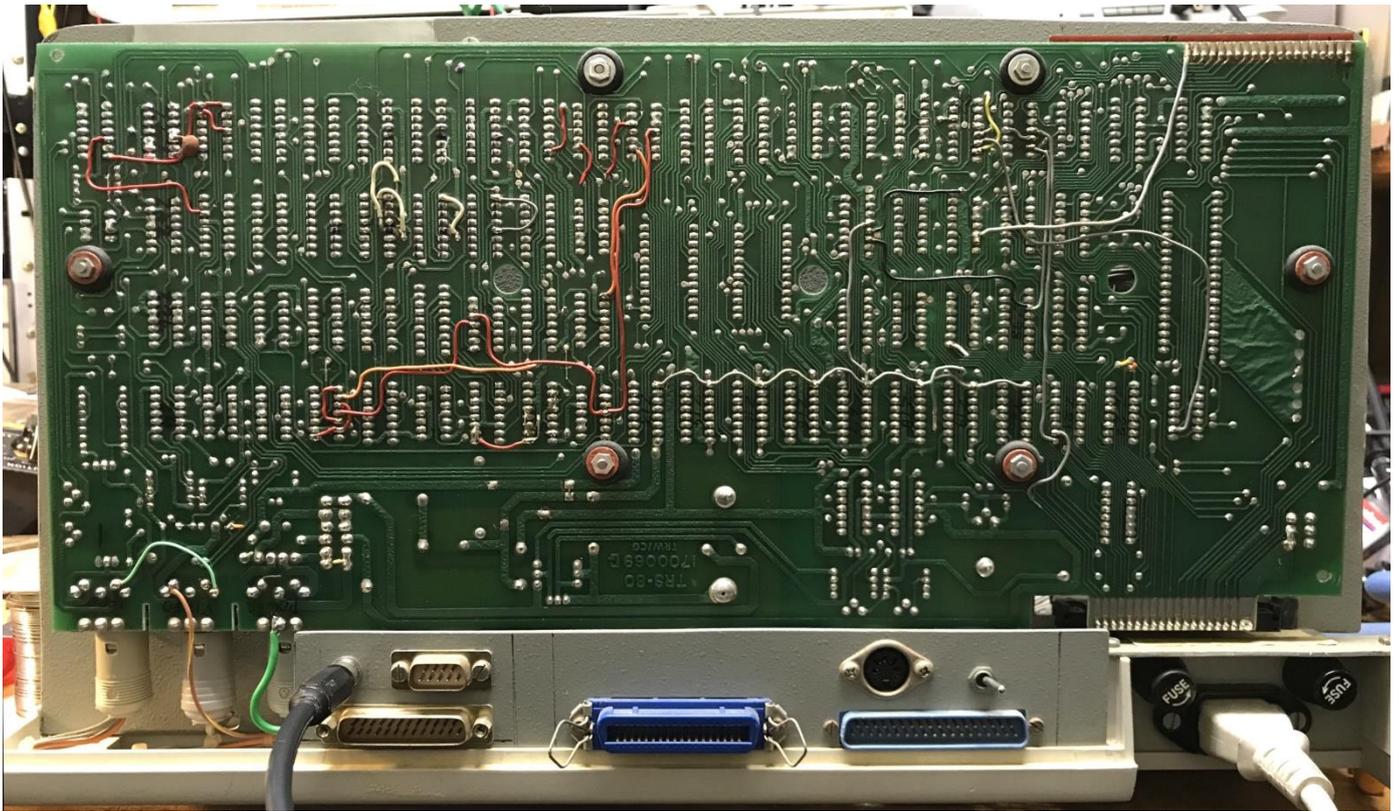


Green Slime – Something to watch out for on old wiring/pastics  
<https://youtu.be/mHlgjTd0yCQ>



Mr Carlson's Lab – Learn a thing or two about valve radio  
<https://youtu.be/74ZynoXL1xA>

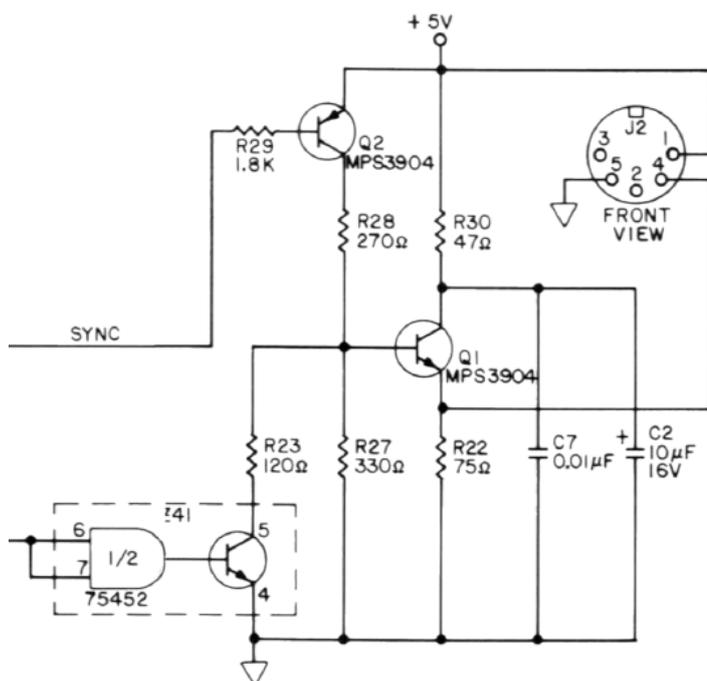
# Broken TRS-80 Computer



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

I was planning on doing an article on transferring software off of quite old 8 bit computers, trouble was the target of this, My Z80 based 8 bit computer decided to die.

When I turned it on the display image came on, but rolling, then quickly disappeared. It didn't fade away, but rather the height of what you could see slowly decreased until there was nothing, as in not the physical height of the text etc., but rather scan line after scan line disappeared... weird. If I turned it off, then back on a few seconds later, exactly the same thing.



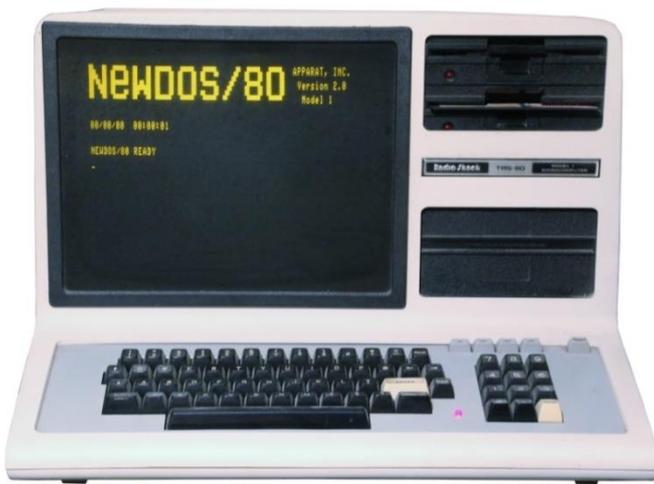
First question was, is it the actual computer, or the built in CRT monitor?

That question was easy to answer, last time I had it in pieces, I added an external video port, so I connected a small LCD screen, and promptly saw the same thing.

The actual video out circuit is quite simple, I was seeing nothing on the output, however I could see sync pulses coming in, and out of the Q2, so that just left Q1.

So I warmed up my de-soldering tool and removed Q1.

Trouble was my transistor tester said it was ok. So what gives?



With Q1 out of circuit, I probed its base drive. Just some rather low voltage sync pulses but no actual picture (graphics) signal.

So was the lack of the picture signal the problem? Normally I would say no, as the computer can make the entire screen black, However my LCD test monitor said 'No Signal', so it was more than this, but what?

So for now I started chasing the video signal, that comes out of Z41. Nothing out, but lots of lovely 5V TTL signals going into pins 6 & 7. So I had a dead 75452, darn, I won't be getting one

of these from my local Jaycar shop (and is that allowed with the current Covid-19 restrictions?)

The output of the IC was basically ground, so just for a bit of extra testing I connected a 100 ohm resistor from its output, pin 5, to pin 8, 5V. This surprisingly gave me video on pin 5.

So I refitted Q1 and connected an LCD screen. All the LCD would say was 'no signal', although my scope could see something on the video out, pin 4 on J2, but it could not lock onto it.

This leads me to a pet height of mine with these modern displays, unless the signal is 100%, they quite often display nothing. If I was using an old CRT monitor, it would show something, even if it was a rolling mess with inverse video etc., you'd see something and quite often it was enough to lead you on the right path to a repair.

I was now in my workshop with the computer chassis, the top half with the CRT was back in the house, so I made do with a CRT TV set I have kept for just this type of faults.

So I hooked it up, and started playing with that pullup resistor I had bodged on. It was pulling the video into Q1 all the way up to 5V, way higher than it should be. So I replaced it with a decade box and tried to make things work. Assuming the IC was faulty, and the extra pull of that resistor was tricking it into working, then maybe I can find a value that will get me going in the meantime whilst I sourced a new IC.

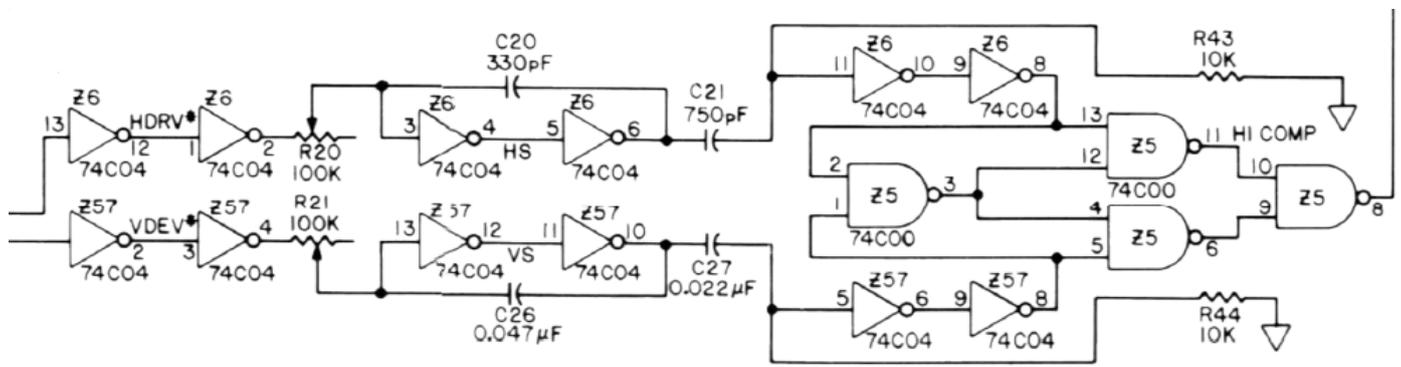
After much playing, I had a resistor value that seemed to give a usable signal on my scope, however it could not sync to it, nor would the TV give me anything useful. In a way the computers video out was the same as before, kind of good for about 2 seconds, then I lost it, although now it didn't go black, but instead showed a totally out of sync picture, with the normal screen content that should be there. Luckily, on this old machine, there is something immediately on screen the moment power is applied, unlike modern computers.

After the initial 2 seconds, I could see a shift in the digital mess on my scope, at the moment when the TV totally lost sync, so what was it?

Monitoring Z41 pins 6 & 7 showed no change (as it should be), however the output was a totally different story. In the first 2 seconds all I could see was just the randomish 5V square waves that make up the onscreen picture elements, however after that there was other signals mixed in.....? So what on earth is going on?

Then I probed the sync signal. In the first two seconds I had negative going pulses, but after the 2 seconds the signal inverted to one of positive pulses.

So time for a closer look at the sync generating circuit.



*This is part of the sync circuit, the bit that feeds the 'SYNC' line in the previous circuit.*

The input is two pretty much square waves, one for the vertical sync (50Hz?, via Z57), the other for the horizontal sync (15.6KHz, via Z6). This circuit converts the square waves into pulses and then combines them into a composite sync signal (Z5), ready to be mixed with computers 'graphics' to give us composite video, as required by the video monitor.

The horizontal was fine at Z6, pin 8, however the same could not be said for the vertical, Z57, pin 8 was stuck, only changing states after that weird 2 second startup carry-on. Moving back down the train with my oscilloscope soon struck gold at Z57 pin 6, with the presence of my probe completely changing things. A scope probe is normally 1 megohm, and should not have much effect on a 50Hz signal. However the real indicator of what was going on was when I touched that pin with my finger, the stay 50Hz mains hum in me made that circuit kind of spring back into life. It restored a picture to the screen, albeit one somewhat out of sync, but a picture nonetheless.

This indicated that pin 6 was high impedance (because I could easily couple into it, and the 1M scope had a big effect) whereas the output stage at pin 6 should have made it low impedance.

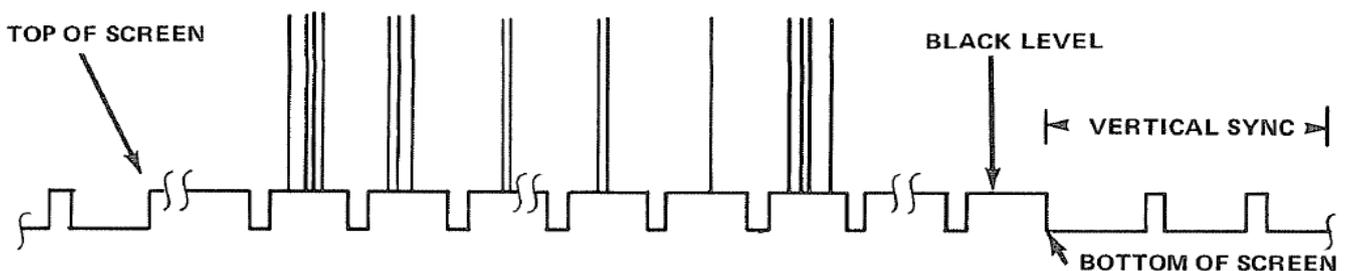
Obviously the output stage of that gate was blown wide open, time for a new 74C04.

Unfortunately my local Jaycar does not stock them, Altronics over in Springvale was my next stop, however with all the covid-19 restrictions in place, driving over to Springvale definitely didn't seem to be in the spirit of things.

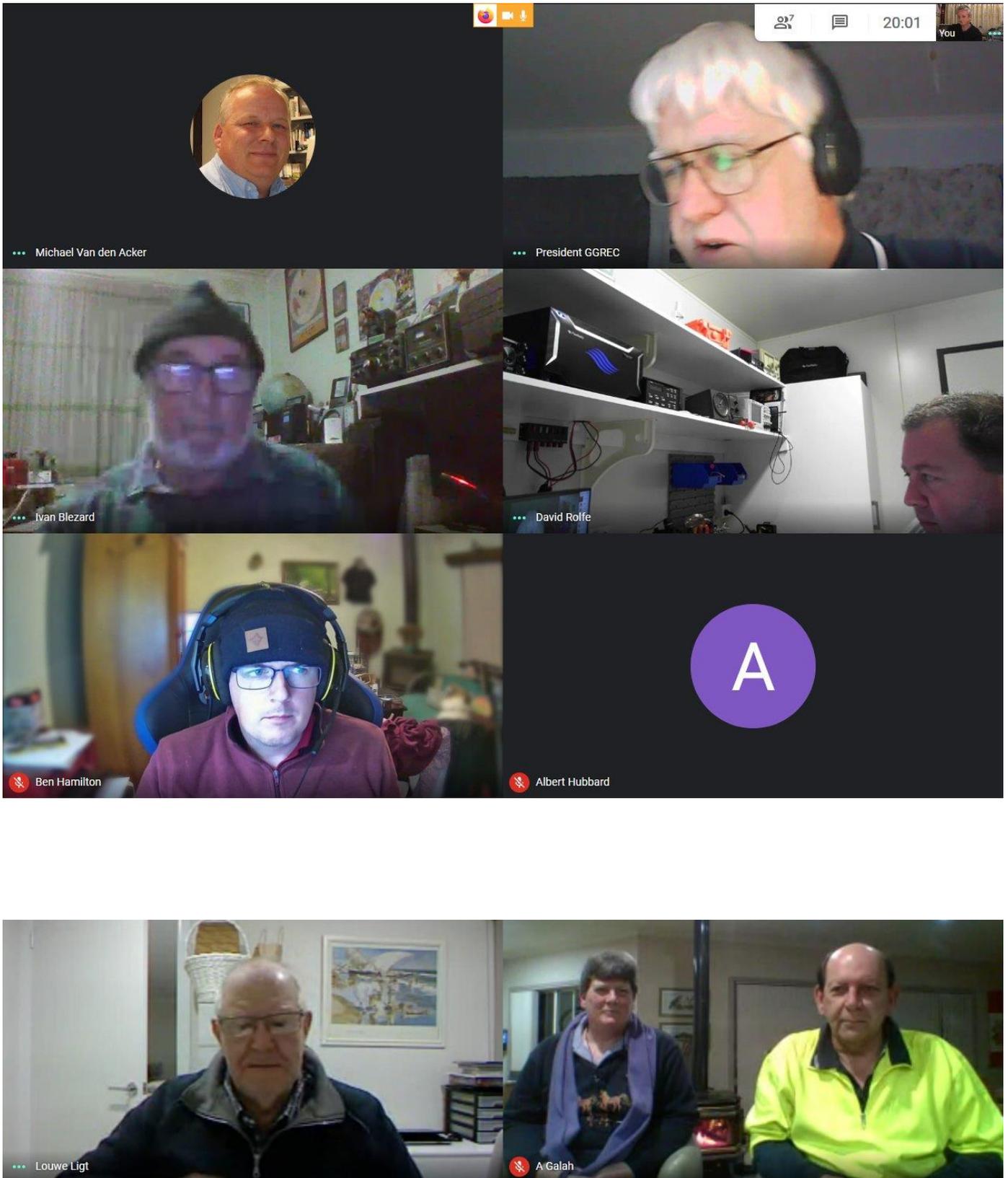
Then I had a closer look at the dead IC, it had two part numbers, 74C04, & 4069. Jaycar, whilst not having a 74C04, does list a 4069.

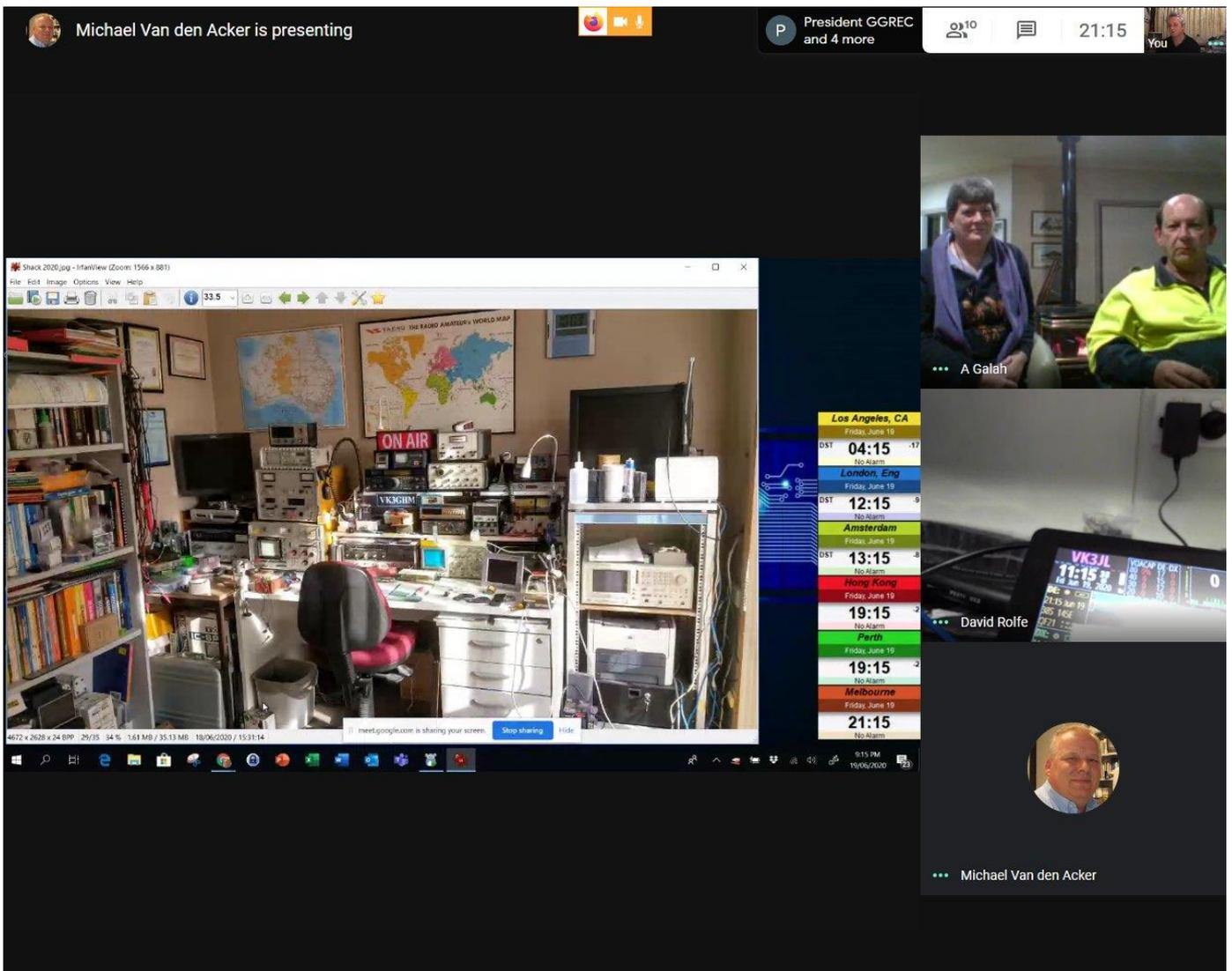
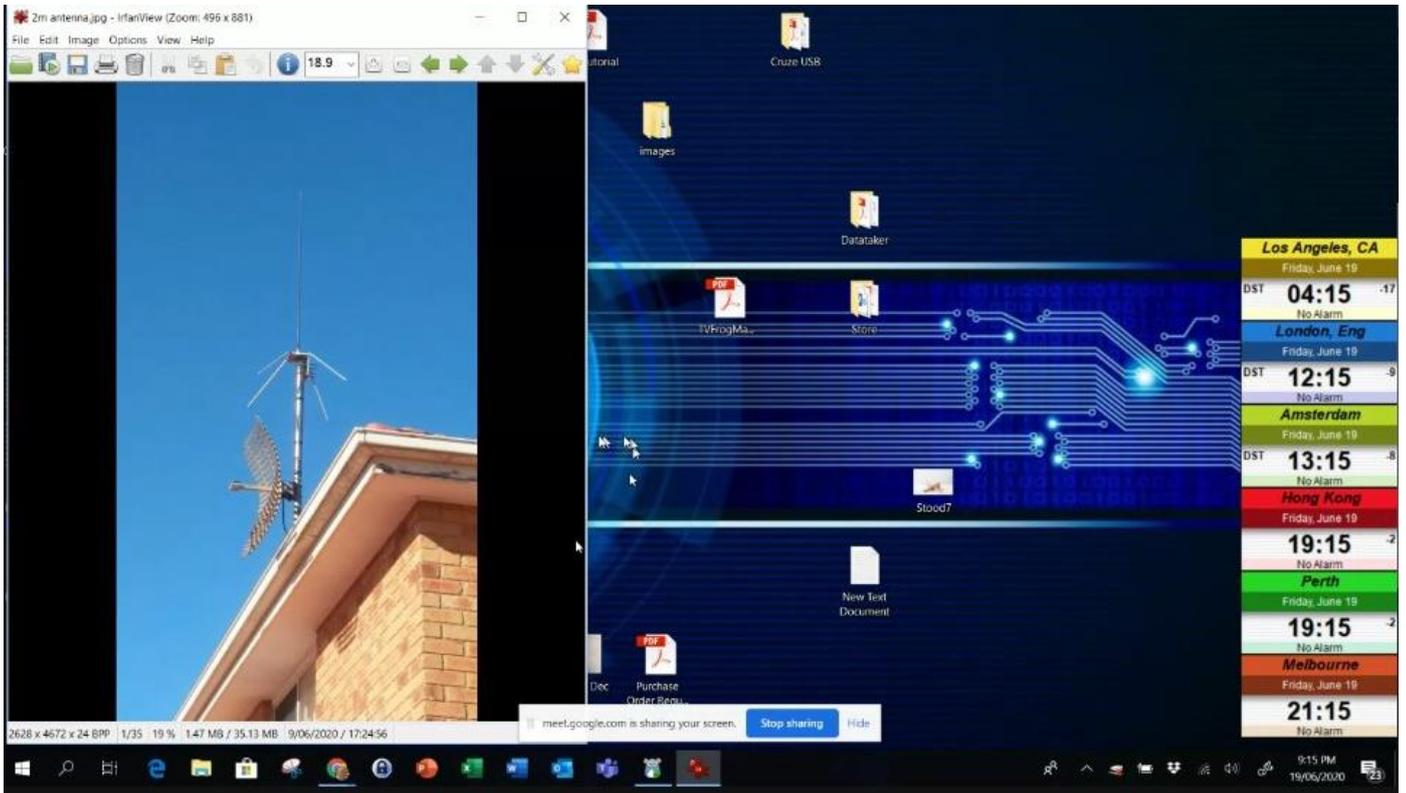
So I fitted a socket to the PCB then grabbed a 4069 and all was well.

Whilst a 74C04 and a 4069 appear to be identical on paper, having the same logic functions (6 CMOS inverters), I never assumed the similarity's would go that far, especially in this application as you can see from the above circuit, there are a few caps etc., forming delay and pulse generators, any variation in IC parameters could easily upset things making the whole stage go somewhat haywire. I have seen the odd design where they even stipulate the brand of gate to use, otherwise trouble. So when I see stages like above, I am weary of any substitutes.



# Prac Night by Google Teleconference







# 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)  
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