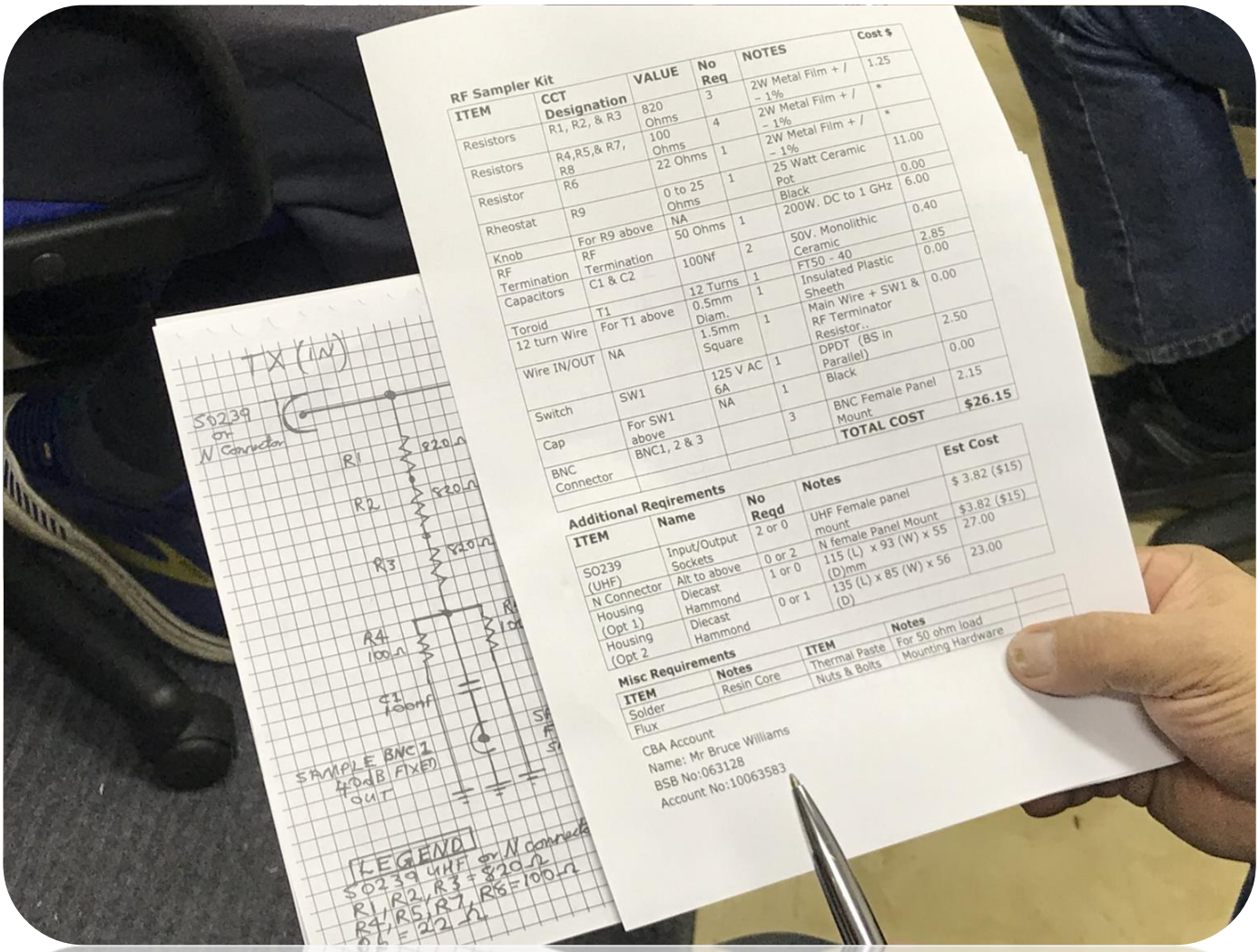
GATEWAY

The Official Magazine of the Gippsland Gate Radio & Electronics Club Inc A0016893M

June 2025



Compressed Audio Distortion

Mid Year Dinner

Rubbish

And More

WIA Affiliated Club

Cover photo, Our latest project, an RF sampler for HF.
(If you have any good photos, please send them in)

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Event Queue

June:

6th.	7:30	Prac night
7 - 8th.		VK Shires Contest – courtesy WIA
20th.	8:00	General Meeting
21-22nd.		VHF UHF Field Days – courtesy WIA

July:

5th.	10:00	GGREC Hamfest Sale 2025 – see page 5
12-13th.		IARU HF World Championship – courtesy WIA
19th.		Trans-Tasman Low Band Contest – courtesy WIA

August:

1st.	7:30	Prac night
15th.	8:00	General Meeting
16 &17th.		Remembrance Day Contest – courtesy WIA

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 June 2025

Hi all,

Last Prac night (Friday June 6th) I handed out the "RF sampler kits" to those that expressed an interest in building the Kit. Also discussion took place on the night on some of the finer points to know, when building the kit. For those that didn't make it on the night, I will be handing out the remainder of the Short Form kits at the General Meeting, this Friday night (20th June 2025). Read the Email I sent to all those on the list, thoroughly, as it gives additional information on requesting additional parts from me (such as the aluminium box and UHF sockets). Along with what is owing, by each individual for the kit parts.

As for this Fridays GM the theme will be "Kits that you have built". They can be of a Radio or electronic nature. So bring them along and share your knowledge about them with your fellow members.

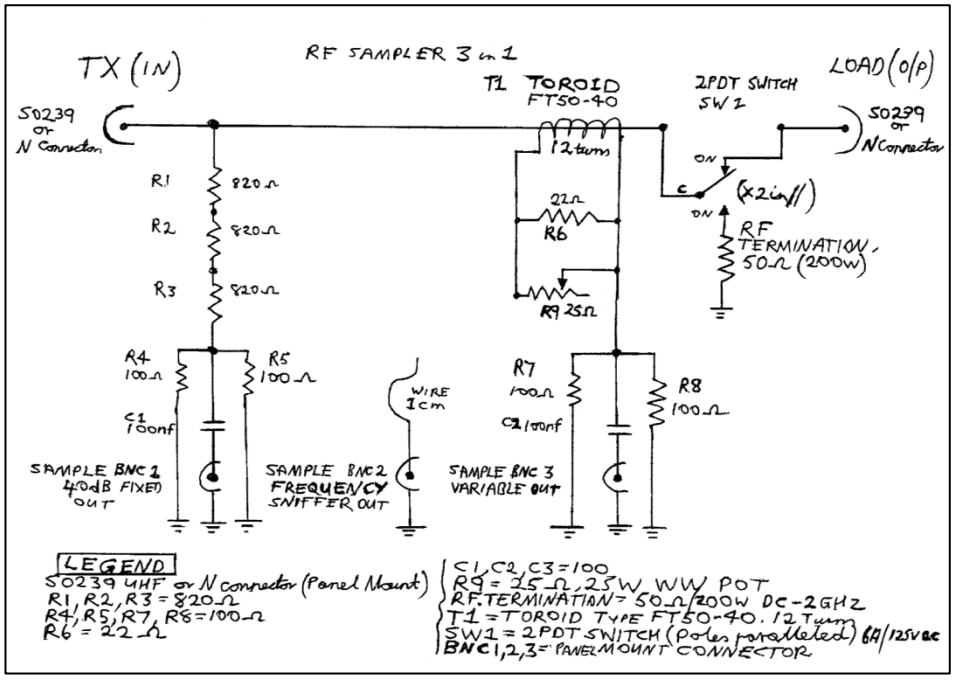
Also don't forget about this weekend's (VHF/UHF Field day) taking place on the 21st and 22nd Jun. Refer to Klause's Email for further details about the event. Note even if you don't take part, come along anyway to have a chat, or to learn more about what takes place at field days.

Cancelled

Look for an update email

As for our upcoming HamFest in July, I'm pleased to announce that all the tables have now been sold, so it's now up to the members to help out on the day, and to spread the word about the event as far and wide as possible, to encourage other ham Radio enthusiasts, to turn up on the day to make it an event to remember.

Cheers and 73s
Bruce Williams (VK3BRW)
President GGREC



From The Editor

This month I started out getting excited by a thing called pps, or pulse per second, it's what you get from a GPS receiver so you can derive a super accurate 10MHz signal for your shack.

However of course you could use the pps signal to lock any frequency you like, mostly provided it nicely divides down to 1Hz, 1pps, so it can be compared to and locked to GPS.

In most cases it's usually easier to just get a GPSDO, a GPS Disciplined Oscillator and divide that down to whatever you need. Trouble is if your required frequency is not conducive to that, like say 3MHz, although even that is not really hard (divide to 1MHz, then use the third harmonic). I had a microcontroller chip that needed 4.915MHz so it could generate proper serial data speeds, yet I wanted to lock it to a nice 5MHz oven'd oscillator, or OCXO, how do I do that? In the end I cheated and just ran it straight off the 5MHz as the speed error in the serial was not actually a problem, I was still inside the tolerances of RS232 comms. For Amateur operators, especially those into digital modes, many require very accurate timing, so short of buying a HP atomic clock, GPS and pps are your best bet. No more wingers saying your 120Hz up the dial.

I have a nice Trimble GPS box in the shack, so feeding it's pps back through my house should not be that hard, if nothing else I will have the most precise Christmas lights flasher ever…

Otherwise I was caught by a YouTube video "How to use phones and modems like it's 1992" from Adrians Digital Basement, https://youtu.be/E7LYCERDnX4. He was given an old Panasonic KX-TA624 Hybrid PBX, I suppose I could look for something online, but they usually go for a few hundred – not that anyone is buying them, it's just high hopes from the vendor. So how else can I do likewise for not much $$$? I do have a manual box that could and has linked old phones and modems, however to really get into the spirit of the video (as I perceived it) I needed something automated, as in generates dial tone & ring current.

Year ago I got interested in bulletin boards, and I built one, I had a separate phone line for it, however it never went far, I passed the number off to several people just to see if it gets out there and I start receiving calls, but It didn't, and it just ended up being used to test dial up modems from where I worked at the TSG in Telstra.

Strange as it may sound, that BBS system never went away, it's just sitting on a hard drive in a networked computer I use to run stuff around my house, it's just never executed as there is nothing there to ring the modem – the line being pulled years ago when they moved us all onto the NBN. So Adrians project made me think of playing with it. Trouble is it's probably only going to be a 5 second wonder, so don't spend any money on it. So I've been scratching my head for the last week or so, and tearing the house apart trying to find an old Sipura VoIP box that I am led to believe may do what I want, I just need a VoIP guru. Or I could just skip all that and put the BBS on a Telnet link – however that would need a dose of Python code….

Paul VK3TGX

GGREC HAMFEST

GGREC HAMFEST SALE 2025

On **Saturday, July 5** the Gippsland Gate Radio & Electronics Club will be hosting a Hamfest sale . the venue is at the **Longwarry Community Hall** at 14 Kennedy St. Longwarry, approx 60km East of Dandenong, Vic. The venue is easy to find. It is just 3 km South of the freeway interchange, 150 metres South of the Longwarry train station and level crossing.

Doors open at 10:00 am for buyers. Entry fee is $7 Doors open at 8:30 for stall holders. No trading before 10:00 am please.

We are pleased to announce that all 30 tables available to stallholders have been booked!

Direct enquiries to Ian Jackson VK3BUF via: hamfest@ggrec.org.au or call 5644 3118

Mid Year Dinner

Rubbish

Recently we had a hard rubbish day in Frankston, so I took a short trip on foot around my immediate area, to see what was out there – electronics wise. Kind of like the TV show “Cash for Trash", Channel 31 I think, their website says “CTV+”, but that means nothing to me. (Actually all the ‘stupid’ TV channel names are a pain, I need the number, that’s all my keypad takes). I was tempted to use that name for this, however they’d probably get upset with me.

As you can see, a few bits and pieces to burn up some spare time when TV time sucks, as it often does. All this stuff will easily fit in the bin, so if I lose interest, no problems. You’d think they’d try and recycle it, but no, straight into the compactor on the back of a garbage truck alongside couches and kids toys. – More landfill, just what our planet does not need.

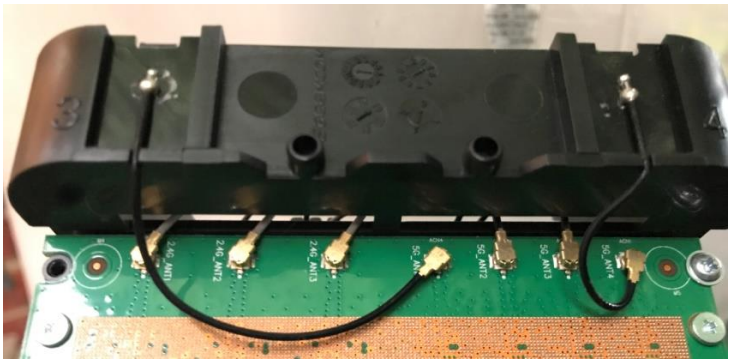
TV Set Top Box, this had a 160GB hard drive in it, unfortunately the older IDE type, however handy if you want to get into retro computing.

It also had a really short Toslink optical cable and back panel coupler, as in optical digital audio, so into the bits and bobs box

Otherwise the metal case it kind of nice, with lots of almost finger stock all around, so mostly good RF shielding. We need less RFI.

Optus Home Router.

Now this was fun to get apart, and also rather interesting to see what's in there, a boatload of antenna's, the RF connector strip that kind of puts my shack BNC patch panel to shame.



The antennas were all just dipoles made on small PCB's, two visible in this picture on either side of that back plastic moulding. Actually all the antennas were slotted around the top in this internal chassis.

I tried powering it up, however it was not happy, seemingly stuck in a boot loop or something simular – I kind of blame the Nand flash chips often used – they are only good for so many writes before they fail. Most of this kit, along with tablets and phones are basically a Linux based computer, often with far too much code and data for the minimal memory in them, so like a full blown PC they use virtual memory and swap chunks in and out of the flash storage like a PC would do on its hard drive. Unfortunately this soon wares out the flash memory and that is that – basically unrepairable and into the bin.

This unit also functioned as an 'ATA', or Analogue Telephone Attachment unit, I'm looking for a box with two lines, as this one has, so hopefully it can link the two together – as in call from one to the other – Yes I'll probably NEVER find one that'll do that, I'm just kidding myself. I recently watched a YouTube channel where they did that, playing with old dial up modems. I still have a (somewhat disused) dial up BBS with no line, so dialling into it seemed a fun idea as the YouTube show showed. As this router was all but dead I never got very far.

I also have this Sipura VoIP box (not part of the hard rubbish), two lines, nice, however I have no idea – other than setting up an Asterisk server on another PC, WAY overkill for what I'm after.

I'm sure I've seen a YouTube video of a bloke doing this, but how and with what brand of ATA/VoIP box I have no idea. I kind of suspect it was a test mode rather than an actual intended everyday user use mode.

So many ATA's may do this, but how-too is buried out of sight in the proprietary software they are running.

SIPURA
technology, inc.

Sipura Phone Adapter Configuration

Info | System | SIP | Provisioning | Regional | Line 1 | Line 2 | User 1 | User 2 | User Login | basic | advanced

System Information

DHCP:	Enabled	Current IP:	192.168.0.184
Host Name:	SipuraSPA	Domain:	gateway
Current Netmask:	255.255.255.0	Current Gateway:	192.168.0.1
Primary DNS:	192.168.0.1		
Secondary DNS:			

Product Information

Product Name:	SPA-2000	Serial Number:	88012BA70261
Software Version:	2.0.10(e)	Hardware Version:	2.0.1(21e6)
MAC Address:	000E08AB35E9	Client Certificate:	Installed

System Status

Current Time:	29/5/2025 17:25:16	Elapsed Time:	05:29:39
Broadcast Pkts Sent:	0	Broadcast Bytes Sent:	0
Broadcast Pkts Recv:	237574	Broadcast Bytes Recv:	14962578
Broadcast Pkts Dropped:	0	Broadcast Bytes Dropped:	0
RTP Packets Sent:	0	RTP Bytes Sent:	0
RTP Packets Recv:	0	RTP Bytes Recv:	0
SIP Messages Sent:	3587	SIP Bytes Sent:	1714438
SIP Messages Recv:	0	SIP Bytes Recv:	0
External IP:			

Line 1 Status

Hook State:	On	Registration State:	Failed
Last Registration At:	0/0/0 00:00:00	Next Registration In:	3 s
Message Waiting:	No	Call Back Active:	No
Last Called Number:		Last Caller Number:	
Mapped SIP Port:			
Call 1 State:	Idle	Call 2 State:	Idle
Call 1 Tone:	None	Call 2 Tone:	None
Call 1 Encoder:		Call 2 Encoder:	
Call 1 Decoder:		Call 2 Decoder:	
Call 1 FAX:		Call 2 FAX:	
Call 1 Type:		Call 2 Type:	
Call 1 Remote Hold:		Call 2 Remote Hold:	
Call 1 Callback:		Call 2 Callback:	
Call 1 Peer Name:		Call 2 Peer Name:	
Call 1 Peer Phone:		Call 2 Peer Phone:	
Call 1 Duration:		Call 2 Duration:	
Call 1 Packets Sent:		Call 2 Packets Sent:	
Call 1 Packets Recv:		Call 2 Packets Recv:	
Call 1 Bytes Sent:		Call 2 Bytes Sent:	
Call 1 Bytes Recv:		Call 2 Bytes Recv:	

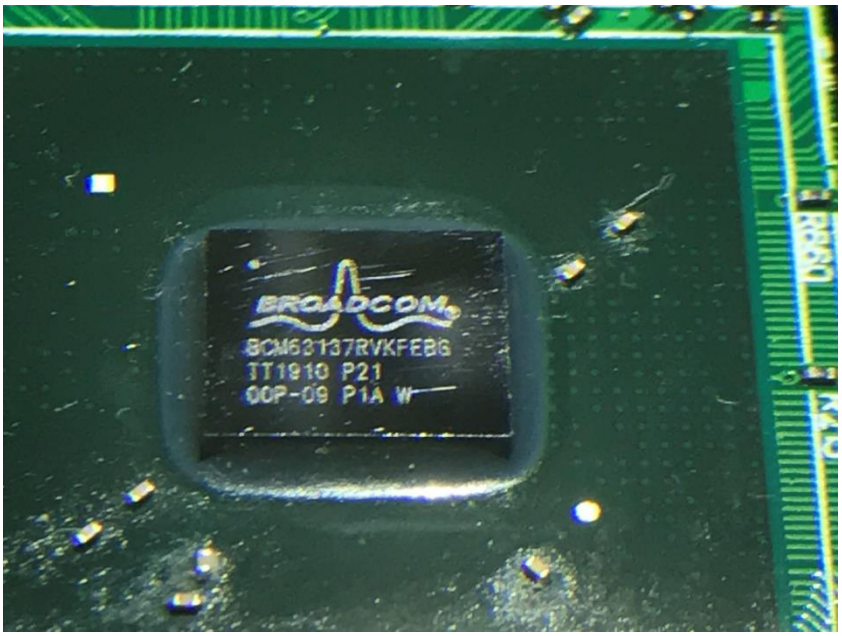
One can probably hack their way in, finding these are just another imbedded Linux based box, and then make it do anything you like, however my days are already full, and this will take many many hours of time, mostly in my case learning my way through this new 'trade'

Something that's not happening at my QTH

I did pull the phone interface board, the one sitting on the table in front of the chassis. However it's all inside a chip, what might as well be custom silicon, that I'm never going to get any info on – or the time to try and get one of my Arduino boards to talk to it.

Oh well, I'll just keep on dreaming..

(Any VoIP experts help welcomed)



Anyway, back to the Optus router, this is the main CPU in it, a Broadcom BCM63137 device, unfortunately getting a data sheet is near impossible, Broadcom loves to keep it's stuff locked down, the only way to get any real data is to enter into a manufacturers contract with them and sign an 'NDA', a Non-Disclosure Agreement, something a home user will never be able to do, as they are only interested in people that will buy thousands and thousands of chips from them.

Even the Raspberry Pi that is used for so many projects uses one of their chips, and a full data sheet is not available, the Raspberry Pi foundation had to sign simular NDA's and are only allowed to release limited information.

That chip you see glued to the underlying board is actually the silicon die, not a plastic IC package we are accustomed to see, it had a thermal pad and quite a sizable heatsink plate attached. Here is one of those pads that was pulling heat from the backside of one of the two RF transceiver chips that drove all those antennas shown before. The pad from the processor came away in a million bits so I could not get a picture of it. The whole router was built like a chimney to lose all the heat!

The Linksys box kind of fooled me, it looked like a Linksys WRP router that are kind of prised for their ability to run third party software. While this one only had an 8 way RJ45 block, it was still labelled 'WRP'.

Unfortunately it's just a dumb switch, with quite a lot of the box empty. Linksys making it look like their router so you can stack one atop the other, like a HiFi stack, but who on earth wants a Linksys stack? My router is out of sight, as would most peoples, so having a matching switch is pointless. Anyway time to take it apart (it too did not work) however apart from removing the screwed on feet that also locked the front blue section in place, how to proceed further was well disguised.

I went looking on the web on how to open a WRT router, but just found guides into accessing the web configuration page, so what's that's got to do with opening it up I have no idea. Maybe a bit of Italian, where to 'open a light' means to turn it on. Boy have I had some fun with my wife in this regards. She says 'open the light', I reach for a screwdriver and ladder.

Anyway after prying and poking for ages I finally cracked it and reached for some more aggressive tools. While there were two small screws under a label, it was mostly one use plastic catches that soon let go (broke) when I got stuck in. *(Flaming plastic crap - whop)*

When powered up, it was drawing quite a bit of 12V power, it brought my bench supply to its knees, so I connected it to my 40A shack supply.

The caps and inductors in the power section started getting toasty hot, but not as hot as the back of the PCB where the main IC was, however surprisingly the heatsink did not get that hot. It should be the other way around.

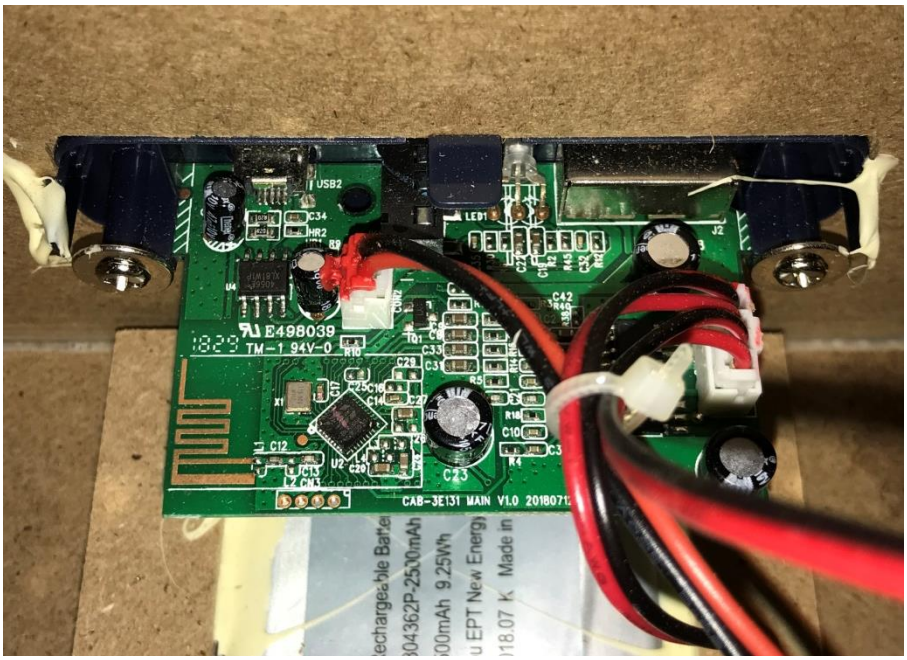
When I pulled off the heatsink I got a bit if a surprise, the main IC had blown a hole into itself, as in I could see silicon, so no wonder it was completely dead.

The silly part is that heatsink was attached with some quite thin foam tape – so almost an insulator, so no wonder it wasn't as hot as the board. What idiot decided that was a good idea. Guess who's not going to buy their kit.

It's amazing how some of these companies get a good reputation selling their wares, maybe if someone just had a good look inside we'd shop elsewhere.

Another VERY popular Chinese brand (whom I have two WiFi cameras from) was recently outed by the US for peddling some awfully bad and buggy software, so one never knows.

Other than that I scored three 2TB hard drives – well they spin up, but are otherwise flogged out – maybe if I could re-write their magnetic structures they'd be ok, however that's only something the factory can do – so strip and score some neodymium magnets etc.



The BlueTooth speaker was a surprise inside, the board was so small, amazing that the super small IC's (hidden under the cable tie) could run the three ohm speakers.

I thought it would only run from a USB power bank, but I was wrong, it had a battery.

Them's the goods, the bads is the sound quality, while it achieves a good volume – surprising due to the low supply voltage, the quality is quite horrible – at any volume.

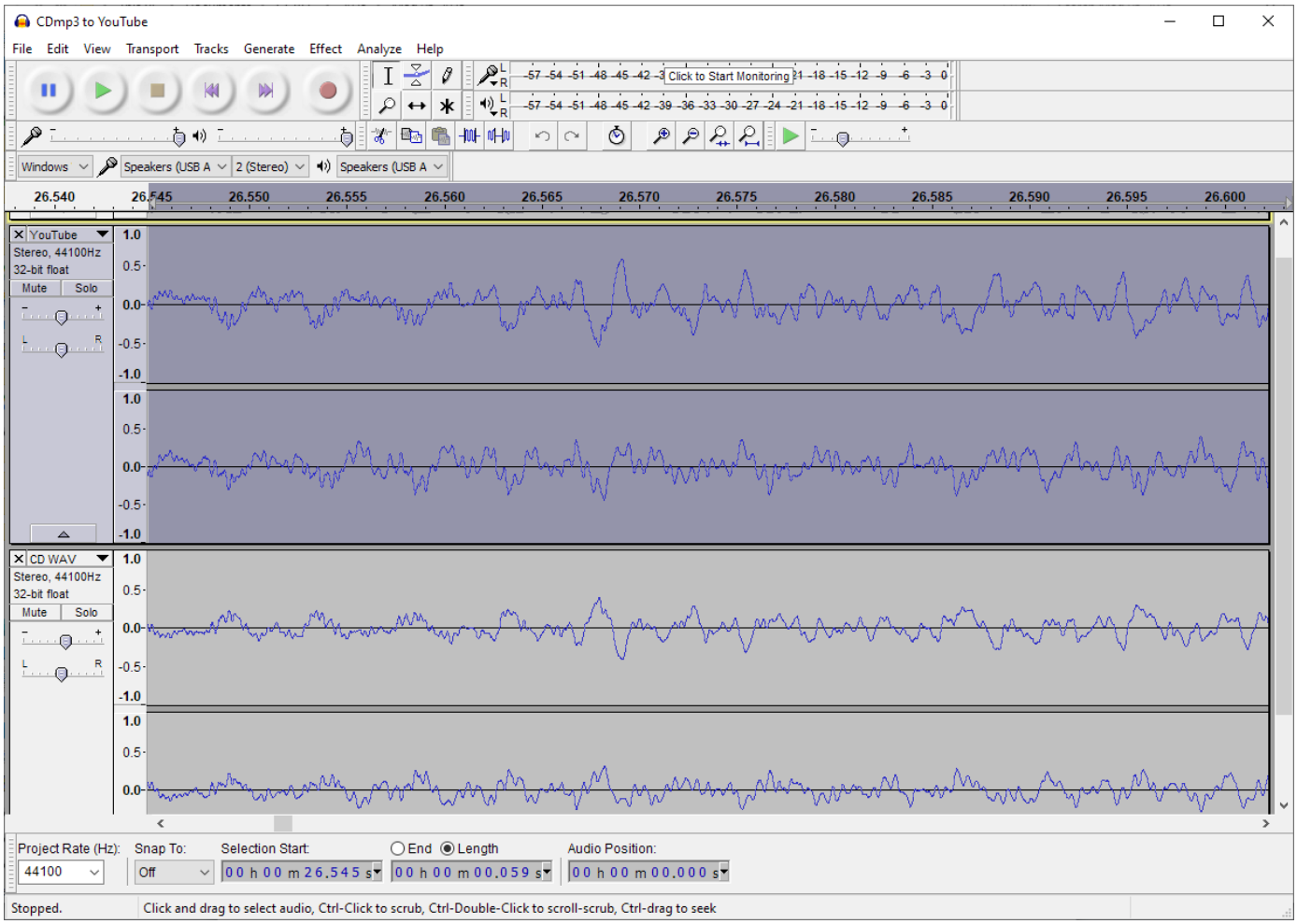
Maybe I'll try disconnecting the speakers and see if the board outputs a better sound. I'm not holding any hopes, otherwise it is quite a good form factor with a top recess perfect for my phone and another round one just asking for a cold can, or a small bowl of nuts.

Unlike the other junk this one is exceptionally easy to open, just remove the two handle screws and the top just lifts off. Why do the other guys make life so difficult?

Oh it is on Channel 31, a good show, try watching it.

Paul VK3TGX

Compressed Audio Distortion



For Church I was given a YouTube link to some music our priest was interested in using for Mass, however I kind of recognised it, so I went searching and realised we had the CD of that one, so no need to pester Mr YouTube.

However to make doubly sure it was the exact track (Yes overkill on my part) I loaded them both into Audacity audio editor. Yes definitely the same track, it looks like whoever uploaded this to YouTube had the same CD as we did.

So now for some fun, let's take this comparison to the Nth degree. So I fiddled around for a while zooming into some sharp transients so I could perfectly align the two tracks, then I inverted one of them, then got Audacity to render them as a new track, as in mix them both together. As one was the complete mirror of the other I should end up with nothing, silence.

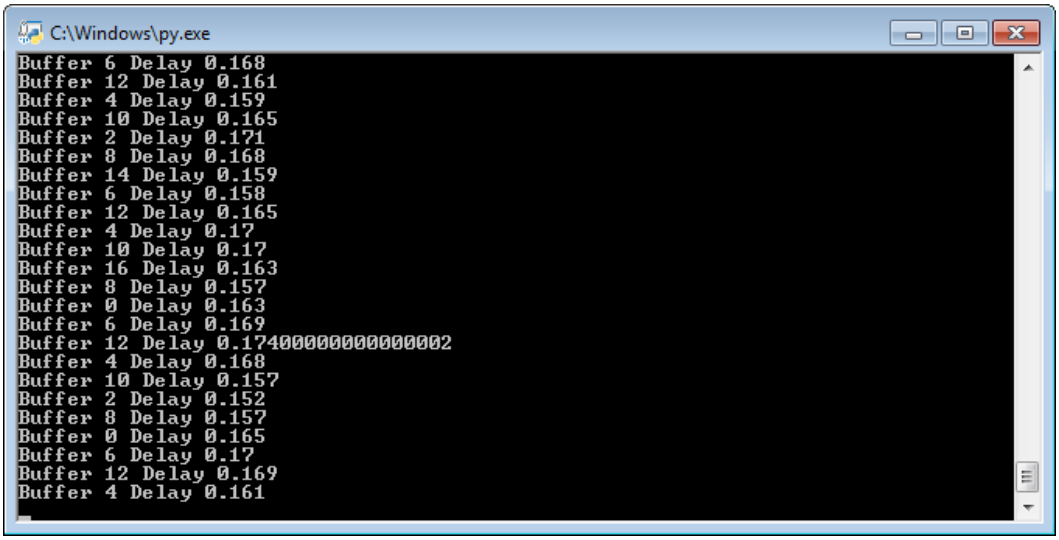
But I didn't, if I boosted that resultant track by quite a few db's I ended up with a pile of digital noise, not white noise, more like something from a weak mobile call. It was all pretty much unintelligible but for the odd burst of real audio.

Most audio is saved on websites and servers as lossy compressed audio, often using the good old MP3 format – although many new formats are now available. MP3 achieves great reductions in the size of the music file by identifying things that our human ears and brain are unlikely to miss, things like weak tones up close to much louder ones. When you compress your audio you get to choose how far you want the compression. When it first came out we were all using digital music players with very tiny storage spaces, so often the compression was quite

heavy, however as the target use was out walking etc., listening on not so great earphones often in noisy environments, so you could get away with murder, compression wise.

These compressors pull the audio apart, identifying the various tones, as in frequencies, that go into making that sound, rather than looking at the actual audio waveform. This 'description' of the audio is what gets saved, and is what is used to recreate the music at the far end. So as you can probably guess, there is one HELL of a lot of mathematical processing done to break the audio down to its components, as in an absolute load of fourier analysis etc.

Now when you do a pile of calculations you almost always end up with a remainder, or decimal result that extends off into a ridiculous number of digits. Divide 1 by 3, you get 0.33333333, the three's go off in an infinite length, as do the results of many calculations. So how much do you keep? And how much can your final destination file handle. Then there is also the processing speed. Numeric processors and math libraries in computers are not the most precise, they are a compromise between speed and accuracy, with much thrown away.



Here is the output of some very simple Python code, notice that '0000002' glitch, actually two, in that the code generated this 'offset' then magically deleted it in the next line. (I've shown this before)

Now what happens to your great wall of numbers (after all that's what digital audio stored in a computer is) gets subjected to way more complex calculations than my lame bit of Python code is? fourier analysis is complex, I kind of doubt the writers ever envisioned the results being put back together to recreate the original signal.

So what your listening to is the original recorded track, with this digital crud added ontop.

Personally I've kind of moved away from MP3's. If I have the choice I now listen to my audio as FLAC files, the 'Free Lossless Audio Codec' with files about half the size of the original WAV file. However there is now the push to go to higher resolution audio as the filtering needed for 44.1 K sample CD is also hideous, (read 'distortion')

To digitise audio at 44.1K samples a second, it cannot have any content above half the sample frequency, whilst at the same time one ideally wants a flat audio response all the way up to 20KHz. Now try and make a filter the starts at 20KHz (zero attenuation) but finishes at 22.05KHz without adding any phase shift artefacts – all but impossible, so compromises are made. Now if the sample rate is say 128K, then the filter can be much smoother, starting still at 20KHz but not having to stop until 64KHz, WAY easier and smoother.

Now if you think that's a hell of a lot of data to store, try looking at DSD, and it's higher flavours, megabytes rather than Kilobytes per second, Ah the crazy world of high end audio.

Paul VK3TGX

Ferrex Blower

When my air compressor failed a while ago, and I subsequently found the tank had also developed a leak I kind of became wary of them, especially after seeing video's or what can happen to old air tanks, as in very violent explosions, blown out windows broken bricks and torn out garage roller doors, So whilst having a handy air gun in the shack in nice, not killing one's self is also quite desirable. As mine had a leak, how far was it from total failure?

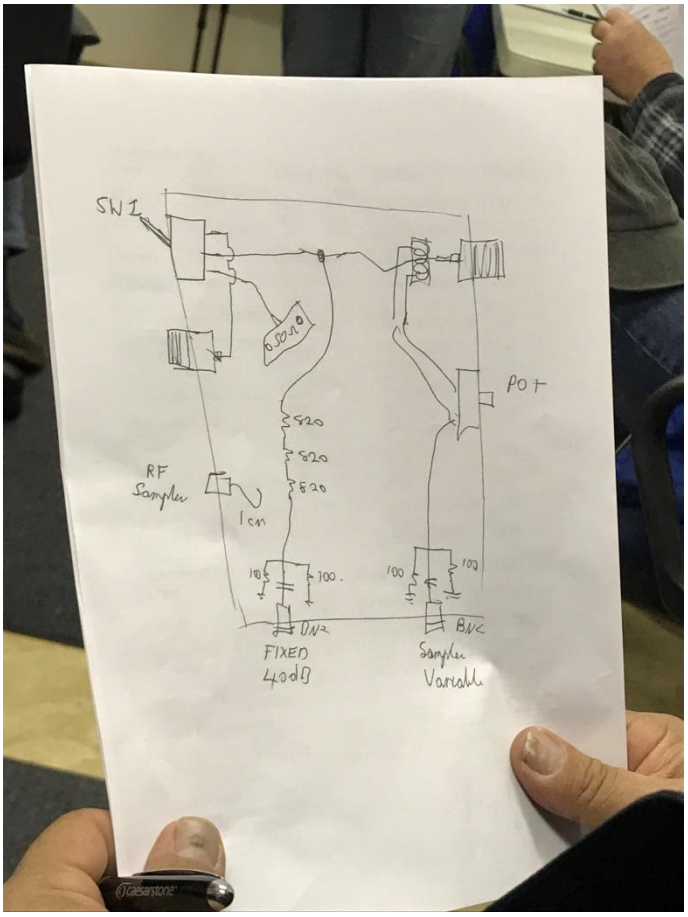
On the internet one sees these mini vacuum cleaners and blowers that do amazing jobs, could one of these replace my compressor? The only catch is I'm a bit wary of clicking on random online ads, so when this unit appeared in Aldi for $35 I was kind of interested; the biggest problem was it didn't come with a battery and charger, those kind of double the price. Anyway the next week they dropped it to $29, so I bought one (maybe it's time I got into their battery ecosystem). Aldi are quite good on their refunds and this unit didn't come with any stupid sealed plastic packaging of wrap, so I could easily return it in pristine condition for a refund.

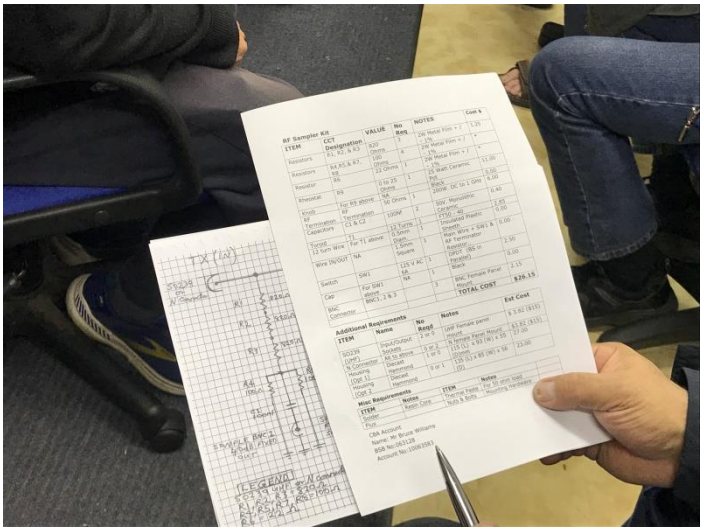
On reading the instructions I was surprised to see it only achieves an air pressure of 0.6 psi, way lower than my compressors 120psi, not that I ran it that high, 60psi was usually fine. Now I wasn't expecting anywhere near that much pressure from this blower, but after seeing so many video's I kind of assumed it would be somewhat better than 0.6psi.

In use it sure puts out a good gale, but block off the end and you feel nothing, it's a high flow, zero static pressure device, so how it could ever inflate anything I have no idea. With my compressors air gun I could easily get little puffs of air, or dive the nozzle deep into something, a job this gun cannot do, nor can it drive a long nozzle as it has zero static pressure, so not really suitable for me – so back it goes, so does anyone have a decent compressor for sale?

Paul VK3TGX

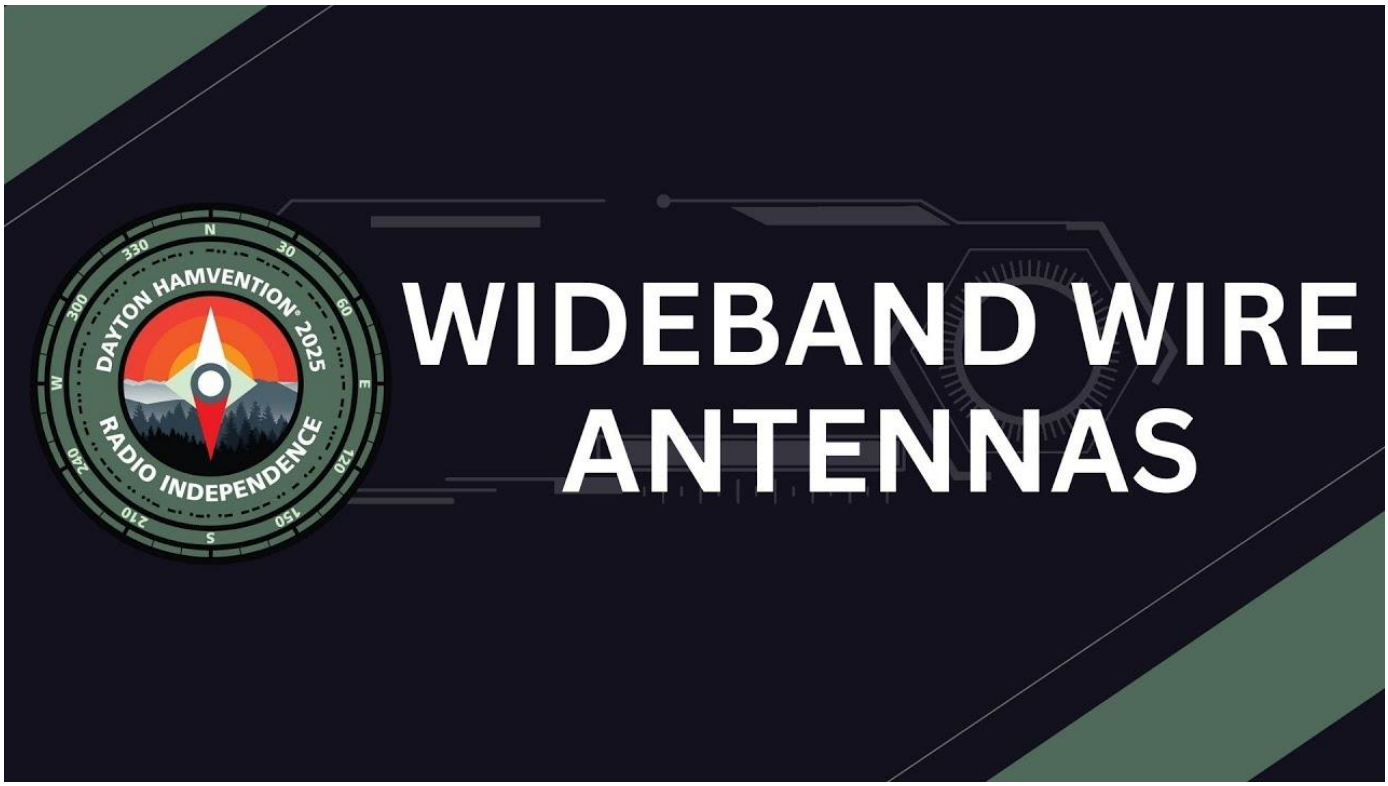
Prac Night 2/05/2025





Paul VK3TGX

Interesting YouTube Videos



Wideband Wire Antennas
https://youtu.be/TshVEbOp_IY

Windows 10 Users Must Do This Now!
https://youtu.be/KiXF0O-eWJM

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We also give Thanks to

Jaycar Electronics

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For their generous support over the years

Club Information

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

Office bearers

President	Bruce Williams	VK3BRW	General 3	--	--
Admin Sec	Phil Pavey	VK3VB	Web Master	Mark Clohesy	VK3PKT
Treasurer	Klaus Illlhart	VK3IU	Magazine Editor	Paul Stubbs	VK3TGX
General 1	Ian Jackson	VK3BUF	Property Officer	'committee'	--
General 2	Fred Reid	VK3FWR	Assoc. Secretary	Bruno Tonizzo	VK3BFT

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 431.425MHz Out 438.425MHz CTCSS 91.5Hz
VK3RGW Repeater supports Remote Internet access (IRLP), Node 6794 **offline**.
70cm Repeater Seaview VK3RWD, In 431.575MHz Out 438.575MHz CTCSS 91.5Hz
Simplex VHF - 145.450MHz FM, Simplex UHF - **TBA**
VK3RLP Beacons 1296.532MHz & 2403.532MHz **(currently offline)**

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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