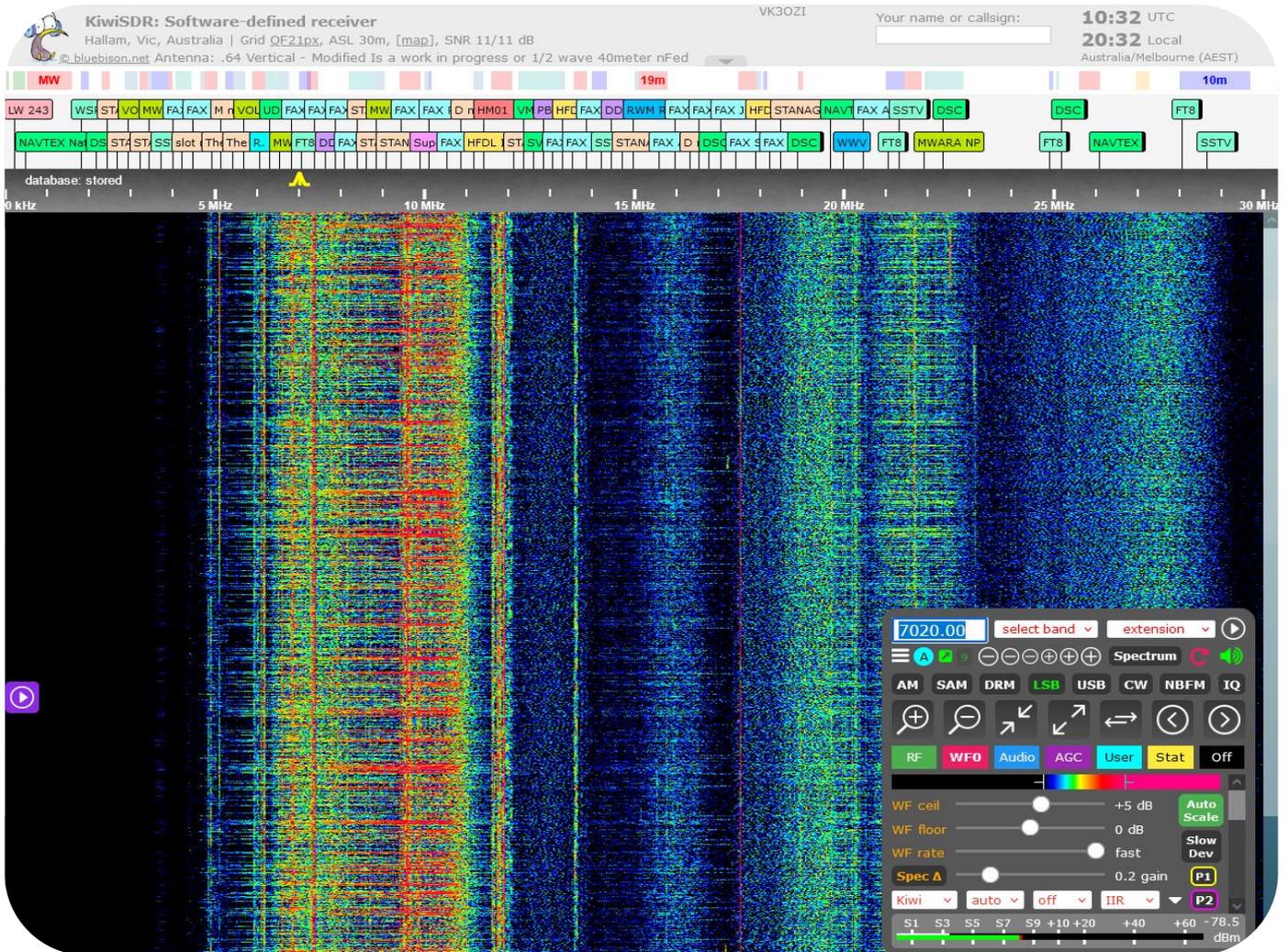




GATEWAY

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

April 2024



Upcoming AGM

Industrial Panel Meters

Fun with FSK

And More



Cover photo, KiwiSDR, a whole new level to online listening, thanks to VK3OZI for letting me in
(If you have any good photos, please send them in)

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Event Queue

April:

5 th	7:30	Prac night
19 th	8:00	General Meeting

May:

3 rd	7:30	Prac night
17 th .	8:00	General Meeting
18 - 19 th .		Don Edwards memorial slow Morse 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 April 2024

Last weekend I made a trip up into the High Country. Starting from Myrtleford, working my way South, I spent the night near Dandongdale, then a couple more nights in Wonnongatta Valley. With me on this journey was my son Hal, David VK3XMF and friends associated with a company I work with. My father Eric was also on board and we got to celebrate his 93rd birthday around the campfire. As it turned out, the weather was excellent. A cloudless 23 degrees each day. It had been a while since I had been up that way. Each night I was up on 80 metres, making contact back to Drouin. It drove home yet again that Amateur Radio is at its best when moving around. Not just an entertaining hobby, but a tool for connecting to others from places where no mobile phone can reach.



My first trip into the Valley was in 1990 in my Mitsubishi van. It is a steep, tough descent into the valley and a long climb out at the other end, with the gear stick in first and second gear, Low range. 34 years later I was back again, still in the same van, still running fine. On such journeys, the vehicle becomes more than a method of transport. It's a mobile survival hub that we rely upon for our accommodation, food, refrigeration, comms and energy.

The modifications I made to the vehicle back then are as useful today as when they were first installed. The 8 metre mast, the inverter, fridge and Jerry can storage and the full length motorised roof rack. Really, the only things that have changed is the IC706 instead of the 101E, the LED driving lights and the tyre inflation system.



The 1990 trip into Wonnongatta



Back again 34 years later

Of course much has changed in our hobby since that time. We have Foundation licenses, now free Class licenses, amazing transceivers and SDR receivers, DMR, cheap antenna analysers and other test gear that we could only dream about in the 90's. Plus powerful home computers, mobile phones and an unbelievable internet system which services Amateur Radio as much as it does our everyday life.

Non-Amateurs believe that Social Media is a modern construct, where people can have daily contact with friends, without meeting them in person, but of course Amateurs have been living this way of life for most of a century. Only the medium has changed.

Our Club, the GGREC has also seen much change since it formed in 1977. We have a healthy membership, a Club shack and enough resources to keep it all going. The largest challenge is to have sufficient members to put up their hands to serve on the committee for a year. This Friday night is our AGM. Whether you have served on the committee before or not, please consider putting up your hand for a role. It is the key ingredient to the future of our Club.

I look forward to seeing you all at the AGM This Friday Night.

Cheers, Ian VK3BUF

From The Editor



This month it was time for a tip run, I had a few 'dead ones' lurking down the side of my house, two dead computer monitors, DVD players and a box of assorted boards etc. At the Frankston tip (transfer station) this sort of thing is free to dump, plus they have a tip shop that is worth a quick peek.

The only downside is where one dumps e-waste etc., there is quite a few staff working there, so picking through others bits and bobs is kind of near impossible, unlike when I was quite young and we had a real tip, me and a few mates would sneak in the back way and

entertain ourselves, like finding that a fan heater was far weaker than the face of a TV tube.

Many many years ago I lived in Bayswater, and one of the activities was making billycarts out of various ball bearing races, scored from the local tip, I don't know how they got them out, as this usually needs special tools, but they did anyway. These were literally nailed to the end of the boards that made the bottom of the carts then used directly as the wheels, no rubber tires, zero ground clearance and almost unsteerable, but boy did they go fast.

Anyway, back to the Frankston tip, or rather the tip shop, they had this miniature HiFi 'rack system' it's the smallest I've ever seen, and for \$2 I could not let it pass. It literally can sit in the palm of your hand at only 145mm wide. The top is a cassette player, with a radio under that, finished off with a clock. I've no intention of ever using it, or even seeing if it works, it's just a curio, a dust collector – however I did get the clock to work – just what I need, another clock.

I used to have a full rack HiFi, with a Sanyo turntable, Teak cassette deck, Tandy open reel tape recorder, Sansui tuner (radio), Marantz CD player, and a graphic equalizer. I also had a Sony Betamax HiFi VCR in the rack, not quite a HiFi component, however it could run as an audio only recorder, and it left the open reel and cassette decks in the dust.

I kind of miss the old rack. I do have a few HiFi amps about, however they are 99% driven by computers. I'm not really into streaming, although I do have a free install of Spotify that's lucky to see use twice a year. Most of my music comes from CD's that now sit on hard drives.

I've occasionally toyed with the idea of getting one of those all in one mini 'HiFi' boxes and using it as a front end to say the amp I have in my workshop/radio shack. The amps in these are usually cheap chip amps and are usually horrible, so hence rip that bit out and kind of use it as a front end to the amp out there. They did this at church, feeding one into the mixer desk, it made it easier for the priests to play various things using a remote control extender so they could program up a dozen tracks before Mass, then control it all from behind the alter.

Then I have a good think about it and realise that I don't use any of these music sources anymore, it would just be a total waste of time. However that does not stop my memories of big racks full of audio bits and pieces, 'the good old days'.

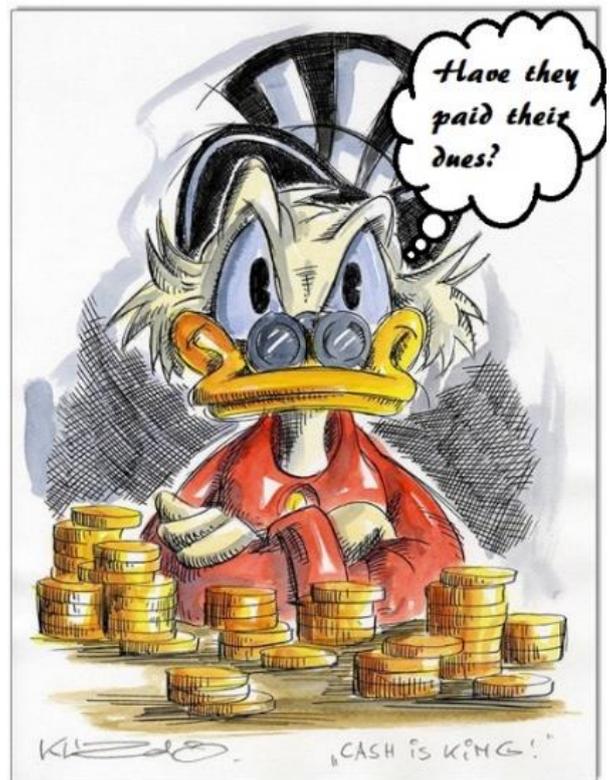


Paul VK3TGX

Treasurer News

This would be my last official communication in the club magazine about the clubs finances. I hope that the new Treasurer will continue to inform the membership about our financial activities, fundraising and membership status at this location. I always thought that an open communication to the membership using the club magazine is a good way to keep you up to date with you clubs financial status.

As a reminder, if you have not done so by now, please renew your membership now. Your club needs the funds to continue to operate.



Donald also says 73 and GB

Reflection on 3 years as Treasurer

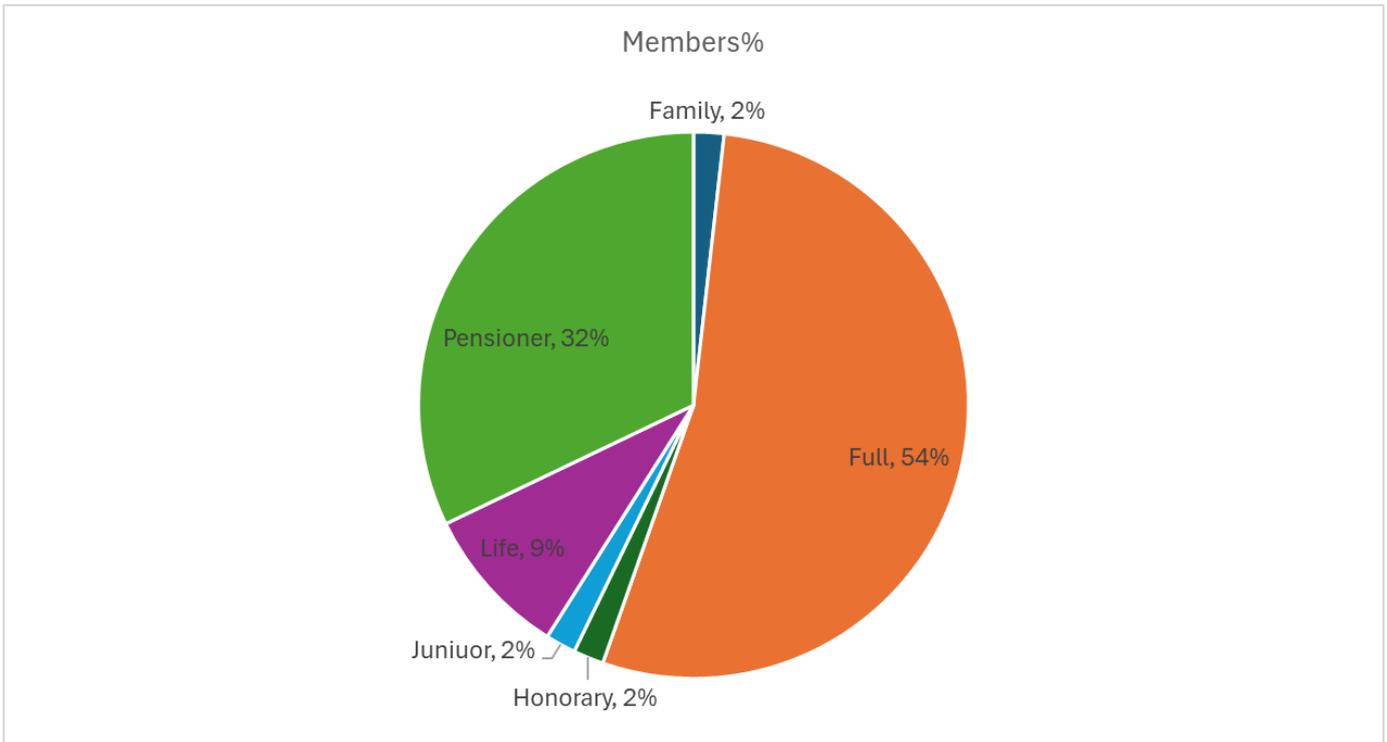
A reflection of being Treasurer for 3 years, I joined the club in mid-January 2021 and three month later jumped into the role of Treasurer. It was the same situation as now many members, but no willingness to actively support the club. Almost the same in all organisations and if you had the opportunity to be active in your local church you will notice that from committee to groups within the church you always meet the same faces. This is probably a sign of time, of self-fulfilment, satisfaction of our own needs and the expectation to be served by others. Unfortunately no society works that way, we always need people/ members to sacrifice their free time and do unpaid and unthanked work for a community, the critics sitting in the back row of the meetings and have a lot to say and little to contribute. The same in our club from 56 members we have a core group of possible 10 members who will be there for work and activities and among the 10 maybe 2-3 members who run the club and do the hard work.

Back to the Treasurer work despite common believe, it is actually a fair bit or work with the peak during fundraising activities and the time when members have to pay their contributions. Unfortunately our club didn't had a Club Secretary for 3 years now, so some of the work checking emails from the outside world needed to be done, which is not all. Having served the first two years with Bruno was a good and fruitful cooperative effort, sharing the workload as much as possible. We introduced the Bunnings Sausage Sizzle fundraiser, without it our club would not be able to maintain the membership fees.

My wish for the new Committee 2024 / 2025 is that we have all three executive roles filled with members who are willing to sacrifice their time and contribute equally.

Membership overview 2023/2024

The club has currently 56 members, which split up as shown below. The number of members is relatively stable, the good news is that we now have about 28% of our members being part of the WIA. In order for our club to be an associated club we must not fall below 25%, this could result in the loss of the affiliation and the access to an affordable public liability insurance.



Call	Name	Member
SWL	Benito	Juniuor
VK3AVI	Bruce	Full
VK3DAK	Damien	Full
VK3DIO	Glen	Full
VK3ET	Emil	Full
VK3MDL	Mark	Full
VK3ZXC	Gerry	Full

2023/2024

We welcomed seven (7) new members in Seven (7) member decided not to renew their membership.

2023/2024 was also the year where we lost a well respected and loved long time member of GGREC Pat VK3OZ.

Financial overview

Note, below financial is just an overview of main items and doesn't reflect accurately the reports issued for the AGM, numbers have been rounded up or down and not all cost/income shown!

Our expenses this year where higher than in the past, mainly due to increased insurance premiums, theft of club items and the break in into the club rooms.

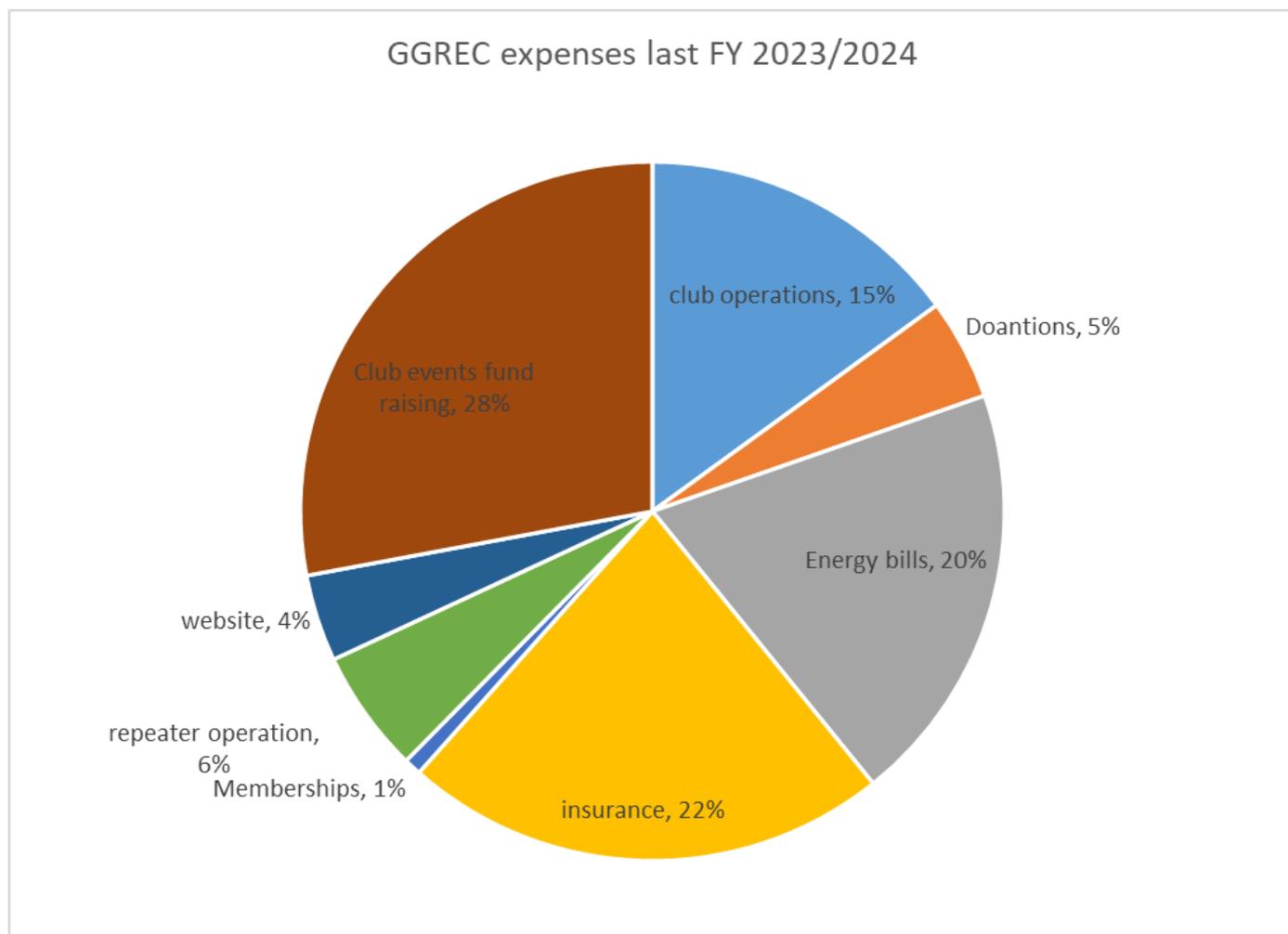
Our operational expenses where 5,600 \$ mainly insurances (1,500\$), electricity (1,110\$), IT Cost (700\$) and 1,600\$ we spend on fundraising activities and the club BBQ.

Due to different incidents of the theft of club items and the break in into our clubrooms, our club had to invest in a security system and replace stolen club assets which cost us more than 2,000\$ on top of the 5,600\$.

In total our expenditures where over 7,600\$ for the 2023/2024 financial year in comparison in the previous FY we had an operational cost of about 5,100\$.

Our income for last year are the membership fees of about 2,200\$ and the fundraising we undertook. We did very well with our Bunnings Sausage Sizzle where made cross almost 2,400\$ (1,600\$ after expenses). We also earned 450\$ in interest.

Unfortunately, we had to dig into our savings from last year where we had a achieved a surplus, due to the Bunnings Sausage sizzle fundraising.



GGREC expenses split

This year we had an operational loss of 600\$ last year a gain.

The Bunnings Sausage Sizzle fundraising is very important for our clubs long term survival. I would strongly encourage the new committee to continue this fundraiser and ask more club members to support actively the effort. It is just 8h BBQ and a fair bit of preparation time.

Two year history of a Bunnings Sausage Sizzle

year / month	Expenses	Income	profit
2022 / 08	-1,114.39 \$	2,294.30 \$	1,179.91 \$
2023 / 08	- 846.16 \$	2,472.85 \$	1,626.69 \$

We improving on our predictions for the quantities and where able to increase our net profit this year.

A note from the member Klaus VK3IU

Considering our problem to recruit members into the committee or finding volunteers we might need to consider to change our Club Constitution to reflect the current situation and to secure the future operations of the club.

My view is that the three years rule is no longer servicing the club and rather a handicap for a successful club operations. A bad committee can always be removed if needed, a well running committee is more beneficial than motivating members, who are not interested.

Another proposal brought to me from a member to encourage more involvement was to provide financial incentives for committee members and volunteers, by waving the membership fee. While I would not think that a 40\$ or 50\$ incentive would encourage members it might be something to talk about.

73 de Klaus

Reminder AGM this Friday

Our Annual General Meeting will be held on this Friday 20:00h at the Cranbourne Girls Guide Hall.

The Clubroom will be open from 19:00h on that day.

Guide Hall will be opened at 20:00h that day.

You still can pay your membership on Friday by cash or EFTPOS with your debit car

Also we will be having a speaker from the WIA Board to talk about the WIA with the opportunity to ask question later, he will be attending remotely.

Fun with FSK

One of the first digital modes is FSK, or Frequency Shift Keying, that's generally how radio teletype, the successor to Morse code (commercially that is) is transmitted. That's not to say they didn't just key the carrier as is done with CW (Morse) for Teletype transmissions, however FSK soon showed it could do a better job. These days there are way more flash encoding schemes, mostly aimed at greater data rates, or weak signal propagation, however if your data is only 50 bits per second then things are a bit easier. (Radio usually runs RTTY at 45.45 Baud)



I've been playing with an old Codan box. It has it's issues, the main one to me is I have no documentation for it, and also it's more or less based on chips that are no longer being made. Currently it appears that its output, FSK wise, is upside down.

So I started thinking of circuits I could use to generate my own FSK tones, Yes a good old 555 timer chip can do it, however it's not quite as simple as you may think, the 'normal' output from a 555 is a square wave, and feeding that into a radio is not a good idea as all those harmonics will do you no favours. Proper FSK should just consist of a single frequency, no harmonics, that steps back and forth between two frequencies – often 160Hz apart.

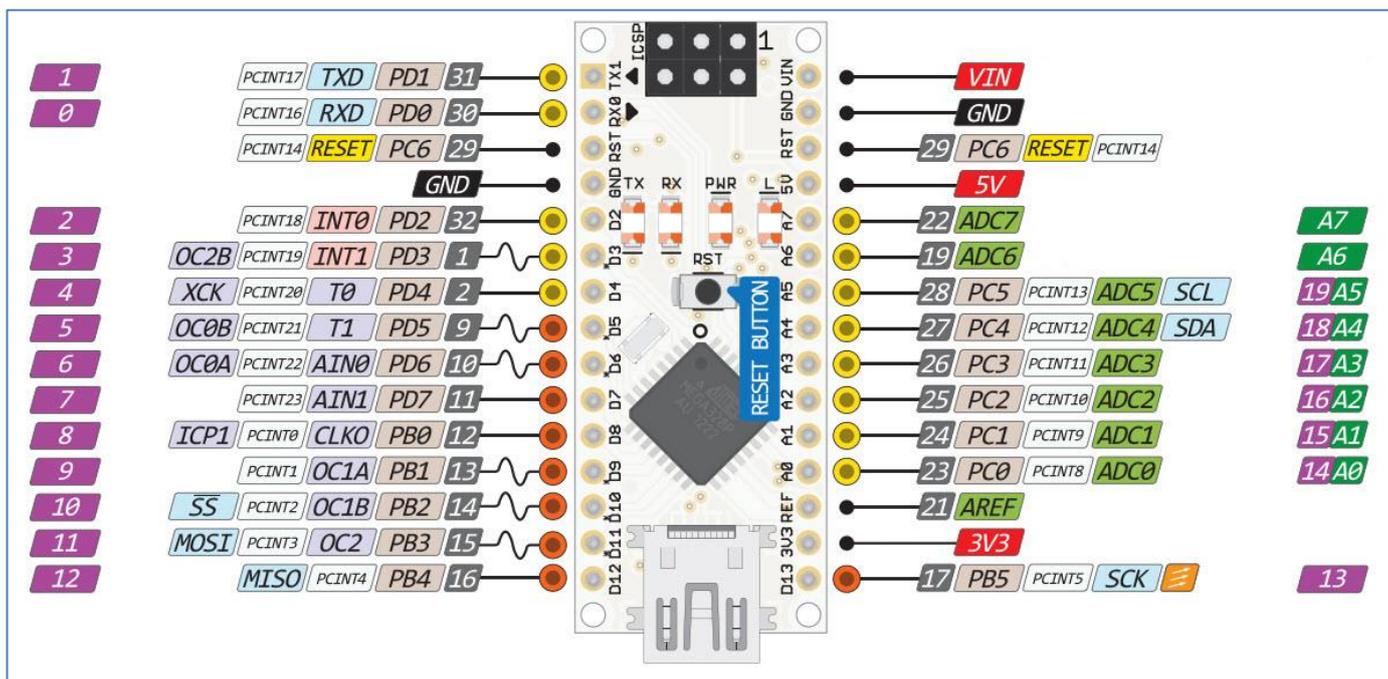
Some radios have an input on the back panel that will accept a digital signal and directly shift the carrier to generate pure FSK – I don't have one of those. The other way is to generate FSK as an audio tone, actually two if you consider its two states, but with only one ever present, then feed that into the radio either via the mic circuits, or auxiliary audio input if it has one.

The trick with a 555 is to ignore the square wave out and use the triangle wave present on the timing capacitor. Whilst the square wave out can supply up to 200mA, the sawtooth wave should be considered high impedance, as any load will affect the signals frequency. The hard part is choosing the various resistors etc. around the 555 so that the waveform is as close to a proper triangle as it can be, the default often seen is more a sawtooth wave, as the discharge part of the timing cycle is often way more aggressive than the charge, or ramp up part.

So you now have a nice triangle, add an opamp as a buffer, however it's still not a sine wave – as in a signal with no harmonics. Well here comes a bit of skulduggery with some back to back diodes. The idea is to gently clip off the tips of the triangle so it more looks sine-ish, an audio distortion meter (or PC software) can be used to optimise the clipping for the least distortion. Normally one thinks of diodes as having a sharp cut off, yes in theory they do, however in practice silicon diodes start conducting near 0.6V and when pushed head up to .7 and a bit more, so if you select the right diodes and get the driving impedance right the effect on the triangle wave is more a rounding as opposed to just a hard clip. This is basically what's been done inside the 'obsolete' waveform generator chips inside that old Codan box, the big difference here is we are talking off the shelf parts that anyone can obtain. They had the distortion of those old IC's down to a few percent, not perfect, but apparently good enough for Codan. So can we do better, and without an absolute truckload of experimenting with different component values? Those old IC's have now been very poorly cloned by some IC copiers, however their attention to detail is zero and the distortion out is hideous, so don't go there.

So what other options have we? My first thought was to generate the waveform digitally then use an analogue to digital converter to give us a clean signal. My first thought was my default micro-controller, the Arduino Nano. Trouble is they don't actually have an analogue output, the supposed analogue out is actually a square wave with varying duty cycle to simulate an analogue one. Feed this into a LED, or into an analogue panel meter and you'd never know, otherwise you need a filter circuit to remove the digital bits and leave you with a nice steady average DC value. Yes this technique can be extended into generating sound, that's how one bit D to A converters found in some CD players, and the DSD audio format kind of works.

The other way is to use an external DAC chip, or even more simply use what is called an R2R DAC, this is just a bank of resistors hanging off a digital port, simple? Well if you are talking only 8 bits then kind of yes, beyond that it gets really tricky as the tolerances of the resistors becomes critical. Good HiFi grade R2R DAC's usually start the wrong side of \$1000

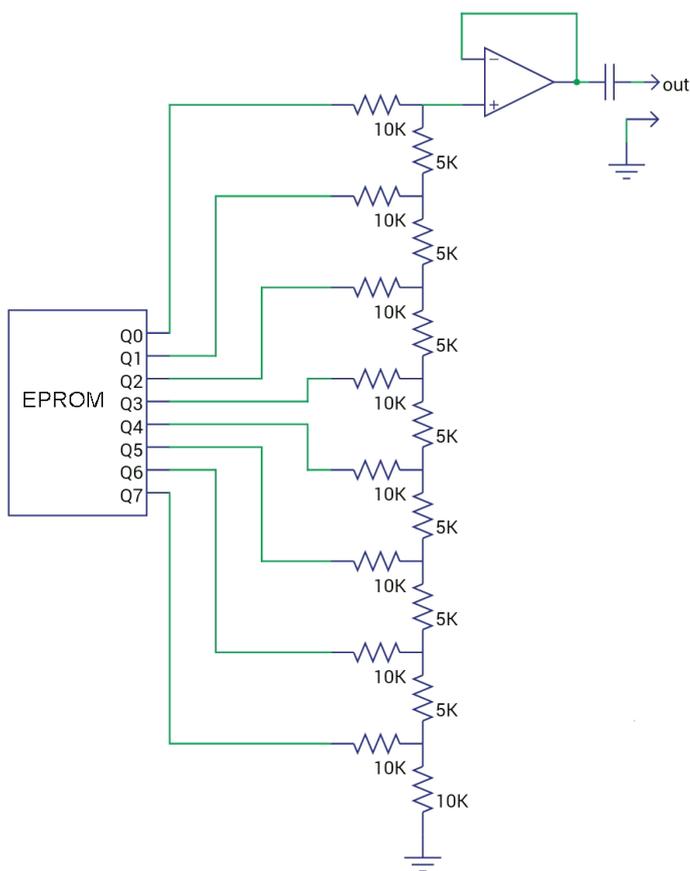


Now to drive an R2R ladder DAC, you need to switch all the pins feeding the resistors at the same time, not one instruction later as that will generate erroneous values until all the pins are set. This means using one 8 bit port, trouble with the Nano is it only has one whole 8 bit port. Trouble is that's the port where one normally talks to and programs the board, so now we are down to 6 bits on port 'D', and forget port 'C' as 2 bit there are input only.

So we either have to use an external latch or an external DAC chip, or skip the Nano and consider a Raspberry Pi Pico, however things are WAY more convoluted over there, I did find one bloke who has made a function generator using one, so that'd be a good place to start.

<https://www.instructables.com/Arbitrary-Wave-Generator-With-the-Raspberry-Pi-Pic/>

So at the time this all sounded way to complicated, although I did think of putting a sine wave into an EPROM, driven of a counter IC, output into an R2R ladder, a bit old school, but kind of keeping it more in the period of RTTY etc. I don't know about you but it kind of seems wrong to be using a dual 32 bit processor cores running at 125MHz, kind of like getting a Caterpillar D9 dozer just to crack a walnut. Mind you the 'Pi Pico is cheap.



So I went trolling through my junk box to see what options I had for a zero cost special, an R2R DAC would see me buying a few resistors, however I'm not that stingy, so maybe that EPROM build is worth a second look, especially as I have some 16 bit EPROMS lurking somewhere, although programming them will be a problem.

As mentioned earlier, resistor precision becomes a real issue with 16bits and above, the error in the resistors ends up greater than the supposed higher resolution of your DAC, rendering your efforts pointless, so maybe I'll try for a 10 bit job, I'll have to do a bit of studying to see where the limits are when using off the shelf 1% resistors.

There is one crazy hack, and that is to allow for the error in your DAC by allowing for it in the waveform your feeding it with, i.e. add a inverse version of the error to the EPROM

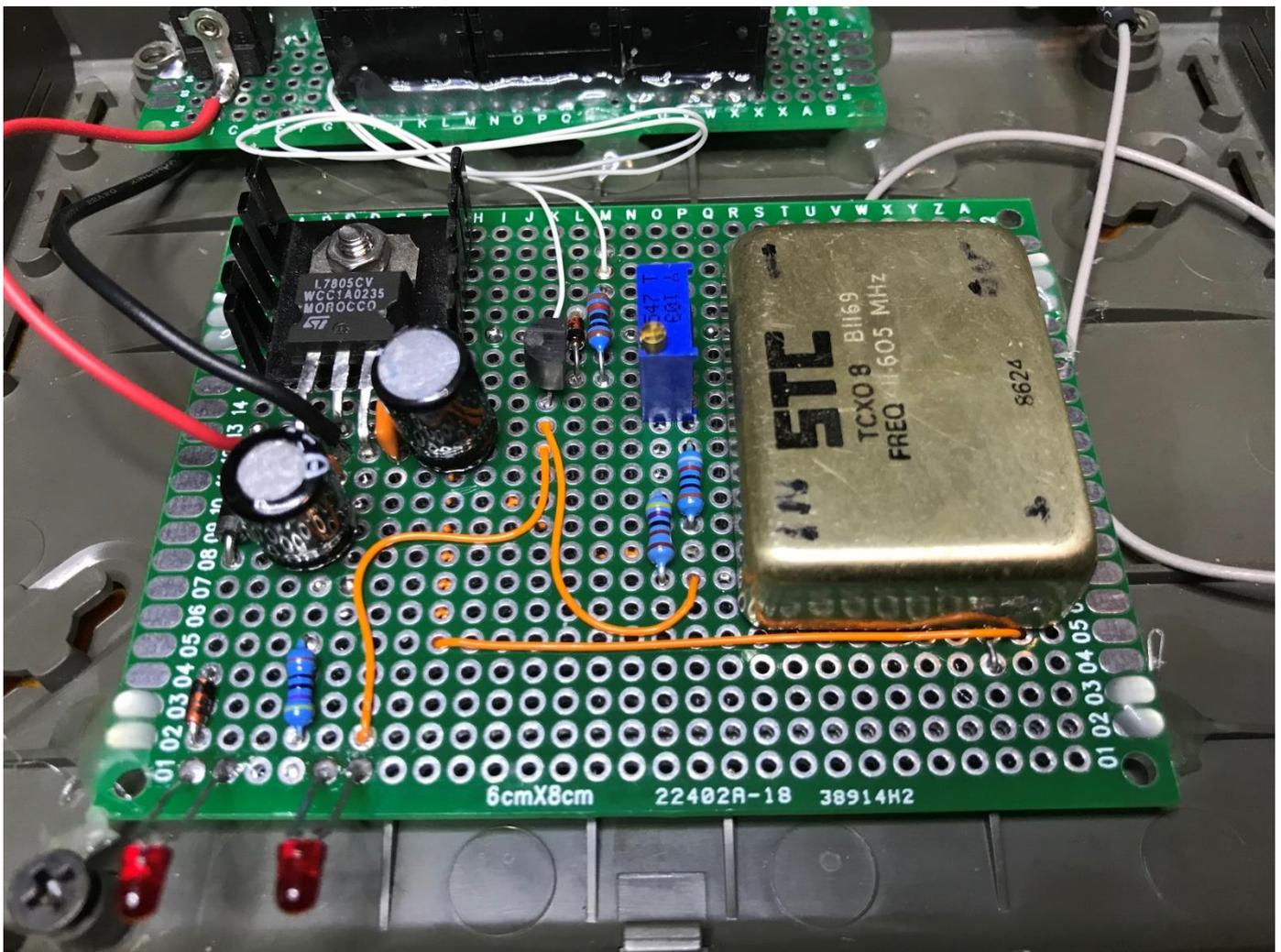
image and the resultant waveform will be now have less error, this is starting to go down the path of those who build multi-thousand dollar DAC's aimed at the very top of the HiFi elite.

It was then that I came across my stash of crystal oscillator modules, can I modulate them?. I have seen some AM transmitters made by simple modulating the power supply of a small oscillator module, now getting all the way to near zero carrier for 100% AM would be a problem. – I was actually surprised you could take it as far as they did, probably worth a look if your into vintage valve radio's and want to supply your own audio – maybe a future project?

Then I stumbled upon an 'STC' 11.605 MHz TCXO, 11.6 MHz is not exactly a frequency I have any use for, 10MHz and sub/multiples yes, but not 11.6. This one had an input pin and feeding it with a square wave from a function generator proved it frequency shifted like a bought one.



Now in my 'to be recycled' pile I have a few disused WiFi routers, nice little plastic boxes with antenna's poking out the back, so how about I bung that 11.605 module into one of these and sit it atop my short wave radio, then I'd have a nice little RTTY signal to play with.



So I did, along with a 5V power supply and a transistor to flip the signal the wrong way up to suit the oscillator, this also enabled me to add some flashing lights so I could see the incoming RTTY signal. The source of my signal was my time and date generator, shown earlier, however it could easily be an Arduino pumping out "Quick brown fox's" etc.

I used two doughnut style proto boards, one for the back panel connectors with the rest of it on another forming the 'main' board as shown above.



I had a few disused ADSL line filters laying around so I got stuck into one with a hammer and chisel and used it's RJ45 style connectors on the back of this build, they are just wired in parallel so this can also serve as a splitter, as the incoming signal does go off to a computer and the above mentioned Codan 7816 box.

Mounting the connectors on .1 inch proto board is a problem as they have two rows of pins offset by half a hole spacing, or 0.05 inch.

As mine came from a telephone bit of kit they only had 4 pins, so the back two were bent flat initially. I was just going to flow solder through the doughnuts and kind of surface mount them, but I ended up turning up the pin ends



so they at least made a start into the appropriate holes. The barrel jack I used for the 12V power feed also was a problem proto-board wise, so I folded the two outer pins flat to the case so it could be kind of surface mounted, that just left one drill hole to take the negative terminal that's in the centre and not suitable for the surface mount hack.



So how did it go, well first that antenna is no substitute for the clip lead I originally used in testing, it looks nice but is less than useless, it only had to cover 6 inches but fails miserably.

I used that particular case as it had a reverse SMA socket so I could easily fit this larger antenna as I knew for sure the regular shorter WiFi ones would bring no joy at all, however it looks like I'll have to rip it out in favour of a binding post so a wire antenna can be used. Jaycar sell an adapter plug so I can run a coax lead, however at \$8.95 I'll go for the binding post.

I'm not exactly legal on 11.605MHz, so this thing was only ever intended for close proximity coupling, now I could make a box that runs in the amateur bands with say one watt, but even then it would not be legit as there is no station ID in the RTTY source I'm using. An Arduino would solve that one, however I'd then have created a beacon, and I'd need a second license?? In that case it would probably be better off at the club rooms using (hopefully) our license that was used for the beacons we had way back then, but with zero interest in this type of stuff that's never going to happen.

The signal it's now generating is very poor, with what almost sounds like a 50Hz buzz on it, and it seems to be pulling in frequency, maybe I'll have a second look, however this is kind of puzzling as it gave such a nice clean signal when run off the function generator in the shack, the whole reason I proceeded with this build.

Oh well, nothing ventured, nothing gained.



Paul VK3TGX

Industrial Panel Meters



A nice meter, good for 500VAC – now that would make a nice 240V mains monitor....

Welcome to the world of industrial meters, these are designed to be installed into the front of control cabinets etc., The front is designed to be touched by a user etc., however the back is a different story, often featuring live terminals. The front maybe rated as double insulated etc., but the back.... Don't touch. If you want to use one at home then your best bet is to fit it into an instrument/project box from Jaycar etc.



Here is one I prepared earlier, along with an input selector switch.

You may also want to add a power switch as these never have one, as they are intended for factories etc. that run 24/7

For power it's usually 240V, however some industries think things are safer if they use 120V, so check, even if it came from a local factory just down the road.

Another option is 24V, so make sure you didn't miss read the label, 24.0 is not 240!

A lot of these meters connect to remote sensors that use a current loop system of 4 to 20mA, where 4mA is the lowest value ever seen and 20mA represents the highest reading.

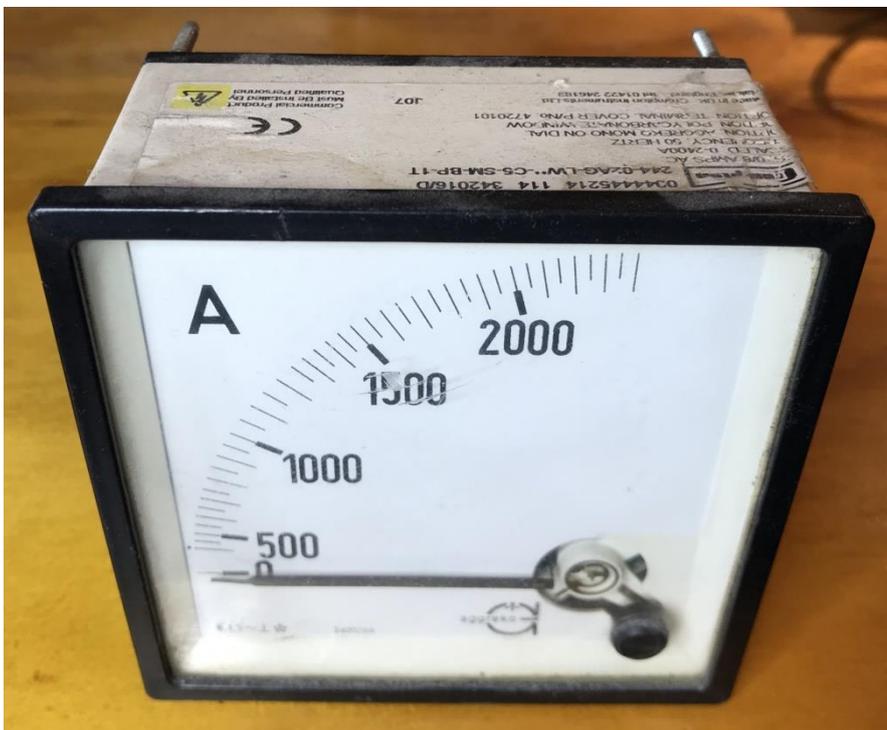
Say you have a 2000 litre tank hooked up with this system, then 4mA would mean it's empty whilst 20mA would mean it's full. The meter will never display the mA signal it receives, it will be scaled so that the display shows what's in that tank, so with 4mA, it will say zero, however with 20mA it will display 2000.

Now when you pick one of these up at a swap meet etc., you will probably never know what it was used for. In the above case it will probably show a negative number as zero input current is an invalid state that it would have never seen, and shorting out the input terminals will not get rid of that oddball number, it's probably not faulty, it's just how it was set up.

Also out there are LCD display versions of these, they often only have the current loop terminals available, no power connections at all, as the 4 to 20mA is enough to run the display.

Another type is called a 'totaliser', that's what the meter in that box above used to be. They can be used to count pulses etc., but can also be run from a 4 to 20mA loop, in this configuration they can be connected to a flow sensor in a pipe, and unlike the earlier meter that would say what the flow rate is, these measure how much has actually passed that point, kind of like your household gas meter, the counter is how much has passed down the pipe into your house.

With the 4 to 20mA setup, same as before, 4mA probably means zero flow, so the totaliser just stays still not counting, however if 20mA means 100 litres an hour, then the totaliser, when hit with 20mA input count up 100 counts in an hour. However these numbers are just examples, 20mA could make it count at almost any rate, it all depends how they were set up.



Here is another one, as shown it reads over 2000 amps, now that is some serious power, however that current never goes into this meter, for AC a current transformer often abbreviated at 'CT' in diagrams is used, for DC they used to use a current shunt resistor however there are now alternatives that are based around hall effect sensors, that measure the current by using the magnetic field that this current generates.

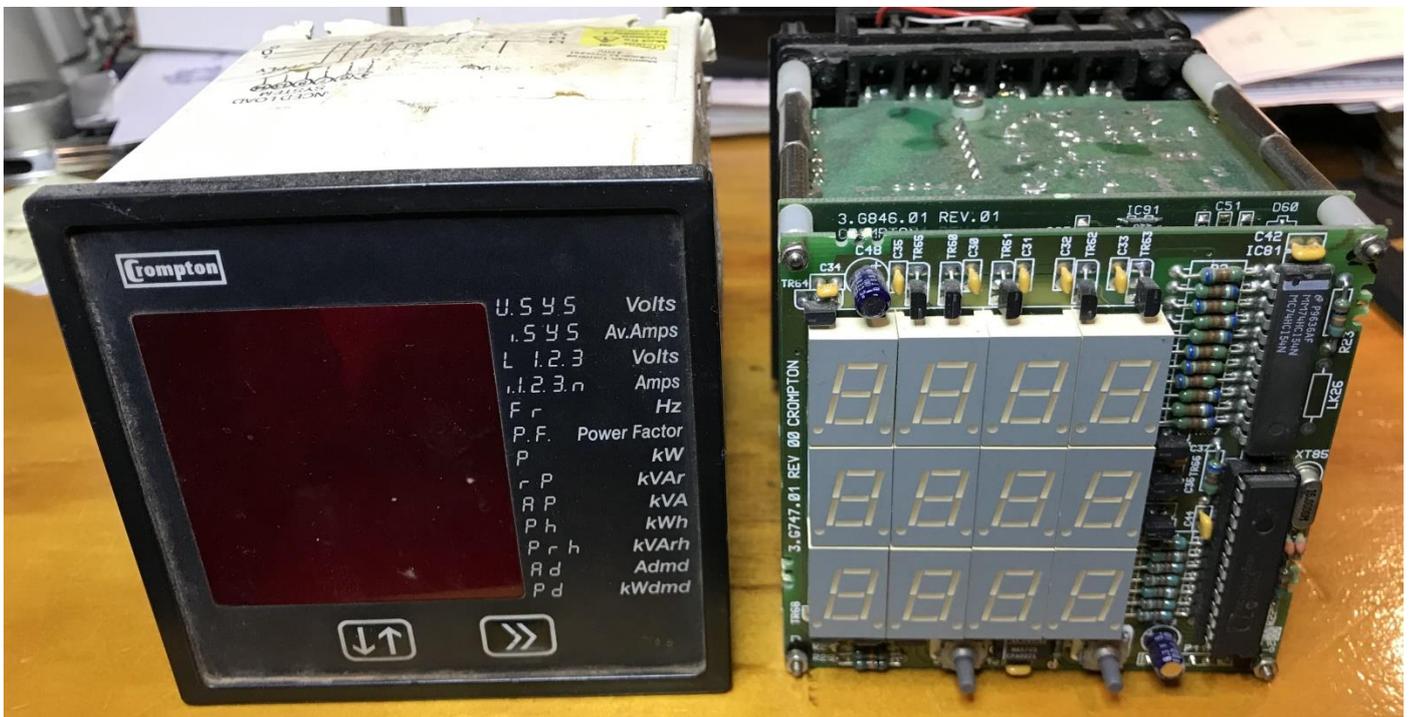
So don't try and feed say 20A through this trying to get it to move, as you'll incinerate it.



Here is a Synchronoscope, as generally found on very large AC generator sets.

With these generators they are often connected in parallel for increased output,

When doing so they must be in phase AC waveform wise, if they are not then large damage can easily occur with huge diesel sets being ripped from their concrete mounts, 'laid on their sides', i.e. big \$\$\$\$ damage/write offs.



Here is a 3 phase meter; I've left this one as a larger image so you can read the front panel that shows all the things that can be displayed.

So what can we use these for, well the last two, probably for parts only, however the round one would make an interesting antenna rotator display, but you're going to have your work cut out for you, removing the micro from the back of the front circuit board and grafting on something like an Arduino – you'd have to be keen. With analogue panel meters, these are often just big panel meters that use a few mA, just watch out for AC types. As for the digital panel meter types, often (without any documentation) your best bet is to download a manual for the actual main IC, hopefully a digital meter chip, ignore the current input circuits, rip 'em out, then wire up the IC inputs as per the data sheet. With the totaliser, kind of the same if you can find a use for a multi digit counter. See page 13 of the 2021 GGREC magazine.





Could Engineers with short antennas or low power output, please move closer to the receiver to ensure transmission is fully received and to minimise earth leakage.

As seen at the EMDRC car boot sale
Bruce VK3BPT

Prac Night 5/04/2024



Also see the front cover,
this is where we were shown 'KiwiSDR'

Interesting YouTube Videos



Antenna building #2 - EFHW Ant - figuring out the right core size
<https://youtu.be/nNzTf1F12BE>



Step back in time... The Schindler 1962 ALL MECHANICAL lift!
https://youtu.be/EcOj3yd_UGY

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The GGREC is an affiliated club of the WIA

<https://www.wia.org.au/>

WIA Affiliated Club

We also give Thanks to



<https://www.jaycar.com.au/>



<https://www.altronics.com.au/>

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	Ian Jackson	VK3BUF	General 3	Gerard Watts	VK3ZXC
Admin Sec	vacant		Web Master	Mark Clohesy	VK3PKT
Treasurer	Klaus Illhardt	VK3IU	Magazine Editor	Paul Stubbs	VK3TGW
General 1	Fred Reid	VK3FWR	Property Officer	'committee'	
General 2	Bruce Williams	VK3BRW	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
 All other Club correspondence to: 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
 Website errors, contact web master: webmaster@ggrec.org.au
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