



# GATEWAY

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

**January 2019**



**Portable Battery Supply  
The Mazda That Wouldn't Go  
The Hi-Fi Autoformer  
And More**

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Note: - club meeting minutes are on the club website

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## Event Queue

### January:

18<sup>th</sup>          General meeting – Guide hall

### February:

1<sup>st</sup>          Prac Night – Club rooms  
15<sup>th</sup>          General meeting – Guide hall

### March:

1<sup>st</sup>          Prac Night – Club rooms  
15<sup>th</sup>          General meeting – Guide hall  
17<sup>th</sup>-18<sup>th</sup>      John Moyle Field Day

## **PRESIDENTS REPORT JANURARY 2019 – Bruce Williams VK3BRW**

Hi everyone welcome to the 2019 January edition of the GGREC magazine. I hope all of you had a relaxing Christmas period mixing with family and friends. I know I did.

First by spending a relaxing afternoon, along with my wife at Pats (VK3OZ) place in Tooradin, along with other club members at the annual GGREC annual Christmas lunch BBQ. Who won the Christmas hamper I here you all asking? Well that honour went to Mike (VK3KTO).

After that it was Christmas spent with the family and off to Cape Paterson with the Caravan for a well-earned rest.

### **FT8 Presentation**

At our last meeting for the year back in 2018, David Rolfe (VK3JL), affectionately known as Big Dave to most of us, gave his practical demonstration on what equipment you need, to transmit and receive FT8. The presentation included the various modes FT8 can be operated in and the main advantages of FT8, over other digital to Digital modes, such as RTTY. Although not for everyone its certainly handy if you live in an apartment and cannot put up an antenna or love playing around with PCs and code.

### **Show & Tell**

Last month's theme (and the first one ever held) was Handheld Transceivers and receivers. This turned out to be quite successful. This month's theme will be on portable Antenna analysers. So make sure you bring yours along to the meeting to give a quick talk, on the pros and cons on what you own, so others can learn from your experiences.

### **Wants & Needs**

Don't forget to think about your wants and needs, prior to the meeting. This is your chance to see if other members can help you out with components, or gear you're having trouble locating, or finding at the right price.

### **RLP Repeater**

The committee will make an announcement on Ron's (VK3FRDL) findings. And this will be the main topic of the night. After hearing all the facts (fix or replace) from the committee, members will need to make a final decision on whether to continue to repair, or replace this repeater equipment.

### **PRAC Night**

For those of you who don't know the 6 Metre RDD repeater is currently not working. After looking at it on Thursday 10<sup>th</sup> Jan, whilst at the club mowing the jungle, whoops that should be lawns and with the help of Bruno (VK3BFT ) calling it up, it would appear the repeaters input receiver (Rx) is ok, but the Transmitters (Tx) output isn't working. The most likely cause is either a faulty power supply or TX circuitry?

This creates the perfect opportunity to make this a project for next month's February Prac night. Those that turn up will get to see inside the repeater box and learn something about the various components that go to make up a typical repeater, along with the diagnostic skills required to identify where the problem lies, and hopefully lead to fixing the problem.

The building of the Interference receiver, to complement the 2 Metre antenna, will resume at the next available prac night. To be held in February.

## TRAIN & HOBBY SHOW

This year GRECC and other interested clubs plan on putting on a demonstration on what Amateur radio has to offer. This is the perfect opportunity to promote our club, along with other clubs that are willing to participate over the three day event, to be held on the March Labour day weekend.

I have again spoken with the event organizers to get answers to various outstanding questions and both Chris (VK3QB) and I are chasing up other clubs and amateur organizations with a view to getting them to participate as we speak.

To help coordinate this properly, both Chris and I have also formed an events subcommittee, which includes other club members, with our first meeting to be held on Tuesday 15<sup>th</sup> January.

Because of its closeness to Antennapalooza (normally also held in March), this might have to be postponed to a later date, as this is too good an opportunity to be passed up.

## Member List

Mike (VK3GHM) is currently working on this and hopes to have it out to members this month. Also take the opportunity to download his latest calendar.

## Financials

As usual Chris, will give a brief description on how we stand financially.

I hope to see you all at the next GM to be held on Friday 18<sup>th</sup> January 2019.

Regards and 73s

Bruce

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## Australia Day & GGREC calendar 2019

Hi Members,

**Australia Day 26th January** is fast approaching. This year Australia day is on a Saturday but the Australia day public holiday is on Monday 28th January. So in good GGREC tradition we will be having an Australia day BBQ at the Club shack on Monday the 28th January from 12 noon onwards. Bring your own everything and feel free to share. Remember that it may be hot or cold, it is Melbourne after all. See you there.

### GGREC calendar for 2019

This year I have assembled a 2019 general calendar. It looked useful enough so I thought that I would send it out to the membership. It can be downloaded from here

<https://www.dropbox.com/s/dncp4vnd9efry8u/GGREC%202019%20calendar.pdf?dl=0>

Remember that not all events are listed and that the ones listed may change so please check for updates in the Gateway magazine.

Michael  
GGREC Secretary



## From The Editor



Well here we go again, my Christmas lights got their last run last night, which my local priest tells me is the real end of the Christmas season, I used to just count 12 days after "the day", but now I get to run them for another week.

It's been a rather hectic time around here, my wife, Marianna has been booked into hospital. So my ability to pour many hours into electronics (and this magazine) are going to have to take a holiday for a while.

The other day the club participated in the summer UHF/VHF field day, I would have loved to attend, but it wasn't to be, in the end after all the days chores had been done (and the compulsory hospital visit) I realised everyone would have packed up and gone home – Darn. I was hoping to put that 2 metre beam kit together that was started last year as a prac night project, and team it up to my FT897, that is currently just gathering dust.

Oh, and just to make things a little more interesting, a driver decided to rear-end my car as we were heading into the shops.

So my car is off at the body shop, and boy what an operation. They had three rows of cars been worked on, in a rather spotless 'warehouse', I was not expecting this scale of operation, I am more used to a mechanic in a smallish industrial estate factory-ett.

Hopefully they don't just write it off...

*Paul VK3TGX*



# Portable Battery Supply

## For QTH Backup and Camping Power

I had been looking at the Goal Zero (<https://goalzero.com.au/>) range of products. They make battery packs with USB ports, Power Outlets and inverters all self contained with SLA batteries designed to be charged by Solar panels. The price is pretty steep with a basic smaller unit costing nearly \$400 without a solar panel. They have model that are designed to run a basecamp for mountain climbs like Mt Everest.

I decided to make one and after thinking about what I needed I made this list

- 20AH or More in SLA Batteries 12VDC
- Anderson Input/Output Direct to Battery for Charging
- Solar Panel Controller built in for 120W Panel
- USB charging port minimum 2 prefer 4
- Accessory Plug (Former Cigarette lighter socket)
- Voltmeter LED
- Self Contained and easy to move
- On/Off Switch for USB and Voltmeter (No Standby Power Usage)

I already had 2 x 12AH SLA batteries that I felt would be suitable for the project and I had a small Pelican style case that one of the clips to lock the lid had broken on, I used to use this for camera gear. As I would not be needing to open and close the case to access the batteries all the time I could use the padlock holes next to the clips to bolt the case closed which as it turned out worked really well.

Next on the list was a search on eBay for the needed sockets and switches, during my search I found a range of items all based around a 1 and 1/8 inch hole, you could get Volt Meters, Amp meters, USB chargers, switches and Accessory sockets (what used to be a cigarette lighter socket) all designed to fit in the same 1 - 1/8 hole and you could also get panels from 1 - 4 holes to dress it up when done so I ordered the parts I needed.



I ended up buying 2 Dual USB Chargers, a Voltmeter, an Accessory Socket and a toggle switch. The toggle switch isolates all the outputs as the USB chargers and the voltmeter all use standby power so will flatten the battery if it is just left just sitting there.

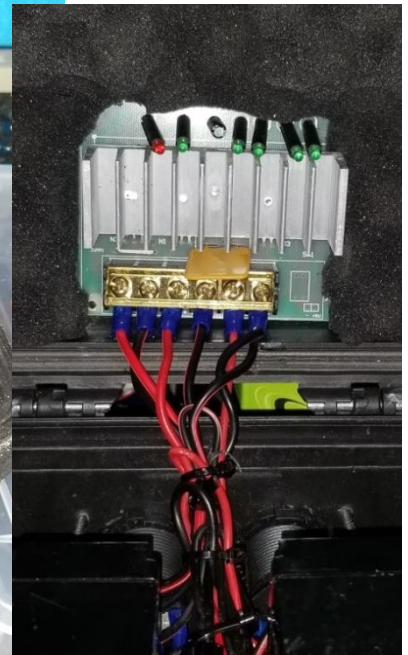
Here is a photo of the bottom panel, I have 4 USB sockets, one accessory socket and a volt meter in red LED's



This is the front of the case it has a toggle switch for the power to the other panel as well as the direct Anderson connection to the batteries and the blue/white Andersons are for the solar panel input



And a shot of the internals showing the SLA's they are not strapped in when you close the lid they are actually sandwiched between the top and bottom.



The solar panel is mounted to the inside of the lid and I have assorted cables and adaptors for lights and solar panels, chargers all in a grab bag to keep it together for camping or extended power blackouts at home.



If I am at home I also have an additional 48AH SLA in the shack that can be attached to the Anderson connector on the battery box to double my storage capacity. Not shown are two 1.2mt LED light bars with dimmer controls for camp kitchen or general lighting



## GGREC Christmas at Pat's



More photo's on the club website



## TEST & TAG FAIL - Ian Jackson VK3BUF

Two days before New Year's Eve, the Christmas rope lights at the front gate stopped working and the earth leakage protection in the sub-board kept tripping. I reset it a couple of times, but it wouldn't last long, so I just left it turned off. Yesterday I rolled up the 240V extension cords and found that the one which skirted the cattle pen had been well and truly chewed on by our cows.

The circuit was on a software timer from the central computer, so it was only live between 8pm and midnight. I think that if the cows had tried to sample the cable between those hours, it would have given them a bit of a fright and I'd be eating (pre-cooked) steak sandwiches for a few weeks.



*Before Christmas, this was just one cable – now I have several of them...*

## THE MAZDA THAT WOULDN'T GO - HOW SMALL PROBLEMS CAN TURN INTO BIG PROBLEMS by Ian Jackson, VK3BUF

Modern technology is supposed to enhance our lives, but have you noticed how support for this technology is a long way behind these advancements.

This story has relevance as it could happen to you the reader, at any time, on most cars.

A little over a week before Christmas Dianne VK3JDI went to start her car, a 2007 Mazda 2, at the end of the working day at a Vinnies Opp Shop. Nothing happened. No engine cranking. I drove to Warragul with a spare key. Still no start. I interrupted battery supply and attempted a reboot. No improvement.

With a trusty rope I towed the stricken vehicle back to Drouin West with my van. (2 metre band communications between vehicles was handy while towing, since power steering and power brakes were no longer working.)



*The ominous dashboard graphic*

A little bit of tech talk is in order here. Inside each ignition key is a small black chip which is a Radio Frequency Identifier (RFID) device. Each chip contains a unique code that has been previously stored in the vehicle memory. This memory is fixed and has no links to the battery powered central locking UHF transmitter also housed in each key.



When we place the key in the ignition, a coil around the keyhole energises the RFID chip and it transmits a unique data string to the car. This code is processed in a black box under the hood called a 'Powertrain Control Module' (PCM). The PCM applies a decryption algorithm, then compares the code with the valid key list stored in both the PCM memory and a copy of the code within the dashboard Instrument Cluster. If all codes match then the car is armed and can start. If they don't match, then this sucker isn't going anywhere. The vehicle computer and transmission are completely disabled at a low level and the little red screw-you graphic flashes rapidly below the speedometer.



*Is this the REAL problem?  
It looked pretty good to me*

The Mazda manual says (in its Dr. Seuss-like simplicity) that if this alarm code comes up, then only the dealer has the computer access to resolve the issue and mere vehicle owners should not try to fix it.

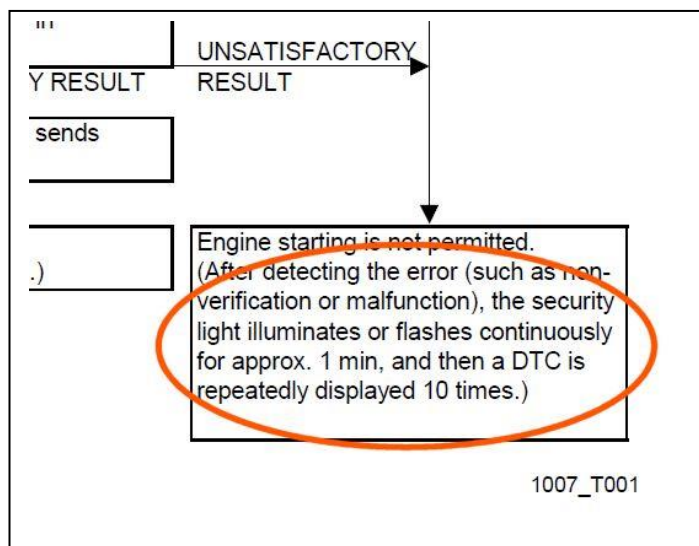
I was fortunate to receive some help from a local business which possessed a lift truck which was heading towards Melbourne that week. The car was winched onboard and delivered to the Mazda Dealer in Pakenham, some 50 km away. Although the Dealer was expecting the car, a week passed before they were able to commence an investigation into the fault.



The advice from the dealership was that there was some kind of intermittent fault in the instrument cluster and that it needed to be replaced because they don't repair parts. They had attempted to 're-program' the keys a couple of times, but they were still unable to start the car reliably. These attempts had already accumulated \$280 in costs and a new instrument cluster was going to be a further \$1738.

This didn't quite sound right to me, as if memory is truly erased from a system, then it doesn't intermittently come back again. We appeared to have entered a servicing phase that I refer to a 'bushranging', where the technician just keeps on replacing expensive parts until the problem goes away. I indicated that before spending more money, I wanted to get the instrument cluster out, strip it down myself and look for problems that could affect its non-volatile memory.

I organised a lift to Pakenham and was informed that at present, the car was starting again. I



decided to drive it home where I could mount a proper investigation. Upon arrival, I noticed that it would not re-start, so the problem had manifested once more.

I had one valuable clue to pursue. In the preceding few days I had hit the internet, looking at forums where other Mazda's had failed. I found plenty of complaints, but few solutions were revealed.

I did find a nice 70 page pdf document on Mazda immobiliser technology, which I read with interest. On Page 27 I saw an information (circled) box that said if I let the fault lamp flash for one minute, then it will

pause and flash out a specific fault code ten times. Apparently the dealer had never bothered to try this. I turned the key, waited a minute and sure enough, the flashing symbol on the dashboard had changed cadence. I got two long flashes, then a pause. After the ten diagnostic flashes the lamp would go steady, to tell me that the fault was still there.

On page 69 of this document I remembered seeing a timing chart. I reviewed this and found a match for the flash code. Code 11 made up of two long flashes was consistent with something it called a '*coil communications fault*'. This could only be the RFID scanning coil that I knew surrounded the ignition key.

DTC		WDS display*		Detection condition	Page (hyperlinked)
Security light flashing pattern		RKE	PCM		
11		B1681	P1260	No detected communication with the coil	SECURITY LIGHT: 11, DTC B1681/P1260
12		B2103	P1260	Coil malfunction	SECURITY LIGHT: 12, DTC B2103/P1260
13		B1600	P1260	The key ID number data cannot be read.	SECURITY LIGHT: 13, DTC B1600/P1260
		B2431	P1260	Key ID number registration error	SECURITY LIGHT: 13, DTC B2431/P1260

\* : The letters at the beginning of each DTC are only displayed when using the WDS and refer to the following: B= Body system, P= Powertrain system, U= Network communication system.

It became pretty obvious that the instrument cluster had nothing to do with this fault code, so I set about stripping down the steering column to reach this coil. Everything tends to be attached to everything else. Before long there was a large pile of plastic panels on the floor.

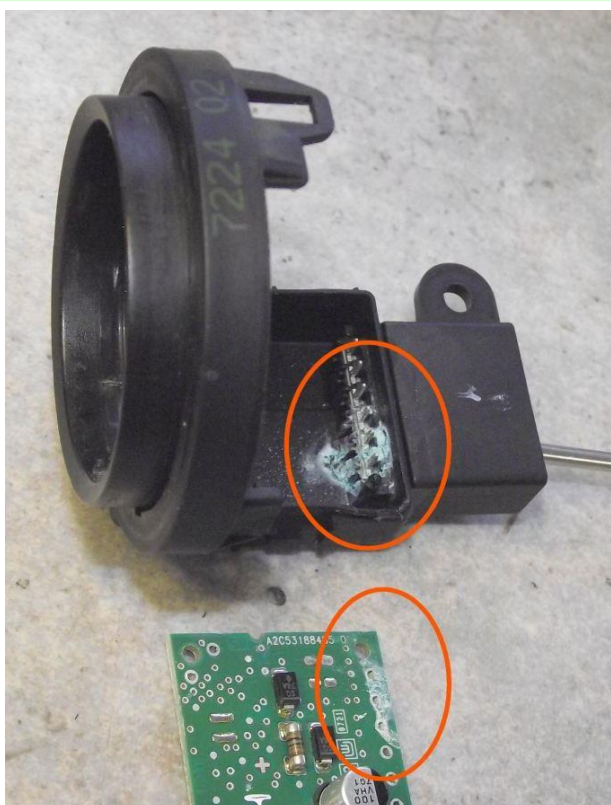
The RFID reader is a small module attached to a large ring that surrounds the vehicle keyhole. It is there to provide a field to energise the chip inside the car key. It was held in place by just one screw and a multi-core cable.

I took this module into the workshop and pried off the plastic lid to reveal the small circuit board within.

There were also a couple of green flecks under the cover, consistent with corrosion problems. Next I pried the pcb from the coil enclosure. This revealed that at some point in the past, some water had penetrated the module and created a significant mess. Certainly enough to kill the data signal that should be coming from the keys.



*Removing the RFID Reader module & coil*



*Water ingress - The actual cause of the problem*

No tracks had been dissolved, but conductive green residue was shorting out several terminals. This was easily cleaned up with some acetone and cotton buds.

After the last of the residue had been removed, I reassembled the module and bound it tightly electrical tape to prevent any future incursion from water. It wasn't clear how the water had penetrated in the first place. As the car is normally garaged, It must have pre-dated our ownership of the vehicle, about 18 months earlier.

The car started with the first turn of the key and the problem was solved. It was time to reassemble the dashboard from the clutter on the floor and move onto the next project.

### **Summing up**

There were a few lessons to take away from this. The first is to not place total faith in the hands of the 'professionals'. Their motivation includes a desire to sell as many expensive spare parts as possible.

Apart from already having lost two weeks use of

the vehicle, the next step by the Dealer following the installation of a new instrument cluster would have called for a new PCM unit under the bonnet and maybe, eventually, the reader coil, which is another \$350 item.

There would have been little change out of \$3000 for this dealer repair.

In the end all that was really needed was some proper diagnosis, a screwdriver, some cleaning fluid, a cotton bud and about one hour of real work.

The second aspect of this case is a warning to other car owners that this could happen to them at any time. The majority of other cars on the road built over the past decade are probably just as vulnerable. When such problems happen, you may be stranded at an inconvenient time and place. Unless you are willing and able to dive into the innards of the vehicle, it means that a truck will be required to take the car away to a dealer of unknown skill. You will also need to prepare for the big repair bill which will inevitably follow.



# **CQ this is VK3G – What's in a callsign –**

## **Could we get 2\*1 callsigns?**

For many of us callsigns are very important – our callsign represents who we are and it's an extension of our personality on and off air. Callsigns are governed by international standards defined by the International Telecommunications Union.

In Australia, we typically have the prefix of VK, followed by a numeral to indicate the call area (most commonly assigned to a state) and then a 2-4 character suffix. The suffix also indicates the operators class of licence. We also get to use the AX prefix on certain days of the year, such as Australia Day. Special event callsigns have also become common in recent times.

You can read more about callsign templates here.

<http://vkradioamateurs.org/whats-in-a-callsign/>

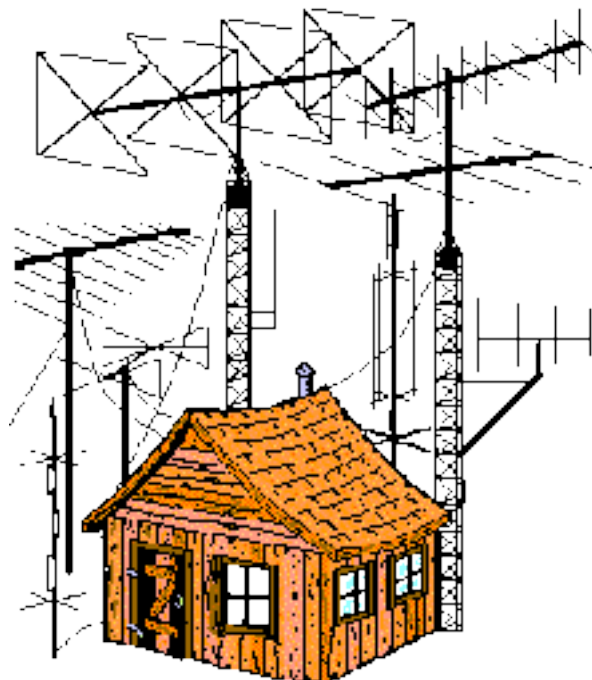
Recently, ACMA have indicated that radio amateurs may be offered the possibility of a new callsign template; commonly referred to as “contest callsigns” or 2\*1 callsigns. These callsigns, for example, VK3G, would be very popular with contesters and DXers, and IOTA activations.

You can read more about the progress with ACMA here.

<http://vkradioamateurs.org/contest-callsigns-vk1a-21-callsigns/>

2\*1 callsigns are obviously a rare resource (there are only 26 available callsigns in each state). Should 2\*1 callsigns only be made available to clubs? Should they only be available for use in contests, DXpeditions and IOTA activations? What do you think about the possibility of 2\*1 callsigns? Send your ideas by email to the committee.

73, Chris VK3QB



# The Hi-Fi Autoformer

The other day I received an advertising email from Massdrop, promoting their wares, so I had a quick look, and in the process I wandered off to find out what they were on about.



On a high-end audio supplier's web site was an ad for McIntosh audio, very decent equipment, so I went to have a look, the so-called 'surfing' of the internet.

Their new 70<sup>th</sup> anniversary amp caught my eye, mainly due to its sheer size and power output of 1.2KW of audio – crazy stuff.

Anyway I soon discovered that this amp had a 'key' McIntosh feature, an 'Autoformer' output. What on earth is an Autoformer – some form of

digitally controlled speaker matching circuit?, I was hooked, so off I went looking for answers, Google offered up two responses, one was a voltage stabilizing transformer for US caravan parks (The USA uses 120V, the motorhome cables are massive at 50A, with crazy voltage drops), and the other was a YouTube video on repairing a Verdin Bell Tower Amplifier. Again I was hooked, so I watched it – all 4 video's, making it a very late night <https://www.youtube.com/watch?v=GLEVEBDccBk> (much better than what was on the TV) to see what it was and for an insight into an 'Autoformer'.



The videos are about repairing a cartridge tape based sound system and amplifier's from a church, whose only function is playing bells at set times from the churches bell tower, using 200W of audio into an array of 8 horn speakers. (The amps were actually made by McIntosh in 1969) Anyway it turns out that an autoformer is just another name for an autotransformer. Occasionally you see these used in cheap 240V to 120V stepdown transformers so that we can use imported American electronics locally. They give quite a high output for their given size, mainly

because they only have one winding with a centre tap at 120V. They are not perfect, there is no isolation between input and output, so if you happen to plug one of these things into a miss-wired power point or extension lead, you can easily have 240V applied to one side of the output socket – and to a device whose insulation is only really rated for 120V – not ideal.

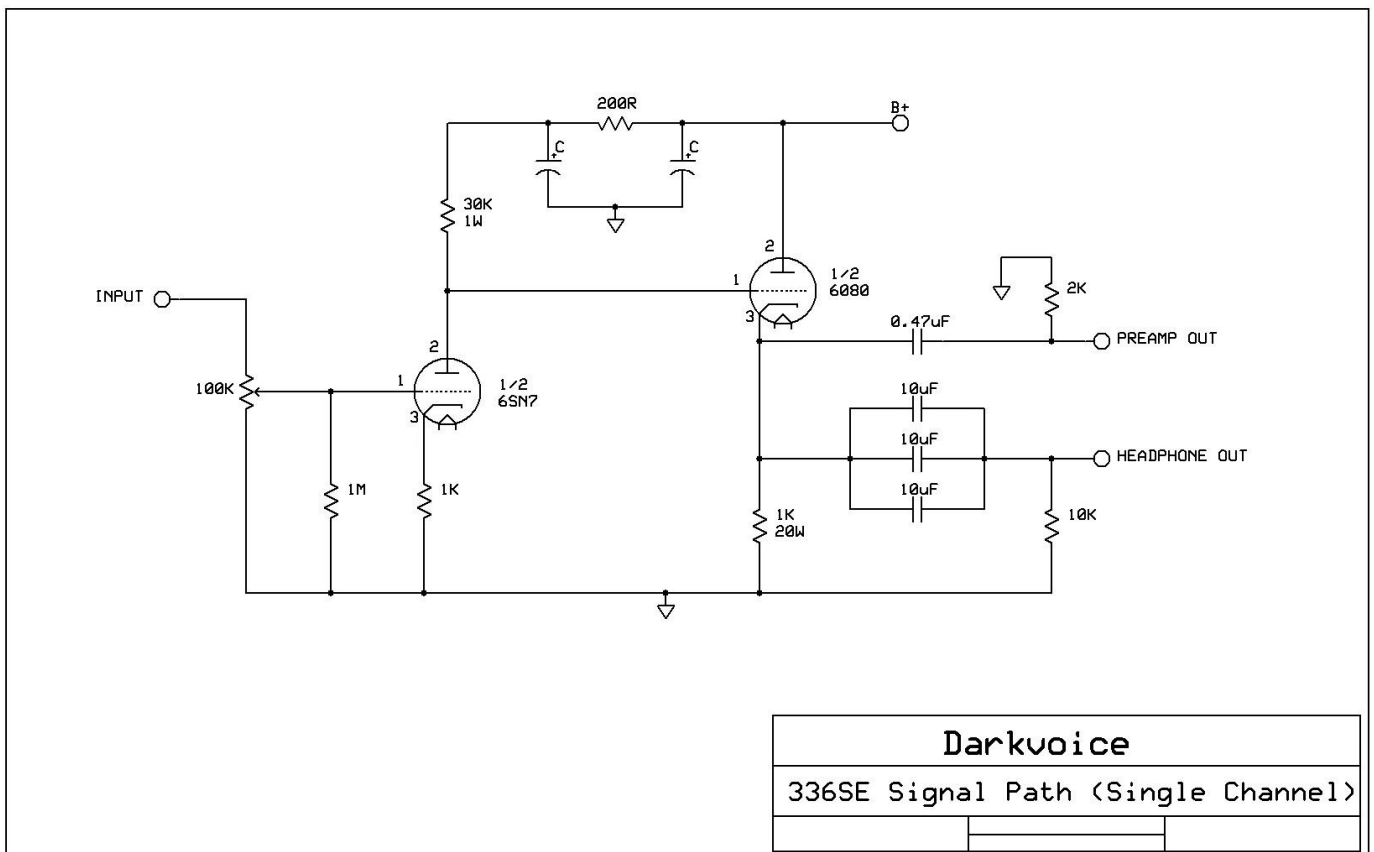
So what on earth has an autotransformer got to do with a very modern top of the line audiophile grade amplifier? After all aren't audio transformers frowned upon for causing no end of distortion in sound systems, and weren't they exercised from all equipment years ago, with the possible exception of valve amplifiers? Even the valve boys have been extolling the virtues of 'OTL' amplifiers (Output Transformer Less)





Here is a good 'recent' example, using a large power valve to directly drive headphones, using no coupling transformers. (Both are dual triodes)

This is quite a feat, as there is an extreme impedance mismatch between a valve output stage, and a typical speaker. They get around this by using larger power tubes with lower output impedances, and the fact that most high-end headphones have a much higher impedance than the 8 ohm junk peddled many years ago.



As you can see, a rather simple circuit, using a cathode follower to try and drive a pair of headphones to the dizzying heights of 60mW, what efficiency. (Plate current 100mA?)

So is there any point to doing this, from what I have read about it, it has been suggested to delete the 'preamp out' stage, as it places a noticeable loading on the sound. This only means the poor tube is not really coping at all – it's all a bit of a dud?, nice to hear after spending \$300.

I'm more tending to favour McIntosh's view. Personally I've been having great success with a 100V (transformer coupled) amp I built, based on an SC480 amplifier, and using toroidal transformers at both ends. Feeding my Hi-Fi speakers, it's giving my 'normal' stereo amp a run for its money – to the point I am now having to upgrade my Pi-Musicbox, this setup is revealing the limitations of my current system! (As in I can now hear the crud from my current D to A)

*Paul VK3TGX*



## Club Information



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

### Office bearers

President	Bruce Williams	VK3BRW	Web Master	Mark Clohesy	VK3PKT
Admin Sec	Michael Van DenAcker	VK3GHM	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Chris Chapman	VK3QB	Property Officer	Bruno Tonizzo	VK3BFT
General 1	Barry Hamilton	VK3ABH	Secretary	Ian Jackson	VK3BUF
General 2	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 (offline)  
70cm Repeater Cranbourne VK3RLP, In 434.475MHz Out 439.475MHz CTCSS 91.5Hz  
VK3RLP 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

- Pension 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.

Magazine Articles to [editor@ggrec.org.au](mailto:editor@ggrec.org.au) or [vk3tgx@gmail.com](mailto:vk3tgx@gmail.com)  
Cut off date, 10<sup>th</sup> of the month.

All other Club correspondence to: [secretary@ggrec.org.au](mailto:secretary@ggrec.org.au)  
or via Snail Mail : 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 via email [webmaster@ggrec.org.au](mailto:webmaster@ggrec.org.au)  
Facebook Page [www.facebook.com/GippslandGate](http://www.facebook.com/GippslandGate)