GATEWAY

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

May 2017

Arduino IR remote control

Time Base Reference

Speaker Recycling

And More

President's report - page 3

Contents.

Event Queue

May:

26th	General Meeting
28th	8:30 club net on VK3RLP

June:

2nd	Prac Night – Club rooms
4th	8:30 club net on VK3RLP
11th	8:30 club net on VK3RLP
16th	General Meeting
17th	GGREC 40th Anniversary Luncheon at the Guide Hall
18th	8:30 club net on VK3RLP
25th	8:30 club net on VK3RLP

July:

22nd	GGREC HamFest

Presidents Report - Ian Jackson VK3BUF

If Ailuromancy is anything to go by, we are all in for a cold winter. (Yes, it's a real word: the study of cat movements as a guide to future weather predictions)

First up is a reminder that the May General Meeting is delayed until the 26th. Most of your committee is interstate or overseas on the third Friday. Specifically, I will be going to Hahndorf in South Australia to see what takes place at the WIA Annual General Meeting.

It will be an interesting one. The Secretary Jim Linton is up to his old tricks of rejecting members formal motions to be put at that meeting on obscure reasons. The (retiring president) Phil Wait has submitted a financial report for approval which has huge omissions and vague references. Mr Wait claims that a full audit has taken place, but the auditors are careful to say that they only responded to information given by directors and they had made no in-depth investigations of their own. To present such an incomplete 'bag of mystery' document at an AGM is quite misleading to the membership at large. From the ambiguous numbers presented in this 2016 annual report, one could draw the conclusion that many transactions have been concealed from auditors and real incurred debts, losses and contractual obligations have simply been rolled into the 2017 year for the new board to deal with. It is somewhat strange that a WIA report that was purports to be a full audit is more brief than last years woefully thin 'review'. Unless a much more detailed version of the 2016 report is presented, WIA members should clearly vote NO to the acceptance of this document.

40th Anniversary Luncheon

The second big thing is our GGREC 40th anniversary luncheon to be held at the Guide Hall on Saturday, June 17. This is no ordinary event. We will be having a spit roast meal and several activities to celebrate this benchmark of Club history. The organisers have put in a lot of thought and preparation. We were tempted to simply take over a function room at a bistro venue, but very quickly it looked like being quite an expensive meal, so it was decided to engage a spit-roast caterer and do our own thing. We still need to know numbers very soon, so a commitment is required. It will be just $12 per head. Please EFT this to the Club Account this week, along with a name or callsign. A full advert is located elsewhere in this magazine.

Overtooling in our society

Electric salt dispensers with LED lights, How did we survive in the past?

This is a really subjective topic. There are no absolutes. I operate a technology based business and I do this because I like clever technology. To do something old, but better or to do something entirely new is the spice that drives our world. Quite often the boundaries are pushed too far and we see things that make us groan out loud or run away. But this is where it can become subjective and opinions do change. When I first saw electric toothbrushes appearing on our supermarket shelves, I thought WTF, do we *really* need an electric motor to move a toothbrush? The concept repelled me. Eventually I succumbed to a trial and purchased one, thinking it would probably be better for cleaning circuit boards than teeth. I was wrong. I found that it did a much better job than a manual brush could ever do, and in about half the time. Now I think I need to buy a second unit just for my circuit boards. (rather than using the same one for both.)
I see adverts on the TV for cars that parallel park themselves and feel a blend of wonder and horror. It is a very clever bit of technology, but it takes away a basic skill that most drivers ought to be capable of. Perhaps it gives drivers choices, as they can still park manually if they wish, but on the whole, its existence has made the world a little bit dumber.

Twinkle, twinkle little jar..

Somewhere, perhaps halfway up an ivory tower in corporate headquarters, there must be a dimly lit department whose sole function is to see what new domestic items can be fitted with more LED lights or electric motors. Possibly they are surrounded by large wall prints featuring previous successes, like electric flour sifters and the aforementioned electric salt & pepper shakers.

I also have a drink tumbler with a battery and liquid sensor in the base that make makes the drink twinkle in five different colours as I drink. Now if I take a drink from a vessel and it does not sparkle, I'm thinking it must be faulty. (It's not so good with coffee)
Which brings me to my main point, and yes there is one….

On May 26 when we have our next General Meeting, I want to see your most useless electric appliances on display. Have a look around your shack, kitchen or tool shed and bring out that 'thing' which taunts you with its indolence.
We'll put them on a table and collectively shake our heads at the depths to which humanity has sunk. It must have a motor, LED lights, an annoying beeper, or all of the above.
Bring out your motorised tape measures, your olive stuffers, your electric pencil sharpeners, letter openers and key finders. Don't be shy. Everyone has one or two of these somewhere. There will be a small prize for the most decadent and self-indulgent exhibit.

Your worst nightmare…
an electric spaghetti twirling fork

Rob VJ3BRS being presented with a Certificate of Appreciation for his Prac night training sessions

GGREC 40th ANNIVERSARY LUNCHEON JUNE 17 AT THE GUIDE HALL

That's right. Your Radio Club is now 40 years old. That's forty years of education, adventures, friendships and antennas.

It is a milestone too big to let slide, so on Saturday the 17th of June, we are going to have a special Luncheon in the Guide Hall. A spit roast is being organised with vegies and trimmings for just $12 per person. This is excellent value for the meal we have lined up

The event is starting from 11:30 am.

If you can possibly make this event, then you should lock it into your diary today!

If you are a new member, it is an opportunity to learn a bit more about how your Club came into being and the adventures that it has created.

Guests may want to bring along any photo's or memorabilia they would like to share on this special occasion.

Because we need to carefully prepare the catering in advance, we will need payment as soon as possible by EFT, or in cash at the May 26 General Meeting night. This is the cuttoff time for booking a place at the luncheon.

If paying by EFT, send the payment to **BSB 633000 Acc 146016746** and put your callsign or name in the reference field.

If you have any questions or special dietary requirements, then please contact Dianne VK3JDI by email dijackson@dcsi.net.au

Guests should bring their own liquid refreshments.

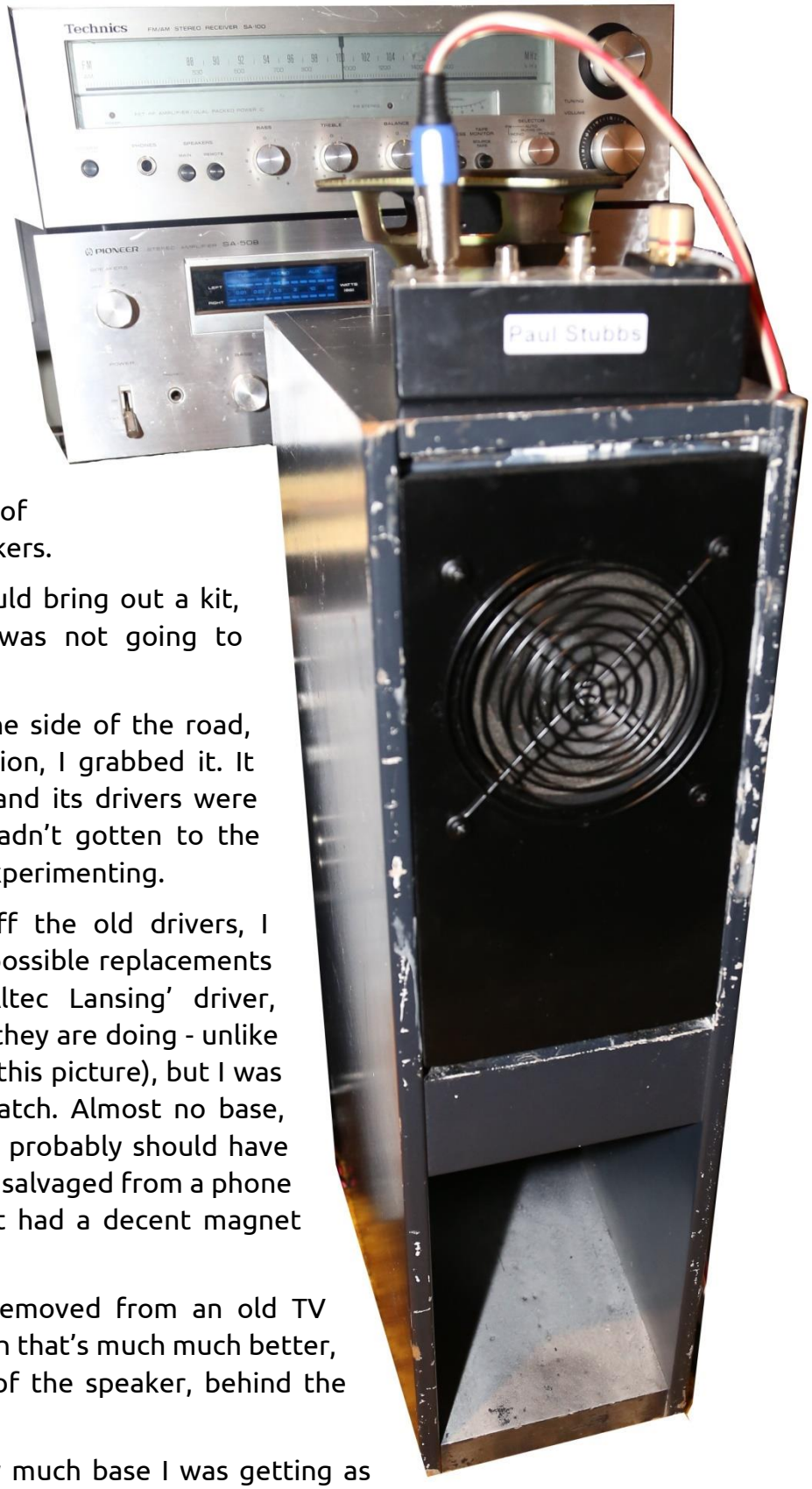
On the day we will also have a limited number of special commemorative caps available for purchase.

Don't forget to circle this date in your calendar.

We look forward to seeing you there!

From The Editor – Speaker Recycling

Quite a while ago Silicon Chip magazine ran a project about building a horn loaded speaker cabinet, trouble was the woodwork was quite involved, and required taking the plans to a cabinet maker with a computer controlled wood cutting machine, as getting it right with hand tools was considered all but impossible. I was quite interested, but not to the point of making a nuisance of myself at the local cabinet makers.



I kind of hoped someone would bring out a kit, but I knew deep down, it was not going to happen.

So when I saw this unit on the side of the road, during a hard rubbish collection, I grabbed it. It was not the prettiest thing, and its drivers were shot, but at least the rain hadn't gotten to the woodwork. – Time for some experimenting.

After some 'fun' finishing off the old drivers, I looked around the shack for possible replacements I initially settled for an 'Altec Lansing' driver, figuring this crew know what they are doing - unlike me (that's the driver fitted in this picture), but I was wrong, it was a very poor match. Almost no base, and far too much midrange. I probably should have known, as the driver had been salvaged from a phone conferencing unit. However it had a decent magnet and looked promising.

Next I tried a driver I had removed from an old TV 'superbase' speaker (Sony?), Ah that's much much better, (The driver is sitting on top of the speaker, behind the patch box in this picture)

I was rather surprised at how much base I was getting as the driver is only a 4.5 inch unit. The speaker is now way too good for the hard rubbish, Darn, I'll have to clean it up and give it a fresh coat of paint.

Paul VK3TGX

Moorabbin and District Radio Club.

HAMFEST 2017

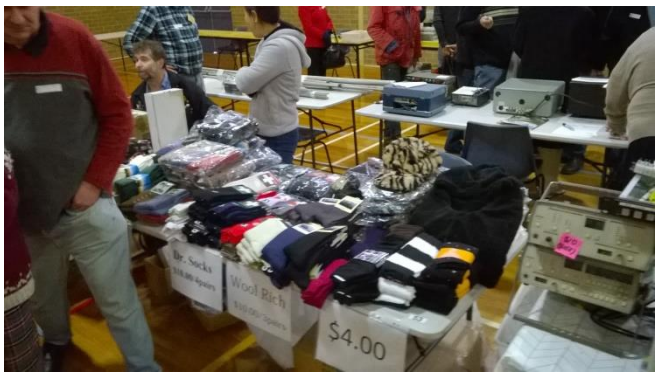
So did you attend? It was well worth the drive.

For some reason my face has been on their flyer for the last couple of years, so I thought I'd add some truth to the image by being there. Marianna usually spots it and says "your still there"

← Flyer photo – I didn't take it, I cannot have as I'm in the middle of it.

Not a bad range of items, although they did suffer from the odd "It's too expensive" comment. Ah amateurs, bunch of complainers.

Mind you I was only after trinkets, no big ticket items so I had no complaints.



I can't say the GGREC has ever had a sock table at our hamfest.

Someone's interpretation of "Sock it to them"?

(Sorry, it looks like I need some new sock jokes)

One surprise was the scouts selling tents for $15

Apparently a great pile of 'em were obtained for a jamboree, now it's all over they have this great pile of excess tents.

Pity the wife's knees are not the best anymore, otherwise I would have grabbed one.

Paul VK3TGX

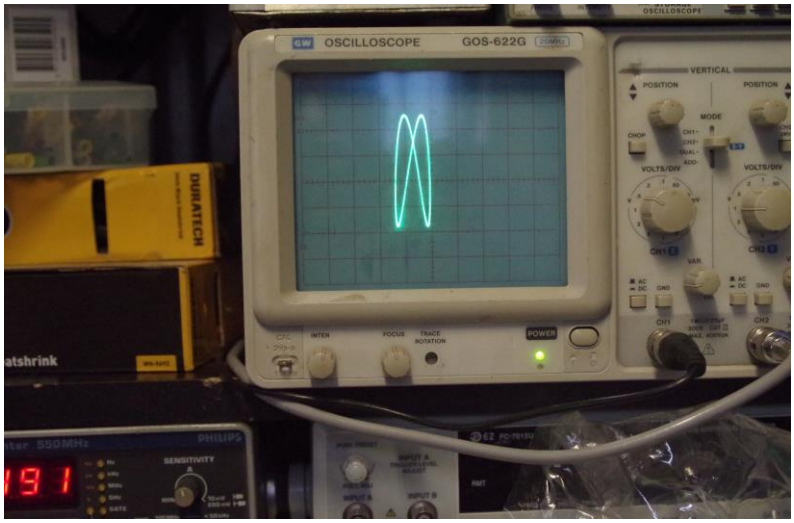
Time Based Reference in VK3PKT's Shack

So over the last 12 months the Twisted Shack of Mark VK3PKT has been getting a lot more test gear. Some of it was from the hamfest, some from people that I know and some from eBay.

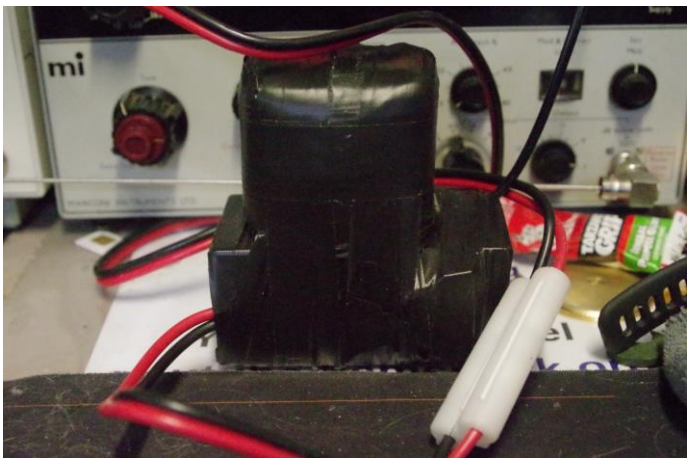
I first acquired a 550MHz Freq Counter this is connected to a 10MHz GPSDO timebase to lock it to a known reference. It is then connected to a 10 MHz-520 MHz Marconi AM/FM Signal Generator to give an accurate display of the frequency of the RF Sig Gen.

Marconi RF SIgnal Generator and Philips Freq Counter (Tuned to 145.450)

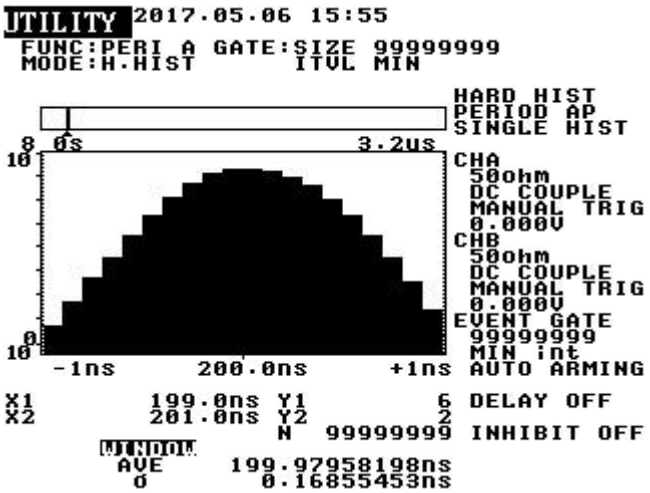
So I have a lot of my gear, 3 Frequency counters and a Time Interval Analyzer hooked up to a GPS Disciplined Oscillator. This uses GPS satellites to create a very accurate 10 MHz signal to use as a reference for the test equipment. I also have a Rhode and Schwarz Frequency Standard that outputs 5 MHz 1 MHZ and 100 KHz. I use an oscilloscope connected to both the 5 MHz output of the R & S Standard and the GPSDO to get the FRQ standard on spec.



This scope is dedicated to the job of using lissajous figures to monitor the GPSDO and both the R & S as well as my OCXO Ovenized Crystal that runs off 12 volts and has a small SLA battery to keep it running while taking it from the shack to the car then to a mates shack to calibrate gear. I first adjust the transfer standard against the GPSDO using a Scope and then take it to the required location as needed.

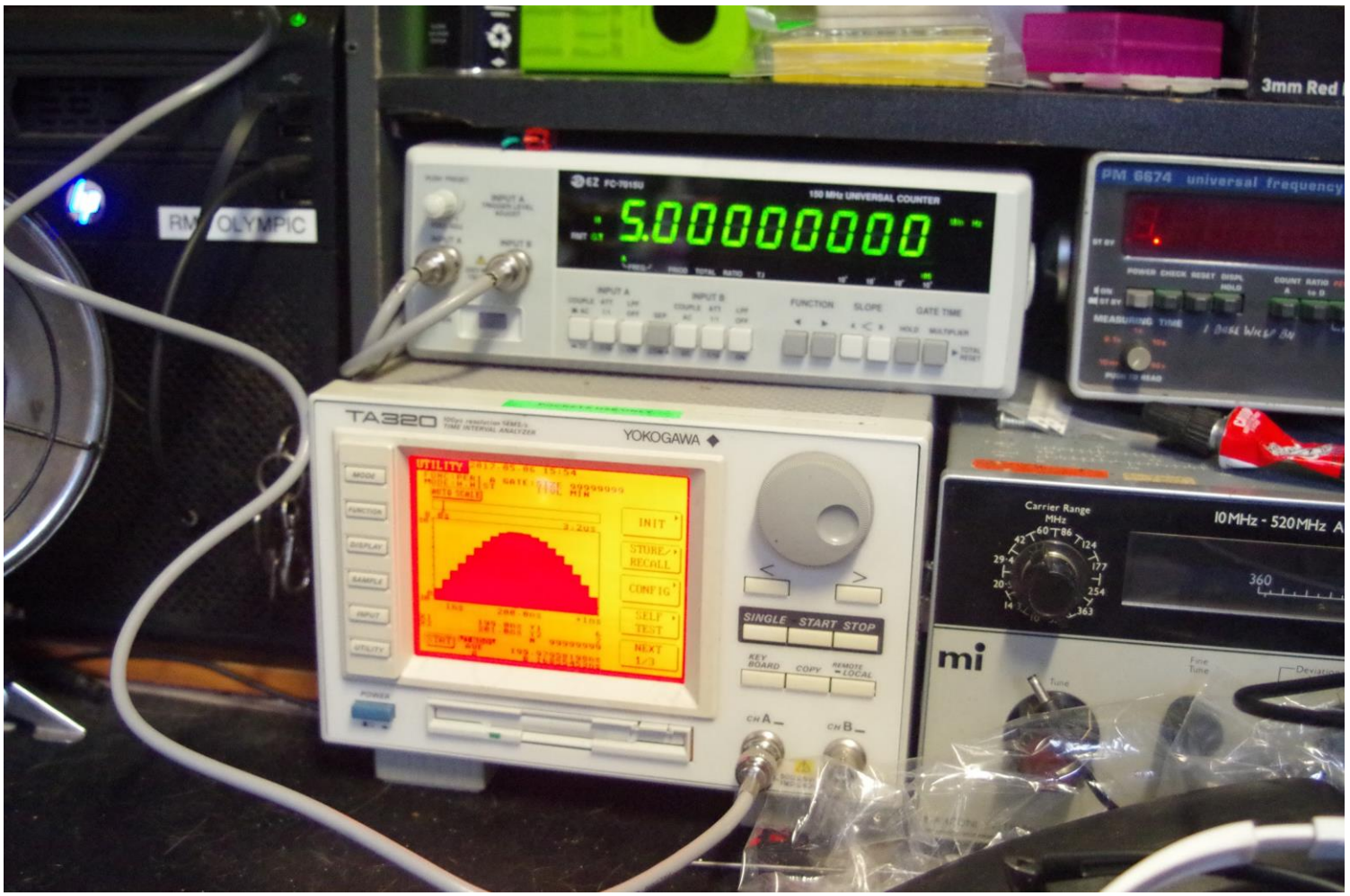


Frequency Counter showing Frequency of the transfer standard shown below



Now when it come to calibrating counters and reference standards I start by using the GPSDO as the Master Standard, this is the one that for my shack I trust the most to be accurate. That is what I feed it into a lot of my test gear as a reference. To check the 5MHz R & S I could just use lissajous figures but I have a bit of gear I picked up dirt cheap on ebay. It cost me 160 bucks delivered and new was over US $8000. It is a Yokogawa TA320 Time interval Analyzer. It measures periods down to picoseconds. Here is a histogram of the the 5 MHz signal calibrated against the GPS 10 MHz signal.

As you can see the range of the window is only 2 nanoseconds, from -1 to +1. The average signal is 199.97958198 over 99.999999 Million samples. The gate time is set against the 10 MHz reference. Apart from setting standards what would you use such a beast for ? Well the manufacturer gives a few ideas with one being connecting it to a hall effect sensor counting teeth on a flywheel of a drag car engine it is fast enough to see a stretched pulse at full throttle if the engine misses a bit. It is also used a lot to



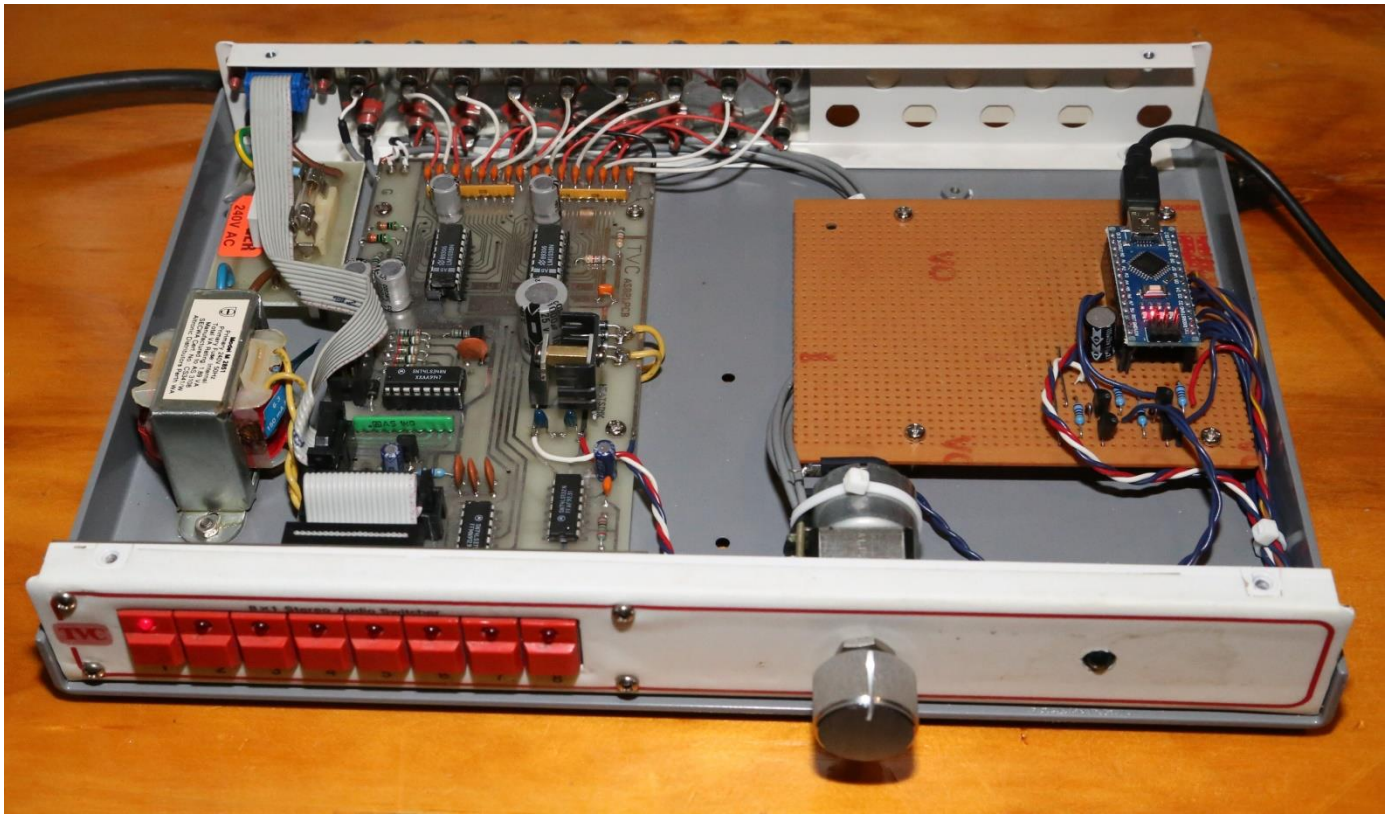
measure jitter in optical drives for CD's and DVD's in a musical recording studio making master discs.

TA320 with Freq Counter permanently connected to it

Here is a photo of the Rohde & Schwarz Freq Standard and GPSDO mounted in 19 inch Rack, there are four 10 MHz outputs on the back of the GPS that break off to test gear in the lab. One comes to the a hole that was in the front of the R & S that had a broken neon lamp in it and was just the right size for a BNC connection to break out the 10 MHz from the back of the GPSDO to the front panel to make it easy to get to it.

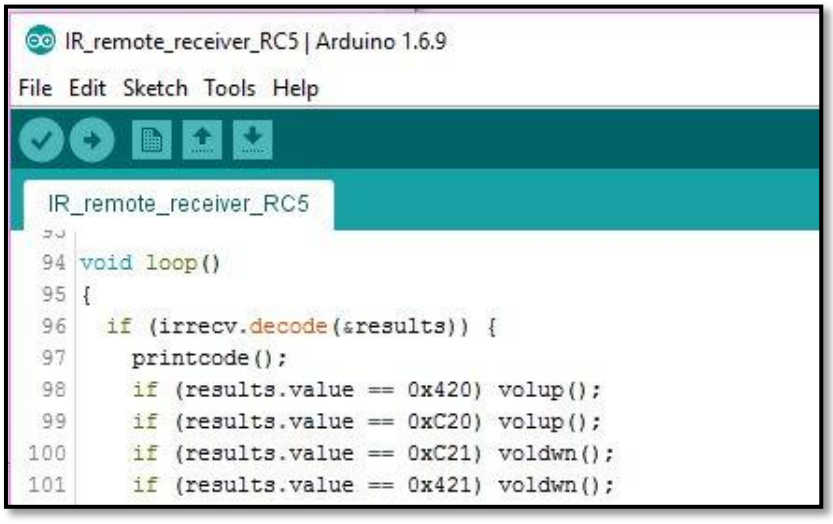
From the Shack of Mark "Pockets"
VK3PKT

Arduino – IR controlled Pre-Amp



Do you have an item of equipment just begging for a remote control option, I sometimes wonder about how lazy we have become in this modern world, where we can do so much whilst sitting in the lounge chair. However some jobs are best done from there, like setting the volume of your stereo. You may recall my article about a whole house sound systems, whilst figuring out how best to do this, I came to the conclusion that a few stereo preamps strategically placed would be the best way to feed & control the setup. So when I spotted a 'TVC' brand audio switch box at the recent MDRC hamfest for $10, I figured I was on a winner (pity I didn't grab the second unit he had) the only thing missing was a volume control, but that's an easy fix as the box was only half filled. Then I realised what it really needed was a remote control, so here goes another Arduino project.

Whilst you may have considered some of my previous projects a touch too complex, this one is at the other extreme, that is if you use the 'IRremote' Arduino library. To start all you need is an Arduino and an IR receiver, scored for nix out of an old VCR/CD player etc. etc. – Or if you are desperate, buy one. Of course you will also need a remote, Quite a few TV remotes etc. have the ability to also control 'companion' accessories, like a DVD player etc. so assuming these buttons are going unused (because you bought a different brand player etc.), then you can now make use of them courtesy of an Arduino. Originally I used a spare remote that used an unsupported code, IRremote directly supports NEC, Sony, Panasonic,



Philips RC5 & RC6 and a few more, unfortunately mine was not in there, so I have put it aside for now so I can complete this article. So now I'm using an RC5 coded remote, IRremote does support raw mode, however it's somewhat more complicated, so I'll leave that for another day.

Before you get too carried away, after loading the IRremote library, try playing with the samples provided, both to see if your intended remote will play easily, and what codes it is returning. You will need these when you start writing your code. – see my sample above. Apart from checking each code, I probably should also verify the that 'results.decode_type' does equal Philips RC5, but for now I haven't bothered as the chance of an accidental matchup with the codes from another brand remote is highly unlikely at my QTH.

Once a command has been received, almost any action can be taken, including sending command to remote equipment via USB, Serial, Ethernet, WiFi, etc etc. You'll notice the largish unpopulated area on the vero board holding the Arduino Nano, that is for future expansion as well as an audio pre-amp, so my switcher can actually be a pre-amp.

Other possible uses for an IR receiving project is a device that receives, then retransmit commands using a different codeset. How about being able to control your Sony DVD player with your Samsung remote, so you don't need as many remotes on the coffee table. For another one, how about a device that say intercepts the play command to your CD player and then turns on your amplifier and selects the correct input so when you press 'play' you actually hear sound, rather than nothing because your amp was set to the wrong input.

How about making your 'complex' HiFi stereo much more partner compatible. – no more screams to come and sort it out.

Or Ian, how about a remote control for that spaghetti twirler in your "presidents report"

Another line of possibility projects is for IR transmitters. i.e. - a 'fix' for those items of equipment that lack a decent local control panel. How many things exist these days where everything is controlled via the remote, but the actual device has almost no controls on it. Using the HiFi example, you pop in a CD, press play, but you cannot select 'CD' on your amplifier, because your sitting in front of the amplifier, you have to get up and go find the remote control – absolutely stupid!, but so commonplace.

EEVblog #506 - IR Remote Control Arduino Protocol Tutorial

If you would like more info on how IR remotes work then try this YouTube video channel.

https://www.youtube.com/watch?v=BUvFGTxZBG8

The first one – EEVblog, has lots of content beyond IR remotes, and you can easily burn many hours

Or try the sparkfun tutorial at :- https://learn.sparkfun.com/tutorials/ir-communication

```
#include <IRremote.h>

int RECV_PIN = 11;

IRrecv irrecv(RECV_PIN);

decode_results results;

void setup()
{
  Serial.begin(9600);
  digitalWrite(A2, LOW);
  pinMode(A2, OUTPUT);
  digitalWrite(A3, LOW);
  pinMode(A3, OUTPUT);
  irrecv.enableIRIn(); // Start the receiver
}

void volup()
{
  Serial.println("Vol Up");
  digitalWrite(A3, HIGH);
  delay(90);
  digitalWrite(A3, LOW);
}

void voldwn()
{
  Serial.println("Vol Down");
  digitalWrite(A2, HIGH);
  delay(90);
  digitalWrite(A2, LOW);
}


void select(byte channel)
{
  channel++;
  digitalWrite(channel, LOW);
  pinMode(channel, OUTPUT);
  delay(10);
  pinMode(channel, INPUT);
}



void printcode(){
  Serial.print("Raw length = ");
  Serial.println(results.rawlen);
  Serial.print("Value = ");
  Serial.println(results.value, HEX);
}


void loop()
{
  if (irrecv.decode(&results)) {
    printcode();
    if (results.value == 0x420) volup();
    if (results.value == 0xC20) volup();
    if (results.value == 0xC21) voldwn();
    if (results.value == 0x421) voldwn();
    if (results.value == 0x401) select(1);
    if (results.value == 0xC01) select(1);
    if (results.value == 0x402) select(2);
    if (results.value == 0xC02) select(2);
    if (results.value == 0x403) select(3);
    if (results.value == 0xC03) select(3);
    if (results.value == 0x404) select(4);
    if (results.value == 0xC04) select(4);
    if (results.value == 0x405) select(5);
    if (results.value == 0xC05) select(5);
    if (results.value == 0x406) select(6);
    if (results.value == 0xC06) select(6);
    if (results.value == 0x407) select(7);
    if (results.value == 0xC07) select(7);
    if (results.value == 0x408) select(8);
    if (results.value == 0xC08) select(8);
    irrecv.resume(); // Receive the next value
  }
 }
```

So here is the source code as it stands at present.

This has to be the first Arduino program that I can present in its entirety in the magazine, and on one page! - I did say it was rather simple.

I do have a few versions with a lot of extra debugging code in place, mainly for trying to get to grips with raw code operation, maybe a subject for another magazine. But for now it would only confuse things to present it here – and probably me in a few days after I've forgotten what all the extras were for, so I've cut it all out.

As it stands, it outputs all received codes via the USB port (9600), so if you want to use a different button for a particular function, press it, note the reported code, then insert it into the code.

10 functions/buttons are currently implemented, 8 for selecting the input channel, and two for adjusting the volume – via a motorised pot assembly.

You will probably notice there are actually 20 codes checked for, on my remote is seemed to swap between two alternate codes on each button press – something not overly documented.

Raising A3 rotates the volume pot clockwise, A2 rotates it anti-clockwise. All via a 4 transistor driver stage, yes I could have used a H bridge driver, however I didn't have one, but I did have a pile of BC548's.

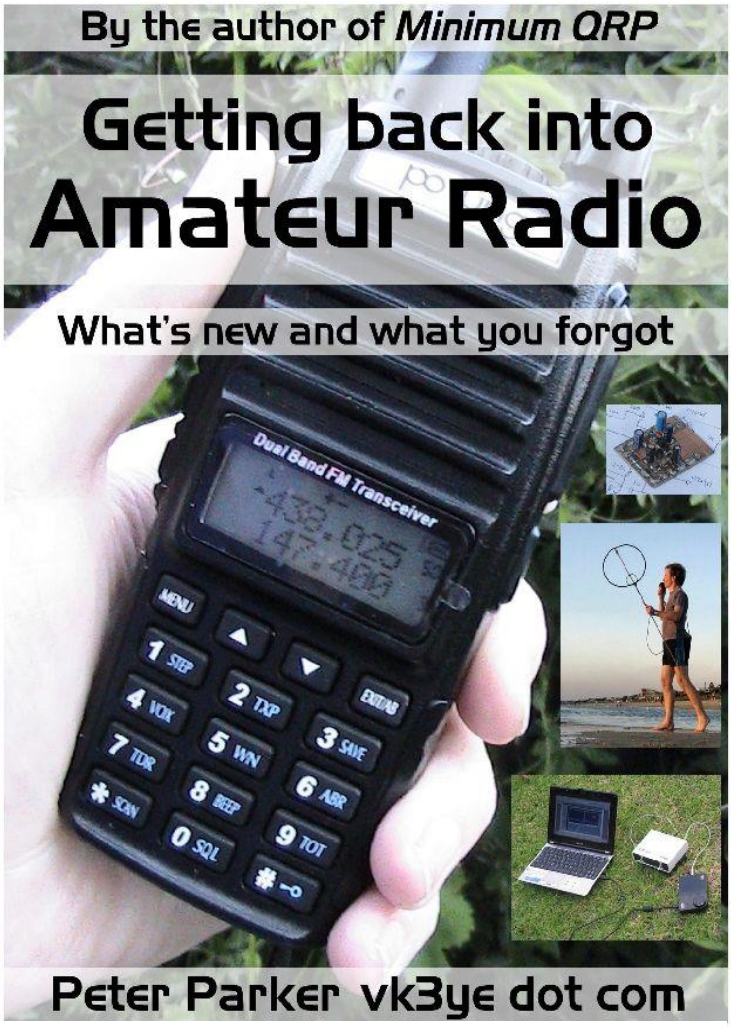
The motor runs at about 35mA, and 42mA stalled at the end of its travel. (5V)

D2 to D9 select audio inputs 1 to 8. These outputs are pulsed low, then left tristate as they are in parallel with the front panel press buttons. If I left the pins all high, then they would get severely overloaded or blown when the buttons were pressed, and if I left one low, it would lock the selector onto that channel and I would not be able to change inputs using the front panel buttons. Also having D2-D9 as inputs means I can also read any buttons pressed and forward the selection to any ancillary equipment in future versions.

Happy Arduino-ing.

Paul VK3TGX

Extracts from *Getting back into Amateur Radio*



Item 2: What's changed in radio - homebrewing

There used to be a huge disparity in the information available to the old-timer with 30 years' worth of magazine back-issues and numerous books, and the newcomer or returning ham with nothing. Apart from the occasional lecture or overheard discussion, monthly magazines such as *Popular Electronics*, *Radio-Electronics*, *Wireless World* and *Electronics Australia* were how we stayed abreast of developments.

All that has changed. Gone are the days of sitting cross-legged on the library floor hand-copying circuits from books. Instead everyone has free access to more information than they can read in a lifetime. There are circuits of almost any conceivable radio project and numerous demonstrations on YouTube.

And if you do want an extract from print, taking a photo with your smartphone can do the job in seconds. Another button press and your friends get it as well.

Parts availability has also changed. At one time the industry comprised surly middleman wholesalers who shunned small orders of specialist parts from people without trade accounts. We were instead supposed to buy from local retailers who rarely stocked many RF components. These outlets had the market to themselves as foreign ordering was too hard for most.

We've since seen the departure of both chain and independent shops from the specialist radio and enthusiast market. Their loyal but small band of customers was insufficient for owners who dropped the small parts, built more and bigger stores and chased the already-competitive consumer market. These strategies proved a failure and within a few years formerly massive chains were gone.

There are still some 'bricks and mortar' component stores (e.g. Maplin in the UK and Jaycar in Australia) but they are a long trip for many. However, previously trade-only outlets opened to the general public while a host of local and international online suppliers cater for more specialised items. Their prices are often attractive, and individual parts can be shipped here for less than local postage alone could cost.

With a worldwide electronic marketplace, even valves, tuning capacitors and crystals are probably easier to get than in the 1990s, though beware of paying inflated 'vintage' prices. Test gear has also become more available. Direct-reading inductance and capacitance meters are common, and antenna analysers have largely replaced the old noise bridge and dip oscillator.

Enjoyed the read? There's more in '*Getting back into Amateur Radio*' by Peter Parker VK3YE. It's available as an ebook through Amazon for $6.99. Search the title on Amazon, like 'VK3YE Radio Books' on Facebook or visit vk3ye.com for more details.

General Meeting Minutes – sort of – Not

So where are the minutes – well there weren't any, we skipped the regular 'General meeting' and dived strait into the AGM after a talk on CNC machining, "Part Maker", and a whole lot of interesting high tech medical implants.

- with a rotator controller thrown in for good measure

Club Information

Meetings 2000hrs on third Friday of the month at the
Cranbourne Guide Grant Street Cranbourne
Prac nights first Friday in the Peter Pavey Clubrooms Cranbourne 1930hrs
Visitors are always welcome to attend

Office bearers

President	Ian Jackson	VK3BUF	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	Mark Clohesy	VK3PKT	Secretary	Ian Jackson	VK3BUF
General 2	Robert Streater	VK3BRS			

Call in Frequencies, Beacons and Repeaters

The Club Station VK3BJA operates from the Cranbourne Clubrooms.
6m Repeater VK3RDD – Currently de-commissioned until further notice - *sorry*
70cm Repeater Cranbourne VK3RLP In 434.475MHz Out 439.475MHz CTCSS 91.5Hz
VK3RLP Repeater supports Remote Internet access (IRLP), Node 6794.
70cm Repeater Drouin 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

Membership Fee Schedule

Pension Member rate $25.00 Extra Family Member $20.00
Standard Member rate $40.00 Junior Member rate$25.00
Fees can be paid by EFT to BSB 633000 - Account 146016746.
• Always identify your EFT payments.
• Membership Fee's Are Due at each April Annual General Meeting.

Magazine Articles to editor@ggrec.org.au or vk3tgx@gmail.com Cut off, 10th
All other Club correspondence to: secretary@ggrec.org.au
or via Snail Mail : GGREC, C/O Ian Jackson, 408 Old Sale Rd, Drouin West 3818
GGREC Web Site & Archive may be viewed at: www.ggrec.org.au
Website errors, contact web master via email webmaster@ggrec.org.au
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