GATEWAY

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

April 2018

Antennapalooza Photo's

Di's first Prize Antenna

Binary Clock Construction

And More

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Note: - club meeting minutes are now on the club website

Event Queue

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20th   Annual General Meeting

May:

4th   Prac Night – Club rooms
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12-13th   WW - Mills On The Air (WIA)
18th   General meeting – Guide hall

June:

1st   Prac Night – Club rooms
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4th   GGREC Hamfest
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18-19th   Lighthouse and Lightship Weekend

PRESIDENTS REPORT APRIL 2018 – Ian Jackson VK3BUF

So this is the lead up to the AGM on Friday night. As previously indicated, I will be giving the pres position away for a while. Work pressure is making it hard to find enough time to do a good job, so it is an excellent time for one of our existing members to give the position a fresh perspective. Maybe you're thinking nu-uh, doing a job like that is way outside my comfort zone. Well, here's the thing. It's important to do things outside the zone. Sometimes sitting in the chair with folded arms is not enough. So when we call for committee positions, don't quietly listen for the chirping crickets at the back of the room. Stand up, fist the air and say "Screw *you comfort zone*! and join our committee. (Well, maybe say that last thing to yourself)

Antennapalooza
Speaking of comfort zones, our Antennapalooza event with FAMPARC EMDRC and MDRC went really well, the weather was awesome and about fifty people attended over the two days. About half that number camped out and warmed their buns by the camp fire. Lots of antennas were up in the air and we had a series of fine lectures each day. Glenn Dunstan VK4DU, the president of RASA came down from Cairns for the weekend to join us. As a Guest Speaker, Glenn gave a presentation about the relationship between Australian Amateurs and the ACMA. We had a talk about the early days of 2 metre FM operation and repeaters in Melbourne by David VK3ADM. We had an exciting antenna construction competition, made from wire coat hangers. Also Wayne Cooke VK3XF gave an excellent presentation on the progression of DMR around the world.


There has been a lot of wonderful feedback about how our visitors enjoyed the two days. Please, don't be afraid to email your thought about what you thought was good and bad so that we can plan for the future again.

New Security Device
From the department of 'What will they think of next' I saw that my replacement British passport

had a fuzzy image of me inside the cover that was different to the regular passport photo. There was something a bit odd about it that warranted closer investigation. What I found was a rather clever trick whereby my image was made up of a wavy form of name and date of birth. Not the sort of thing that could be faked with a sharp pencil.
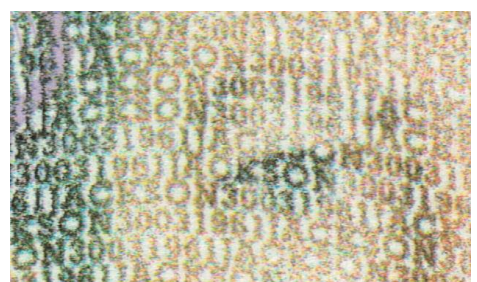
Lighthouse & Lightship Weekend

In August 18 & 19 a bunch of GGREC members, plus a few others will be spending the weekend at the Wilsons Prom lighthouse, operating under the Club callsign of VK3BJA. The trick to this weekend is that participants must load up about 20kg of back pack and walk the 18km into the venue and back out again afterwards. For reasons I am not entirely sure about, I have decided to do it again. My last effort was back in 2010. Surely 8 small years can't have too big effect on a person's fitness? Plan B is when I

Are we there yet…

attach a long stick to my back pack where some caramel koala's dangle from a string, just outside my reach. Keep the eyes on the prize….

Hamfest Sale 2018

It is happening again. This year it will be on Saturday the 4th of August. All sorts of radio goodies will be on sale in Cranbourne. Dianne VK3JDI is taking the bookings again. Checkout the links on the Club website if you want to examine the details. Maybe I'll find a nice big 20A power transformer power supply to put in the back pack for the Prom trip…

RASA Participation

GGREC members may have observed that I am a committee member on the newly formed Radio Amateur Society of Australia (RASA). I see this as a way to make a good contribution to the hobby of Amateur Radio. My 40 years with GGREC has been a great training ground to see

where the hobby is going, what challenges lie ahead and how best to meet them. The other four committee members of the RASA management team fairly represent different parts of Australia and each brings their own set of skills to the organisation. My long association with radio clubs has shown that this is where the real frontier of the hobby lies and that it is essential to engage with lots of clubs and seek the best outcomes we possibly can through this new national body.

Glenn Dunstan VK4DU, RASA President, talks at Antennapalooza about the ACMA Liaison process

Over the next few months you will hear a lot more about RASA and how it intends to achieve its aims. Information about RASA and how to join may be found at: http://vkradioamateurs.org/
It's catch phrase, which in some ways applies to all radio operators, says it all:

<div align="center">

BEING HEARD IS IMPORTANT

</div>

That's all folks

So this is the last Pres Report for a while. I wish to thank our present committee for this work over the past year and wish the incoming committee all the best for the next one. Be warned though, this does not mean the end of funky articles in Gateway by yours truly, you're not getting out of it that easily…

From The Editor – trees & cars.

Well I had a bit of a crashing month this time around, it all started when we had a bit of a blow about 3 weeks back. Reports mentioned 160K winds, althou I don't think it was that bad in Franskston.

Anyway Marianna let out a bit of a yelp and came in saying 'quick a tree's fallen over' Admittedly I did hear a bit of a crack, but boy was I surprised by what awaited me in the back yard.

The tree belonged to a bloke over the back, it had died a while ago, however it was located in a rather awkward corner, behind a shed, making extraction a very expensive affair. A week earlier the local tree men were around attending to a large branch fall, so I asked them what that tree would cost, roughly $3,000 was the answer, so no wonder he was letting it go for a while. – Unfortunately a tad too long! (He's a pensioner)

The crack I heard was not this tree breaking loose and falling, but rather a tree I had in my backyard getting the absolute living crap smashed out of it by this tree. This tree, somewhat taller than my Nally tower & antenna's etc. was now extending though the back fence to basically the back wall of my house. Thanks to God it fell in the perfect position, doing the least possible damage to anything, A little to the left and my clothes line (& Nally tower?) would cop it, a little to the right and by-by new fence – only a few months old. As it was a few largish 'twigs' did hit the cloths line & neighbours fence & shed, but with no damage.

So with all that, and my feeble attempts to get rid of it (using a 'toy' Aldi chain saw), along with heaps of extra tasks from church due to Easter, I never got to work on my caravan in preparation for the up-coming Antennapalooza weekend. Not to totally miss out I opted for a day trip on Saturday. Marianna thankfully declined, so I set out on my own. However, just short of Ian's, I received an alarm from the car – it was greatly overheating! As I was only about 50 meters from Ian's gate, I gently nursed it though his gate, and left it there to cool down. At about 5:00 it was time to go home, so I filled up the radiator and set off, taking it nice and slow to take as much load off the motor as possible, figuring if it made it to Ian's, then hopefully the return should go the same. No way, yes I made it onto the Princess highway, but not that much

further. So I let it rest for 15 minutes, then tried again – it was hopeless, I'd only made it to Gumbuya World, Tynong. Looking at the map I had a long way to go, so I gave up and gave the RACV a call, arriving home at about 8:00 on the back of a tray truck.

In the end it was the thermostat, so replacing that & a rather odd radiator hose ($100 all up) fixed it, luckily the job was within my limited mechanical abilities.

(Thanks go to Graeme VK3XTA for lending a hand)

Paul VK3TGX

How BENT was my coat hanger antenna

By Di Jackson VK3JDI

The 2018 Antennapalooza event was recently held, in Drouin West, jointly hosted by EMDRC, FAMPARC, GGREC and MDRC.   Part of the fun and activities, was a DIY coat hanger antenna competition. Now, I don't know a lot about how to construct a working antenna but, it looked like it would be a lot of fun to try. My design came to me as I held the coat hanger in my hand. I straightened out the hook, and that gave me a nice centre fed starting point. Then I snapped the wire roughly in the middle. The wire was very hard to bend but I persisted and managed to fashion a square on either end of my antenna. When it was done it looked a bit like square Mickey Mouse ears, but that didn't matter as I had made it myself, and had been a bit of fun. There were eight or nine other entrants, and they were all very different. One looked like a TV rabbit ears, and some looked like proper antennas with directors and reflectors. My poor little Mickey mouse ears didn't stand a chance against those. There were three judges, one from each radio club so that it would be impartial. I will add here that Ian VK3BUF was not one of the judges. The antennas were judged by three different criteria, Originality, Robustness and Visual appeal. There was to have been a measurement of SWR on a transmitter, but the proper test equipment had not been set up. However, while the battery lasted, they were able to measure whether or not the antennas were resonant on a given frequency.

When the time had come to announce the winners, I sat there wondering who's creation was going to win.   Ian VK3BUF was announcing the results, second place was awarded to John VK3BSE. His antenna had two big loops in a roughly figure eight configuration, with some sort of box or balun in the middle.   Everyone clapped and cheered as he accepted his certificate and box of connecters. The tension was mounting as we waited to hear who had taken out the first prize.

I was absolutely gobsmacked when Ian read out my callsign, VK3JDI. How could my little antenna, have been judged better than all the others. It seemed that everyone else was as bemused as me.   I accepted my first place certificate and box of connecters to the sounds of incredulity from the crowd. Its rigged they said not fair, and I walked back to my seat feeling a bit deflated that they weren't happy about my win.

After the presentation I was walking past some of the other antenna builders and they were laughingly saying "you know she slept with the judge." I cried out "lies and innuendo" Ian was not a judge and I have never been unfaithful.

It all became clear when the judges results were scrutinised. My antenna got high points from all the judges for originality and robustness and by some miracle it was resonant on two metres. Some of the other entries, while resonant on their frequencies, were not judged to be very robust, so mine snuck over the line with the most overall points.

While I may not cherish my winning coat hanger antenna, I will certainly display my first place, winning certificate proudly, and know that in life, it's not about winning or losing but participating and having fun. Of course winning is always good too. Thank you all for letting me get that off my chest. Finally, as I have no use for a box of antenna connectors, I gave them to another entrant who had put in a good effort with his beam antenna.
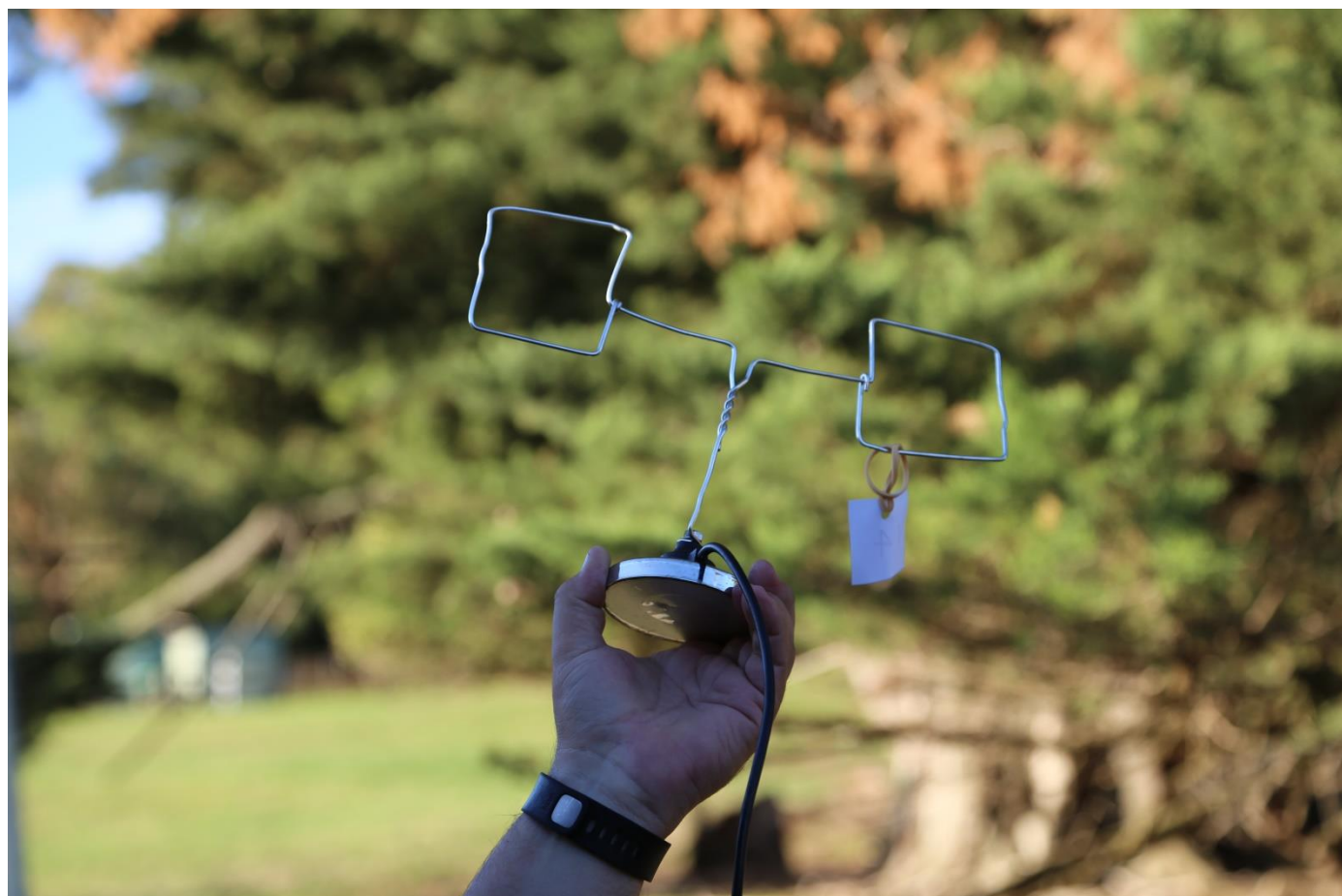
Gippsland Gate Radio & Electronics Club Inc.

AN INVITATION TO STALLHOLDERS

On Saturday the 4th of August 2018, the Club will be conducting its annual HAMFEST for the sale of new and used electronics and radio equipment.   As it was last year, the venue will be at the **Cranbourne Community Hall** on the corner of Clarendon and High Street, Cranbourne. High Street is part of the South Gippsland Highway Melway 133-K4.

The Club takes pleasure in offering you the opportunity to become a Seller at our 2018 event. Forty one tables will be available for stall holders and can be booked online.

Details can be found on our web page at:
   http://ggrec.org.au/hamfest.html

- Table hire remains unchanged at $22 per table. A limit of 4 tables per Stall Holder applies. Table Hire provides access for 2 people to operate the stall and includes 2 tickets to the door prize and free tea/coffee throughout the day.

- The $22 fee must be paid in full to the Club within 7 days of booking your table. Cancellations made more than 14 days prior to the event will be given a full refund by Direct Transfer (EFT) or by cheque if Direct Transfer is unavailable.

- To make a booking please contact us by email at: hamfest@ggrec.org.au. Payment may be made by direct transfer (EFT) to: **BSB 633000 ACC 146016746** or by sending a cheque or money order (payable to 'GGREC') to: GGREC c/- Dianne Jackson 408 Old Sale Road Drouin West VIC 3818. If paying by direct transfer (EFT), please include your call sign/name as the reference.

- When making a table booking, Stall Holders will need to provide a **Name**, **Postal Address** and **Contact Phone Number** with a **Return Email Address** if different to that in a reply. Table requirements will include **quantity** and if **240v power** is needed.

- Upon receipt of the $22 per table fee and contact details, a **Booking Number** will be sent as a receipt of payment. IMPORTANT! **No booking is confirmed until this number has been received by the Stall Holder.**

- Access to the Hall shall be from 8.30am (earlier if ready) for Stall Holders (and not later than 9:30am unless by arrangement).

- Transfer of your booking to another person is not permitted. Please contact us if you cannot attend or wish to discuss your booking at: hamfest@ggrec.org.au .

- The doors will open for buyers at 10am with a $7.00 entry fee.

Each year, this event is a great success with many hundreds of people through the door in our large Cranbourne venue making it a premier event for radio markets in this state. We look forward to hearing from you.

Antennapalooza 2018

More on the GGREC website

More photos are on the GGREC website

1943 - Army HF Stations in Melbourne

Browser tab: 1943 - Army HF Stations in Melbou ✕ +

Address bar: bpadula.tripod.com/australiashortwave/id65.html

THE HISTORY OF SHORTWAVE RADIO IN AUSTRALIA

1943 – Army Shortwave HF Stations in Melbourne

Navigation sidebar:
- Home
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- 1874 - Guglielmo Marconi - a Tribute
- 1895 - Wireless Telegraphy
- 1901 - Wireless Telegraphy
- 1902 - Wireless Telegraphy in Australia
- 1904 - Australian Coastal Radio
- 1906 - Wireless Telephony
- 1912 - Melbourne Radio - VIM
- 1914 - Shortwave Wireless Telephony
- 1920s - Commercial Shortwave Telephony Development
- 1920s - Receivers
- 1920 - The huge RCA Longwave Station in New York
- 1920 - Wireless broadcasting in Australia
- 1920s - First shortwave stations in Victoria
- 1921 - Discovery of Shortwave Propagation
- 1921 - Koo Wee Rup (Victoria) Experimental Wireless Receiving Station
- 1923- Longwave

1943 - receiving room Ringwood North

1943 - UHF FM link transmitter at North Ringwood

Backgound

It is not commonly known, but during World War 2 the Australian Army operated a large HF wireless telegraphy communications station from locations in the outer east of Melbourne.

The facility was split geographically - the receiving station was sited in a farming region, at *North Ringwood,* on the fringe of the town of Warrandyte, in a bushland area of about 30 hectares, which in later years would become part of the suburb of Park Orchards, about 20 km from central Melbourne.

The unstaffed transmitting station was located near the country town of *Coldstream,* some 10 km east of Warrandyte, and included several rhombic antennas, an antenna switching panel, and five HF high-speed W/T transmitters.

The antennas were designed for optimum radiation to places such as Alice Springs, New Zealand, Darwin, Hobart, and Chungking (China).

The transmitting towers, were north of the airfield, on the *Yarra River Flats* in Tarrawarra Rd, not far from the present-day Coldstream airport.

The transmitting station was in the yard of a property called St Huberts in St Huberts Road.

Closure
After the War, the transmitting and receiving facilities were dismantled. The receiving equipment was relocated to the Army Receiving Station at Rockbank, and the transmitting equipment was resited to the Army Transmitting Station at Deefr Park - both sites were in Melbournes óuter west.

A series of photos taken in May 1943, held at the Australian War Memorial, in Canberra, show various features of the receiving and transmitting stations, and these may be viewed on-line at the AWM website:

Receiving station

http://www.awm.gov.au/search/collections/?q=ringwood+radio&conflict=all

Transmitting station

http://www.awm.gov.au/search/collections/?q=coldstream+radio&conflict=all

Thanks Ron for finding this on the web, I certainly burned a few hours reading the various sections, Paul (ed).

http://bpadula.tripod.com/australiashortwave/id65.html

WINDOWS 10 – THE SERIAL KILLER by Ian Jackson, VK3BUF

Serial Ports

If you are not interested in using digital transmitter/receiver modes on your PC, then "***this is not the article you are looking for, move along…***"

Otherwise, if you are tempted to have a go at some digital modes like **Packet, WSPR,** or **FT8** the chances are that you will require a fully functional **Serial RS232** port to make the application work, even though nowadays few PC's come equipped with one of these ports. Also, it's likely that your PC has come with, or upgraded to, **Windows 10**. This creates fresh problems.
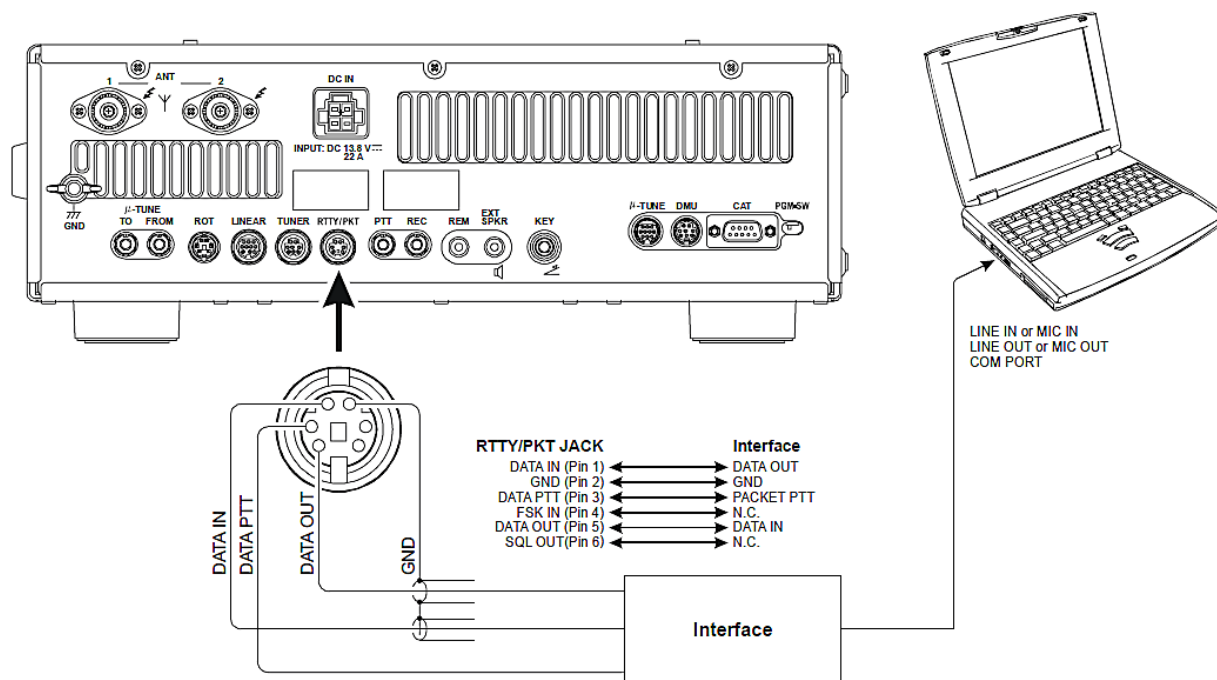
Most modern rigs, like the FT950 here, want to make a connection to an RS232 port on a PC

So probably you think, ok, I just need to buy one of those cheap USB to RS232 adapters, stick it in a vacant USB hole in the back of the PC or notebook and away we go. The problem is that 90% of these adapters use a **'Prolific'** brand chipset inside the dongle. In the past, you inserted the appropriate driver CD that comes with the adapter, then it is set up to work as say COM2 or COM4 and away you go.   About $15-20 from Radio Parts or Jaycar will get you one.

Unfortunately, while the Prolific serial chips will work under Windows XP, Vista, Windows 7 & 8, **they won't work under Windows 10**. The Comm Port settings in the Device Manager area will have a permanent exclamation mark next to it that won't go away.

Setting compatibility modes won't help.   Windows 10 just refuses to talk to the appropriate driver. The Prolific company who created the chipset have given up, saying they won't produce a Windows 10 driver or a future Windows 10 compatible product.   This makes most of the USB-RS232 adaptors in circulation permanently incompatible.

Very few of these adapters work with Windows 10

The solution is to use a different USB dongle with a chipset made by **FTDI** (Future Technology Devices International) or **Silabs** and *NOT* by Prolific. They are harder to find and they are usually twice the price than the Prolific versions, but they will work on Windows 10.

Windows 10 incompatibility is only part of the story, as the Prolific chips also have buffering and handshaking line issues that are sometimes problematic on the earlier operating systems. For reliable comms, it's best to avoid these cheaper adapters. You can waste a lot of time with them Here is one which is obtainable from Radio Parts in Melbourne that works really well. It is made by **IOCrest** in Shenzhen, China. These supprt RS232 and RS485, with bonus LED indicators to show data traffic. (An description of RS422 is at the end of this article)

When Radio Parts had no stock of these, I was able to buy them directly from the factory in China for about $40 each, but freight from there is expensive, so buy local if you can.

There is an alternative from Jaycar which looks like it has the good Windows 10 compatible chipset that is worthwhile trying (below), but it is a new product and I have not tried one out yet.

An alternate adapter that is supposed to be Windows 10 compatible

Installing the IOCrest Adapter

Buying these FTDI adapters is one thing. Getting them to work is another. Take it out of the box and plug it into your Windows 10 pc. The screen will grind for a while then it will tell you that the best driver for the job is now installed. All lies. You will need to delete the driver that Windows provided and force the PC to use the one that comes on a small CD with the adaptor.
Under the folder **\1411\Windows XP,Vista, 7,8,10\EXE** is a file to execute called **"xrusbser_ver2200_installer.EXE** Run this file to install your driver. If you now go to Control Panel and select Device Manager, scroll down the list until you see **Ports (COM & LPT)** Next to this it should say: **XR21B1411 USB UART (COMnn)** where '**nn**' is the communications port that was allocated to the device, such as **Com3** or **Com4**.

Sometimes the pc will automatically allocate something unusual like **Com19**, which is a problem if your application only allows connections to say **Com1** to **Com4**, but this can be fixed in Device Manager by opening the comm port driver window and selecting the Port Settings tab, then 'Advanced' . Here there is a drop box where you can force the pc to use a different comm. Port designation such as the more common **Com3** or **Com4**. If it says that this port is in use, it may be lying, so select that port anyway and give it a try.

Configuring the adaptor

You may think that it is all good to go now, but wait, there's more! These USB adaptors support both **RS232** and **RS422** standards. We want **RS232**, but **RS422** is the default standard and we have to change it. Back on the CD that came with the adapter there is a sub-folder called **\Tool.** In that folder there are two exe files and we want to run the one called **ComConfig_EN.exe** (The English version) This is a little utility to configure the adaptor to the necessary standard. A window pops up which asks for three items to be entered. For **Port Num**, select the active com port from the lis. For **Interface** select **RS232** For **Term** select **Enable**. Then click on Apply. If all went well you should get the message "**Configuration succeeded**" Now (finally!) you have a viable RS232 port to work with

What is RS422?

It is sometimes difficult to find out about this RS422 standard is, or its close relative RS485.

As far as the computer or microprocessor is concerned, it wants its data to be 0-5V logic, but at baud rates of 9600 baud and above, the range is only a few metres.

The common RS232 protocol is an improvement where the transmission signal is converted to data on a single wire relative to a common ground where each bit of information alternates between +9V and –9V. This alternating voltage polarity fights rounding of the data waveform by cable capacitance. Doing this will extend a 9600 baud data stream to 40-50 metres in a wire.
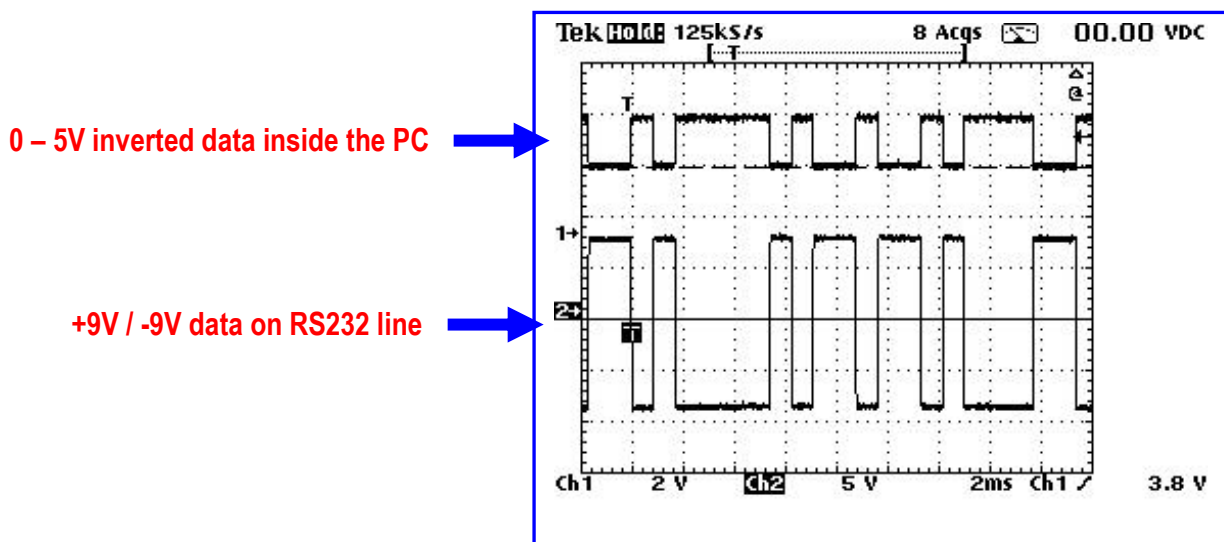

Sometimes 40-50 metres is not enough, particularly where environments are noisy or data has to be sent across the width of a factory site. **RS232** signals are sent on un-balanced wires, which still limits the working range. Here is where the **RS422** standard is useful.

RS422 has two wires twisted together in a cable isolated from a grounded shield. A constant current of a few milliamps flows through the two wires as a loop. The polarity of the **RS422** current loop reverses with every bit in the data stream. Like telephone lines, balanced transmission lines carrying data solve a lot of signalling problems.

Being current based, it has high noise immunity. A 9600 baud data stream can be sent successfully for hundreds of metres.

RS485 is similar to the **RS422** except that it has a bit more drive current and can support many more slave devices on the current loops. More of an industrial thing really.
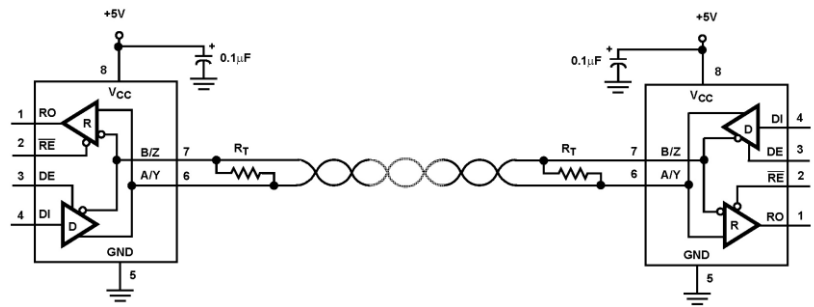
The RS422 and RS485 uses balanced current loops for sending data

Crazy Mouse Syndrome

This article would not be complete unless I address the issue of Crazy Mouse Syndrome. Ok, so you set up your receiver into a modem of some kind, which converts received signals to RS232 data. This goes into your serial port via your USB adapter. You turn on your radio, then re-start your PC and as soon as the desktop can be seen, the mouse pointer darts wildly around the screen clicking on random shit and generally making a mess of your PC desktop.
So, what the hell is going on here?

This is not so much a fault as a facility, a very annoying legacy facility that has no place in a modern PC. Back in the dark ages, computers had 'Serial Mice' which worked by connecting to the built-in RS232 port of early PC's. These mice would send a steady stream of mouse position information into the PC serial port. All Microsoft Windows (including Windows 10) has this legacy feature where any serial data arriving at a serial port during power up is construed as being a connected serial mouse. It then loads a mouse driver that makes any data arriving at the serial port control the location of the mouse pointer and generates mouse single and double clicks. If you have random noise or receiver data arriving at a Windows PC serial port during power up, it will load this mouse driver and immediately send your desktop wild.

There are three strategies that can resolve this issue.

1. Ensure that the RS232 adapter is not plugged into your PC until after it has finished starting up. If you have a semi-permanent setup, then this is not a good fix.
2. If the mouse has already gone wild, turn off your radio, or un plug the data cable, then go into Device Manager, find the serial mouse driver and disable it. (This is a temporary fix, as it will re-load the driver the next time the PC is restarted.)
3. Make changes to your system registry so it never happens again.

The last option is the preferred one, but the most difficult to implement. These instructions were taken from a tech website and it seems to work well from Windows 7 to Windows 10.

1. Click on the **Windows start button**
2. In the search box, type in: **regedit** and press the enter key on your keyboard
3. The Registry editor windows will open
4. Navigate to the registry key named:
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\sermouse
5. On the right hand side of the registry editor window you should find subkey named: **start**
6. Double click on the "**start**" subkey and modify the value of the key to: **4** and click the **OK** button to return to the registry editor window
   Setting the "**start**" subkey value to **4** stops windows from looking for serial mice at startup
7. Exit the regitstry editor window

With these settings in place and the right serial port adapter plugged into your machine, then you should be able to get reliable serial communications with your radio. Good luck!

Arduino – Binary Clock
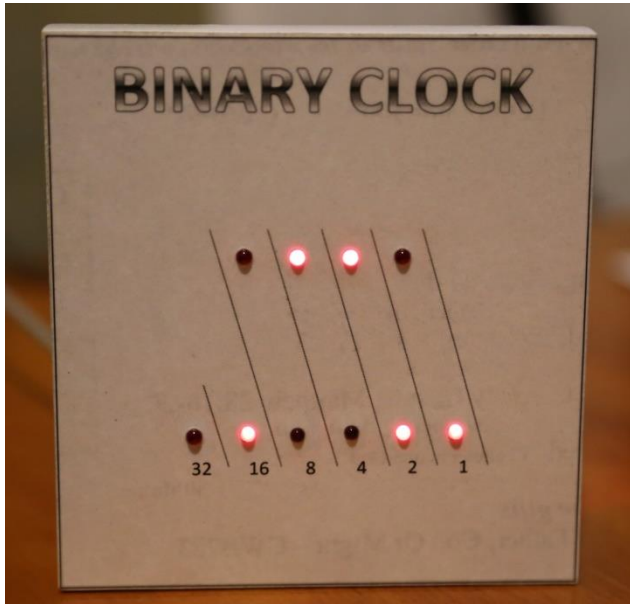
So now that I have a working clock, it was time to build the thing – to get it off my proto-board.

I had some scrap MDF board lying around, so I thought I'd make it like one of those wall hanging photo's one sees, where it is basically a sheet of wood with the picture glued to it, with no frame.

My board was 100mm wide by 110 high, any smaller then fitting the electronics gets harder, larger and the LED's will get lost and it will look like a blanc ….

Those with more artistic flair will probably come up with some better ideas.

Normally with seven segment digital displays, one would put them behind some form of cover/filter that hides any unlit segments, this makes the digits really stand out and be easily read, seeing any unlit segments is an un-needed distraction. However in the case of this binary clock you have to be able to clearly see any unlit LED's. Take a look at the picture above, it is saying 6:19, Now look at the second 'blacked out' face, the sort normally used for red seven segment
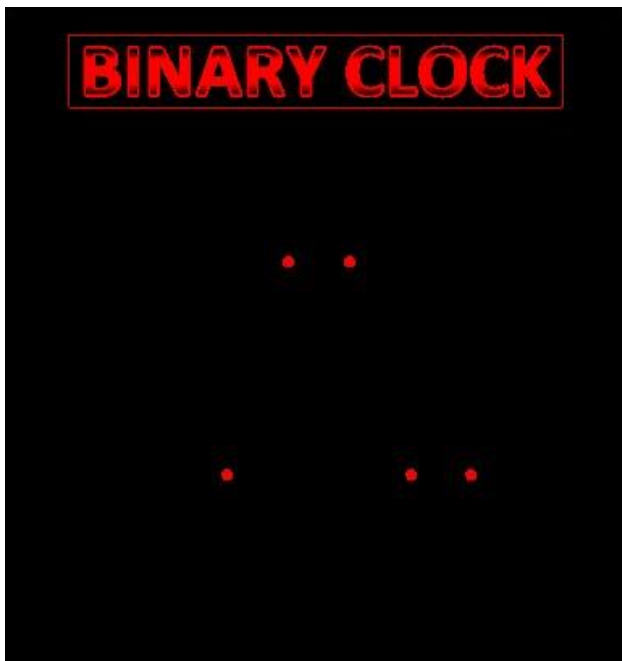

displays, it is almost impossible to read. You can only see the ones, not the zeros. Yes you could use dual colour LED's, but then what do the colours stand for. In this case getting it wrong would mean reading the display to say 9:44, both valid times, but which one is it?

So hence my choice of a white face to make the 'black' & red LED's stand out. I added the numbers and lines more to fill the spaces between, rather than intending them to be used. I could have done it like the watch shown here, but elected to use my own imagination rather than copy theirs.

Another choice I made was to use a 12Hr display, and also to dispense with an AM/PM indicator, not that either would be hard to include, I just thought keeping the display simple, with the least number of LED's was the way to go.

I did see another clock that used a heap of 7 segment displays to show the time (in binary). This would solve any problems associated with putting it behind some form of display filter. He used a few intelligent 8 digit display modules, these are cheap, and have the advantage that a simple re-program can easily swap it back to a traditional digital display, however they doo bring up the IC count somewhat. If you have a pile of 7 segment displays, they can easily be connected to display binary with

only a single transistor per digit to drive them. The trick here it to wire segments 'A' & 'B' permanently to power (i.e. always showing a '1', then connect segments 'C', 'D', 'E', & 'F' together, to the driver transistor, that way when the transistor is turned on, you have a zero. 'Backwards' yes, but simpler and with less parts. (Or just use 2x ULN2003's etc.)
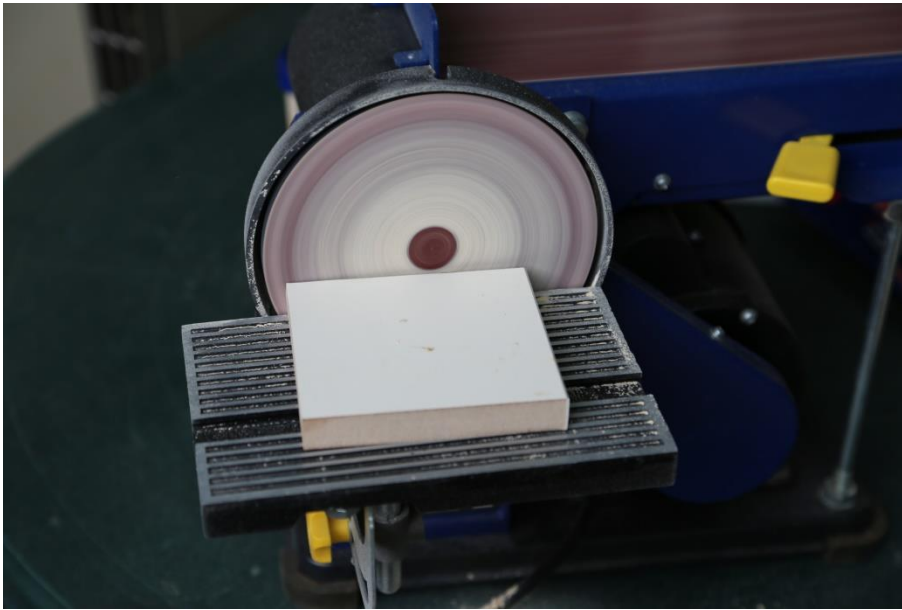

To start things off, after cutting the board I sanded it nice and square. If you are really good with a saw and sanding block, then go that way, however I had this Aldi sander just waiting to be used.

I then used a router (Aldi) to cut a slot into the back of the board, this was to house all the electronics, (one Arduino Nano) keeping it all flat.

I originally envisioned hanging it on a wall, however getting power to it soon killed that idea.
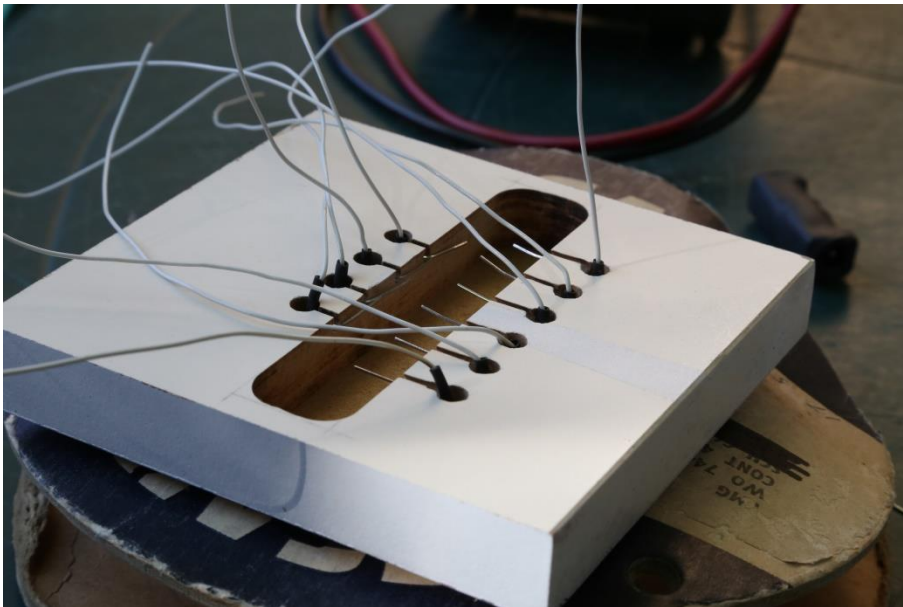
Forget batteries, things that light up never last long on batteries, you'd be forever changing them.
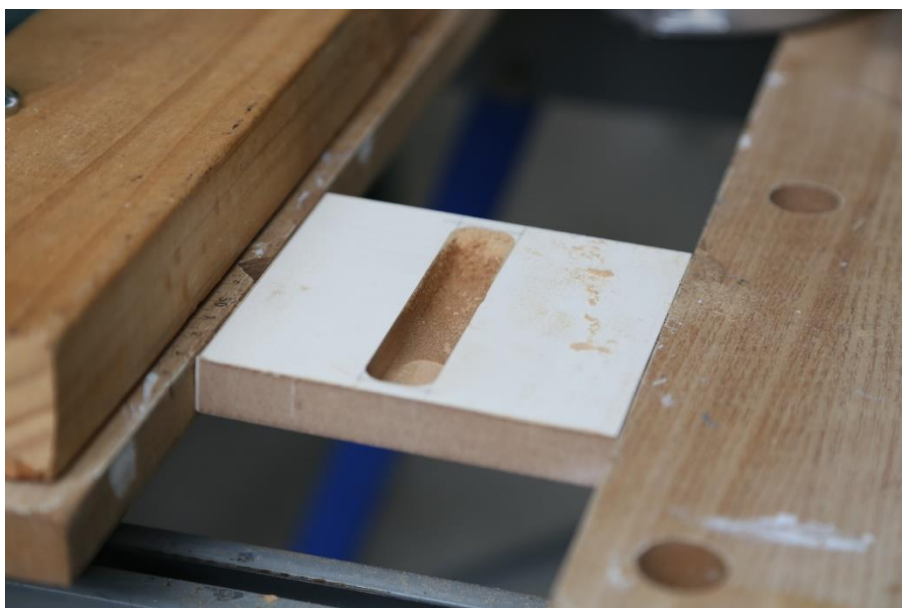
The slot was a little wider than the Arduino Nano, and extended to about 2mm from the front surface.

In hindsight, I should have made it somewhat wider, also encompassing the LED's

However, in the end it all fitted.

The front face of the clock was made from thick paper, using a Laser printer, then it was glued to the front using spray adhesive. After it had set I applied a coat of clear lacquer to protect the paper, then I used it as a drilling template.

I used two drill sizes, one just big enough for the LED's to peak though the front panel, and a larger one run to within a millimetre of the front to take the wiring etc.
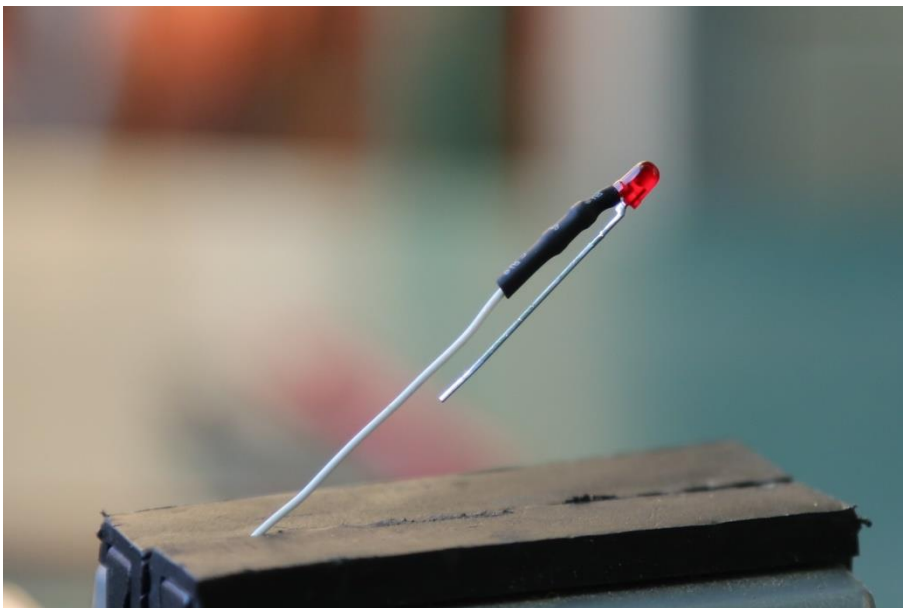
The 1.2K limit resistors were soldered directly to the LED's then covered in heat shrink.

As I was not using a circuit board as such, I didn't have many options as to where to hide them. Attaching 10 resistors directly to the Arduino Nano didn't seem like a good idea, so I figured I'd 'burry' them in the holes I'd drilled for the LED's.
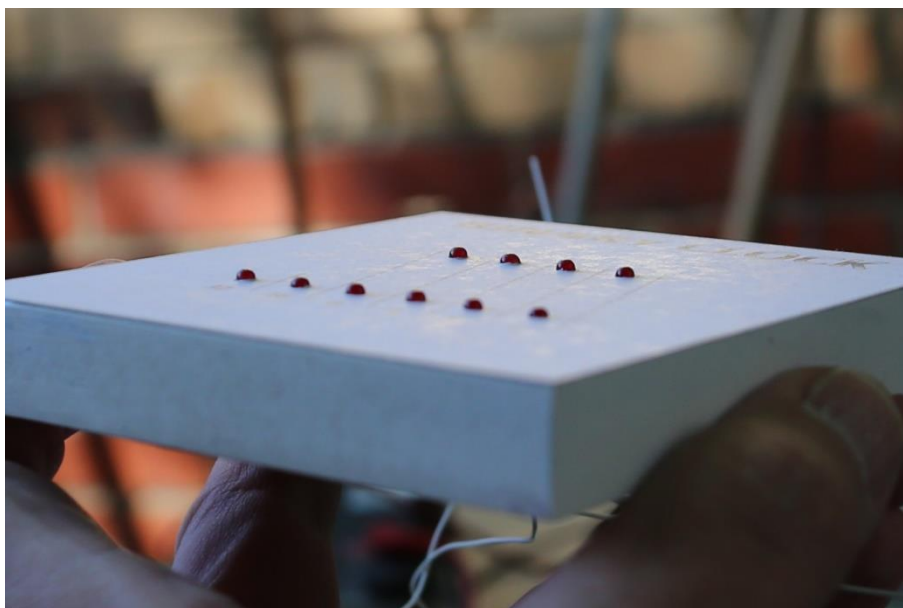
The LED's were pushed in to be just proud of the front face.

This required several rounds of trial an error with a needle file to slowly enlarge the holes so the LED's were a tight fit, but not so tight that you end up busting them while trying to get them into the holes. And Yes, I did destroy one of my LED's in the process.

Then finally a drop of hot melt glue was used the lock them into place.
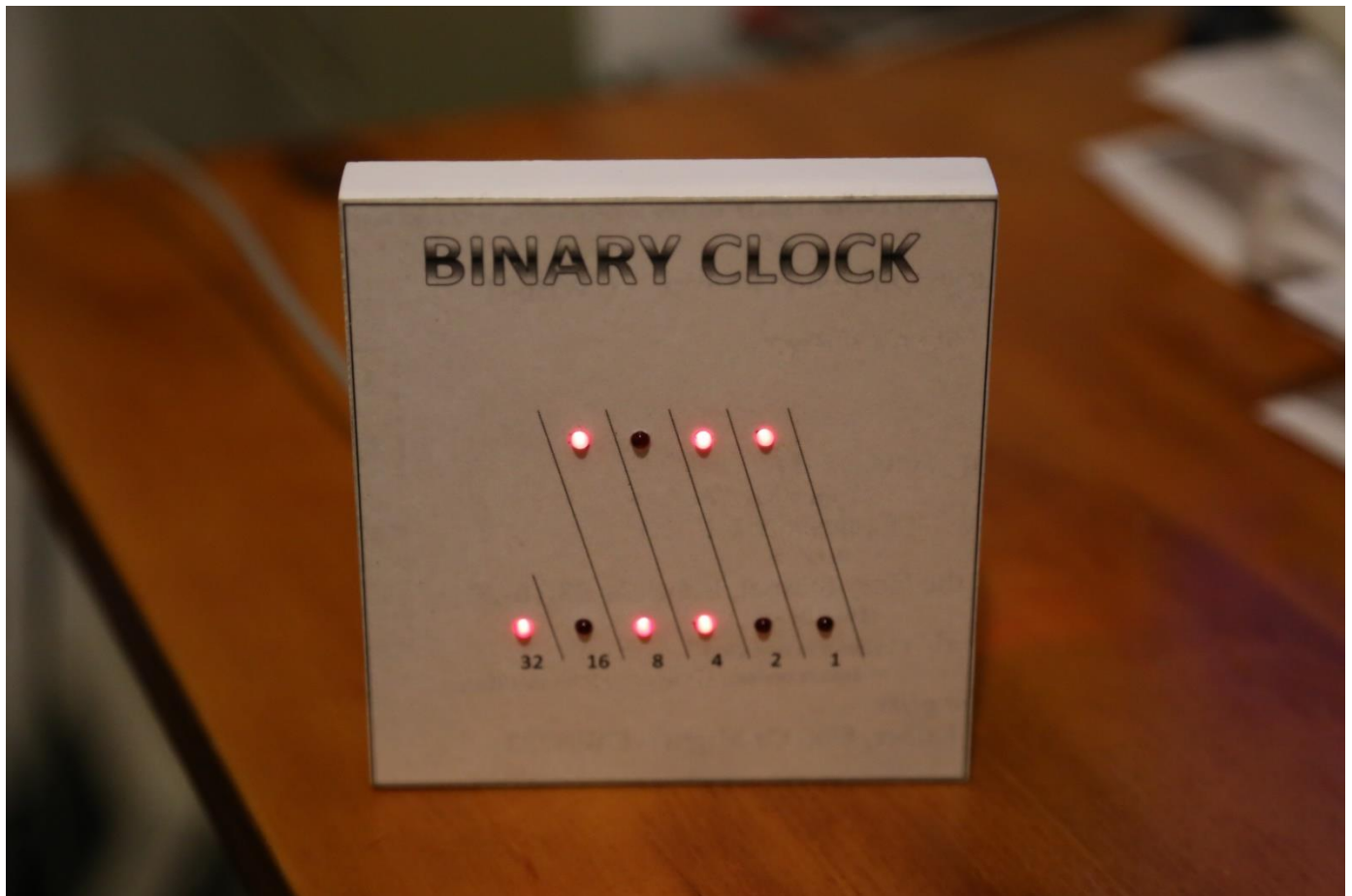
So is it perfect, No. did it all go smoothly, No. Have I learned anything for my next build, hopefully? Making front panels is one problem that I have yet to perfect. Years ago there was this material called Scotchcal, or something like that, it came in several forms, and was quite popular in the electronics magazines. It was 'done' much like making a circuit board, using photographic techniques to transfer an image to the blank material, then one would rub it with a special chemical that then removed all the excess material, just like removing all the unused copper from a blank circuit board. However it was discontinued many years ago.

Another one was using rub on letters, using 'Letraset', however it was quite fiddly, especially getting the spacing right. Creating lines of wavy text was way too easy!

Creating an artwork on a modern computer is so easy these days, it's just being able to print it onto something that is durable is the problem. There are plastic films available that are compatible with laser printers and others for inkjet printers, but I doubt you'd find this material at 'Officeworks' etc. So I'll persist with paper for the time being. Protecting paper and making it long-lasting are my problem for now.

So what is next? Actually the binary clock is not an end, it's actually a midpoint distraction to making a Nixie tube clock. The driver IC's I plan on using are TTL 7441's, these need BCD data to drive them almost what I have coming out of the Arduino at the moment, it just needs a few minor tweaks and I'll have BCD data rather than straight binary.

Paul VK3TGX

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

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70cm Repeater Seaview VK3RWD In 433.575MHz Out 438.575Mhz CTCSS 91.5Hz
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