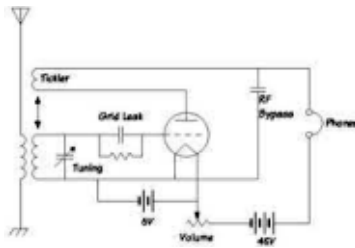


I started this article a number of years ago as a blog to put up on my web site, but it has remained shrouded in secrecy in a corner of my computer and added to from time to time. I had been reading with interest the articles that have appeared in OTN from various amateurs regarding their entry in to amateur radio and thought I might bite the bullet and jot down my own memories. I found looking at photos of the various activities mentioned in this article piqued my interest and provided additional material which had been long forgotten. Hopefully this might encourage others to look at any photo's they have of their own various radio activities and do the same [and send an article in to OTN!].

From the Beginning

My family had recently moved to Ringwood [30Km East of Melbourne] for my fathers work when I was around 12 years old. One day when looking for something to do, I found the circuit of simple one valve receiver in one of my mothers' old physics books. I tried to replicate what was in the book with an old tube out of a valve radio, however it blew up, mainly due to applying 12v to 6v heaters - no idea at that stage what the voltage



should have been! I tried a few more valves - same result! Stumbling across a valve with 12v heaters, The valve started glowing a deep red colour [the heaters that is, not the plates!]. The start of the learning experience. Plate supply was 12v DC [woefully inadequate] from an old train transformer which was not smoothed in any way, so it would have had quite a lot of hum if it had actually worked! The whole lot was breadboarded over a desk - no real idea of what I was doing at that stage. Looking back it was probably best the rig did not work - I was certainly not ready to deal with the voltages that were needed to actually get something like this working.

Of course one of my first real 'projects' was the mandatory crystal set. This actually did work and I found that with a larger antenna and a lot of wire I could hear far more stations. This provided many hours of fun and allowed me to start getting an idea of how to put things together following a circuit diagram. It was good to have a success story after my first attempt at a making a radio.

Introduction to valves

My first major project was an AM radio built with valves, a regenerative three tube type for my younger brother. I had found the circuit of this particular AM radio in one of the magazines around at the time - Electronics Australia comes to mind. This was built in the old 'rats nest' configuration. Rats nest is a term that was applied to the way old valve radios, and other electronic equipment of the time, were wired under the chassis. Basically point to point wiring connecting

the components together. Often layered with the components on top of each other as the space filled up. It was a style of construction that was difficult to work on if there was a fault, due to having to remove some components just to be able to test them.

My father made a box to contain the electronics and it gave good service for a number of years. The valves had been collected from old radios and only a few components had to be purchased.

I was also asked to fix some old radios for friends of my parents - some were easier than others. I remember fixing a 'treasured' mantle style radio for my grandfather which had a loud hum. This turned out to be dry electrolytic capacitors in the power supply. Thought I was doing well to be able to identify and fix the problem. After ratting some electrolytics from another radio that was being used for parts, I replaced the capacitors and returned the radio.



The amplifier section of a Playmaster

The Playmaster Amplifier

By now I was getting more confident with constructing bigger projects, and my next major activity was to build a Playmaster stereo amplifier, which most old timers would remember. I had convinced my father that our old AWA Radiogram [mono] needed to be upgraded to stereo, and that would require a new amplifier and speakers. The

Playmaster had a number of versions, starting off with valves in the sixties and moving over to transistors in the seventies. This particular design used 2 x 6BM8 dual triode/pentode valves in each stereo channel. They were configured in an ultra-linear mode which had a multi tapped output transformer. I built the main amplifier on a chassis which was hidden inside the cabinet of the family radiogram, which I had butchered to install the new amplifier and electronics. There was a separate control panel that contained the input switching, volume and tone controls. The high impedance input allowed the radiogram crystal phono cartridge to connect directly to the amplifier.

This was a fairly major change to the type of equipment I had built to date, and I learnt a lot from the experience. The tuner and turntable were all that was left from the original radio. I had to replace the mono cartridge with a stereo one but that was about all that needed to be done to upgrade the system to stereo. I had hacked the AM radio tuner to provide a line level signal to the new amplifier, so all the old functions were retained. Again my father assisted by building the cabinets to mount the new stereo speakers to go with the amplifier. Everyone was impressed with the new stereo system. [Secret sigh of relief when it all worked!].

The KT88

By now I had developed an interest in valves and had started to get quite a collection. Somehow I managed to obtain two KT88 valves. I think I was just fascinated by the 'look' of this glass envelope and its size. The KT88 is a Beam Tetrode. 2 x KT88's would produce 100w of audio in push-pull [Class AB1]. I discovered that the tube had the same pin out as a 6V6. I know what you're thinking! Yes - you could interchange them. After much trepidation, I tried swapping the 6V6 tube of an old valve radio that was lying around with the KT88 and it actually worked! The sound quality certainly improved - I would be surprised if the KT88 radio delivered more than the rated 4.5 watts of speaker power available from the 6V6, but there was certainly an improvement in distortion at higher listening levels! The radio showed some signs of stress [a dimming dial lamp!], providing the extra current for the filaments. If I turned up the volume enough, the dial lamp would also modulate in time with the audio, but otherwise it survived OK. This interest might have marked the start of my 'experimentation' in the field of electronics.



The KT88

The Youth Radio Scheme

The founder of the Wireless Institute Youth Radio scheme was Rex Black, VK2YA [1912—1997]. Rex ran radio clubs in the schools where he taught, and encouraged many young people to become radio amateurs through the scheme He set up. Rex was vehemently opposed to the growth of CB radio, seeing this as the thin end of a wedge. He was also a member of the Wagga Wagga Amateur Radio Club.



The Youth Radio Scheme Badge

My first move into electronics came while I was still at school. The Youth Radio Scheme [YRS] was one pursuit that was available at the time for a young person to get in to radio and learn about the 'new' world of electronics. This involved learning the resistor and capacitor colour codes, something that has been of

use ever since, as well as getting a general grounding in the field. There were various levels available, Beginners Intermediate and Advanced, with appropriate certificates [and a badge] issued on the passing of the relevant exam. It's a pity that this type of experience does not exist today, as it would be a good way to introduce the hobby to a younger generation. It was a wonderful way to get in to electronics generally, and provided much needed peer support for those who wished to continue on with some form of development in this medium.

The staff member responsible for supervising the Camberwell Grammar School [CGS] radio club was Jack Treen, a Geography teacher. Another teacher, John Hanken, helped teach morse code to those going for their full radio license. John had morse code experience during WW2 and was still able to do some 20 words per minute.

The CGS radio club managed to get a space in the lift well of an old mansion, Roystead, which was used mainly as a staff room in the downstairs area.



Roystead

The machinery in the lift well had been removed long ago and was hidden behind a door. It was basically a vertical space. There was one teacher who lived in the upstairs area flat, which also had a darkroom for the photography club. This was Roy McDonald, the latin teacher and photography club supervisor. He

had a number of Siamese cats which prowled around the general area. We often joked that in our radio room, there was not enough room to swing a cat [which was true], thinking about the cats upstairs. Well before we got our radio licences, some of us had built some basic transmitters. We were testing them out one day in our "clubroom" when Roy McDonald came down and started complaining that he could not hear the ABC news, as our signal was coming through loud and clear over the top of 3LO [now ABC 774]. The transmitters suddenly disappeared and were never seen again!

I was fortunate to have others who were also interested in radios, transmitters and the like. Chris Holliday VK3JU, now VK7JU and Mike Goode VK3BDL, were also students of the school at that time, and I have kept up with them to the present day. They were both members of the CGS radio club and we shared the common interests of radio together in our later school years. All three of us have now ended up connected with RAOTC in various ways.

Lucky for us, the school had just purchased a property, another old mansion called 'Highton'. It was to become the music school, but there was a spare room that Jack Treen had managed to get for us out the back, and gave us a huge space to run the radio club.

The school eventually managed to obtain an amateur radio callsign VK3BCG. While the official callsign was Bravo Charlie Golf, It was me who suggested "Bravo Camberwell Grammar" as a possible alternative! It was Chris [VK3JU] who managed to get the school callsign by going directly to the Radio Branch .

I'm not sure where the club transmitter came from, possibly a disposals store or donation. The 'rig' consisted of an AWA [Amalgamated Wireless Australasia] - AT5 aircraft transmitter. This was modified for AM operation with a 'clamp tube' modulator [6V6],



An Ex RAAF AT5 Transmitter

which fed the screen grids of two type 807 tubes in the final, and could pump out all of 50W. The receiver was an AR8, and the antenna was a G5RV, which Chris VK3JU had strung up to a tree outside the radio room. This activity provided hours of fun at lunchtimes and after school, kindling a life long interest in amateur radio. The radio club was also seen as a good way to get out of sports practise - possibly

one reason that led to its popularity!

The main bands used were 160, 80 and 40 metres. The unit was tuned by looking for a dip in the plate current combined with maximum output using an RF ammetre in the antenna line. Many contacts were made around Australia, opening up the 'world' as it was to us at the time. In the pre-internet/pre-mobile phone era, 'the world' was defined by young people in a completely different way.



Signed photo from back of licence

I obtained my limited licence in 1969 and was allocated callsign VK3YBP. I had passed the regulations exam first time but required a second go at the three hour theory paper to get the required 70%+ pass mark. The date of issue was 24/10/1969.

These pimply schoolboys went on to be involved with Amateur radio for the rest of their lives.

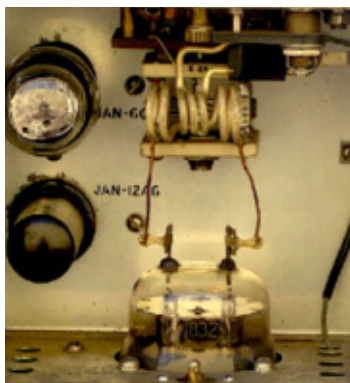
My first experience on air from home was on 2 metres. Detailed information regarding a transmitter for two metres was hard to get as there was no internet - and not much information readily available, at least to me at the time.

The station was gradually cobbled together from bits and pieces collected from all over the place. A 3ABP 2m convertor was obtained and fed in to a broadcast receiver [valve] which I had 'scrounged' from somewhere. Luckily this had an RF stage [and three short wave bands] so it was better than a lot of radios around at the time. The problem was that the convertor output started at around 1.6 Mhz, and so the radio setup as a tuneable IF barely managed to tune the 144 Mhz AM portion of the band.

I built my first transmitter in 1970, which in those days and was a standard configuration consisting of a 12AU7 3rd overtone crystal locked oscillator, 12AT7 doubler and a QQEO3/12 [dual beam tetrode] final producing around 10 watts of output on 2 metres. [OK, I admit to sometimes over-driving it till the plates got red just to squeeze a few more watts out of it!]. An old speaker transformer was pressed in to service to modulate the final with an audio amplifier which had been given to me from a friend of my mothers. It had a 6AQ5 pentode [4.5W] as output. I wonder how many old timers remember this kind of configuration, possibly also as their first attempt at getting on the air!

Eventually a copy of the 10w transmitter described above was built into an old SCR 522, [bc625] aircraft radio chassis. This unit originally had a mechanical switching system for the receiver and transmit channels. The original design frequencies

for the SCR522 were 100-150Mhz. It was widely used in WW2 through to the 1960's by the military for ground to air VHF communication. The chassis, which I had secured from somewhere, was used mainly for the modulation transformer contained therein. This involved stripping out all the old mechanical switching gear and electronics in order to access the internals and make space for building the two metre transmitter. I remember admiring



The output stage of a Type 522 Transmitter

the strip line output stage and the driver [a type 832a dual power tetrode driver and another 832a as the final PA]. My new transmitter was built to the same specification mentioned above in the 522 chassis using a QQEO3/12 as the final. I still have the 832a valve and its ceramic socket!



The 832a Tetrode

The 832A, (MIL type VT-118) is a spacey-looking tube. It's a small version in a series of these double tubes, which its big brothers could produce upwards of 1 Kw each. It has a centre-tapped heater, and is usable (with lower ratings) to 250 MHz. The ARRL handbooks of the 60's have designs for this

tube on the 220Mhz band [US only]. It was also used on the 144Mhz band.

Eventually I managed to get a circuit board to build a 20db FET two metre preamp for the 3ABP converter, which improved reception markedly and allowed me to hear a lot more activity on the band. I then built my first 5 element yagi - again further increasing ability to hear weaker signals and making for more interesting operation on the band. It was certainly an improvement on the 2M dipole that I had initially constructed in the hurry to get on air! The yagi of course was turned using the 'armstrong' method.

I had also made a 'rookie' error in determining the frequency output for my transmitter. I had eagerly been waiting for the new crystal which had been ordered from Hy-Q crystals, but as it turned out, the final output frequency of 144.27MHz was far too high. Noting that most of the activity on the 2m band was between 144.1 and 144.2Mhz, and that there was often doubling due to the many people crowded in to that segment, I thought it

would be smart to choose a frequency of 144.27 Mhz, hoping I would get a clear run. Problem - most people stopped tuning at 144.2Mhz as they thought there was no activity beyond that point [which was correct!]. I also had a problem that my converter/receiver would only tune to about 144.15, so it was not possible to hear some people that did call back! As it turned out, no one actually tuned up as high 144.27 and there was no one there listening! The main reason I was calling away madly but not getting any response.

I must thank Kevin Phillips [was VK3ZYP, now VK3AUQ], who lived just around the corner in Ringwood East. Kevin was a graduate of the [then] PMG training school. He was able to assist in adjusting the tuning of the receiver mentioned earlier, which I was using as a tuneable IF. Once the word was out on 2m that there was actually a station on this higher frequency most people did bother to tune higher in the 2m band and I finally managed to get some contacts!

Kevin showed a lot of patience helping me get started in the realm of amateur radio and deserves special mention here as an example of how a little help at the right time can make such a difference to ones experience in a new field of endeavour such as amateur radio. He started at the PMG training school in 1965 and had preferred radio. His training took place at the Tooronga training school and included on the job training at locations such as High Park receiving station near Kilmore, Radio Lyndhurst, Radio Australia at Shepparton, TV transmitter sites at Yatpool (Mildura) and Mt Baranduda (Albury/Wodonga), along with Radio Installation and Maintenance sections. All of these sites had active amateurs. One of the instructors at Tooronga, Tony King, got his full call (VK3IO) and it enabled the Tooronga radio club to get the full call VK3API. A number of the instructors there were also amateurs.

I have vague recollections of working VK3API from school as it was one of the few stations active during the day. It's a pity that in house training has now moved in to the commercial arena. I know of many amateurs who had moved into radio this way and it's disappointing that this path is no longer available.

Kevin collected me on his way to the monthly [Melbourne] fox hunt. He also provided lots of advice and help, and introduced me to others active in the radio scene of the time [Gil Sones VK3AUL, Les Jenkins VK3ZBJ, Robbie Wilkins VK3AUR, Eric Gray VK3ZSB and many others]. Kevin also drove me to WIA Victorian Division meetings at the club rooms on Victoria Parade, East Melbourne. This was the headquarters of the Victorian Division of the Wireless Institute of Australia [WIA] and was very active at the time.

People like Kevin may not realise how much their

help was appreciated. He certainly paved the way for my introduction to amateur radio to another level. My association with the WIA started after going to the meetings with him and seeing just how extensive amateur radio could be.

There was also WICEN - [Wireless Institute Civil Emergency Net], which had a much more direct involvement in emergency activities than it does today, due to the ability to provide mobile communications in a [fixed!] phone free environment. There were no repeaters available at the time and so line of site was the primary way communications were designed. Many exercises were held and there was a team of experienced people who could respond to the call for help, and manage radio traffic at very short notice. This gave me a deep insight in to the management of radio traffic in a pressure situation. I also found this to be of great use when dealing with 'dogpiles' on various bands during contests later on.

Lord Somers Camp Technical Department



Lord Somers

Lord Somers was appointed Governor of Victoria from 1929-1931, and started the first "Governor's" camp at the Angelsea Scout Camp site, Victoria, in January 1929. Another camp was held at Angelsea in 1930 while the permanent camp was built at Balnarring East, in Western Port Bay [later to become known as Somers]. Apart from a break during WW2, A camp has been held on that

site every January since 1931 and continues to this day. The first camp had its own PA system and technical department, which apart from general announcements, also played music. Films were also screened.

I was introduced to Lord Somers Camp and Power House [LSC&PH] by one of the staff at Camberwell Grammar School, Art teacher, Ron Wootton. The School used Lord Somers Camp for its annual Art Camp in the September school holidays. I attended a number of these camps over the years between 1965 and 1969. The camps ran for a week, so I had some familiarity with the camp and its layout. During one of these camps I was able to get a look inside the 'Technical Department' and saw some of the equipment therein. It was not until after I had left school that I finally managed to get down to one of the annual 'Big Camps' in 1971.

These camps were run by Lord Somers Camp and Powerhouse and were held in January each year.



The Radio Room at Lord Somers Camp 1970

The camps had some 250 people [100 groupers and around 120 staff plus guests etc]. LSC&PH have 16mm footage of the first Big Camp held at Angelsea in 1929, which I have digitised. I also found a newspaper story listing the technical department equipment of that camp which would make another article in itself.

I was appointed to the technical staff as a first year staffer. The technical department ran the local closed circuit radio station [At that stage it was called 3SBS for Somers Broadcasting System], and maintained the amplifying equipment and speakers. The technical department also set up microphones and P.A. for various events and in the mess hut for breakfast lunch and dinner. There was also a requirement to set up PA facilities outdoors. In addition, bugle calls were played to wake people up in the morning [Reveille], Call them to meals [first and second sittings, breakfast lunch and dinner], and put the camp to sleep [Last Post]. There was also a Cinema Officer who screened 35mm films on the Saturday and Wednesday evenings.

You can see what the radio room in the technical department originally looked like when I arrived in 1971 from the front cover photograph. It was like going back in time to another era. [It WAS going back in time to another era as I found out later].

The original radio system was constructed of a series/parallel speaker configuration fed from a 35watt amplifier. This caused much consternation, as when any of the series speakers stopped working, for whatever reason, a whole group of speakers would go off Christmas tree light style. Many hours would then be spent looking for the offending speaker. Being close to the beach, sea air would eventually lead to the demise of many electronic devices. The system was installed during WW2 by the RAAF who took the camp over for the duration of the war. If you can imagine 35+ speakers connected variously in series and parallel

to eventually end up with something approximating 16 ohms then you have some idea of what it was like to add/fix anything in the system. The speaker control panel consisted of switches which had resistors in place in the off position to try and keep the load constant if a speaker or speaker group were switched off.

In my second year at the camp I was promoted to Technical Officer as the previous T.O. had left to go interstate. As it turned out, no one else who attended these camps knew how to manage the 'beast' of the radio system, or had sufficient skills to run the radio station and repair it in real time as things broke down! Over the ensuing years I replaced the messy series/parallel speaker system with a 100v line system. This increased the reliability of the radio broadcasts and allowed a desperately needed expansion of speaker coverage to the newer areas of the camp.

Initially there was a library of some 1000 78rpm records [mainly classical] stacked in the room next to the radio area. These had been donated by a local radio station many years earlier and were at one stage used to provide music during the camp. Within this collection were sets of classical records [whole symphonies and musicals] - sometimes up to 10 in a set. Normal 78rpm records could only play around 3-5 minutes per side, so to get through a whole symphony required multiple records. The opera sets had even more records in them. Plenty to do just to keep the music playing. By the time I got there the 78 records were hardly used, and were eventually removed. A number had been used as prop records [and broken], and the others were taking up valuable space.



The Radio Room at Lord Somers Camp with new mixer in situ circa 1978

The turntables had been donated to the camp by a local AM radio station along with the collection of 78rpm records. They are 16" Byer transcription turntables which were designed and built by Byer to use the 'extended' play 16" 78rpm records. Blank 16" disks were manufactured locally for use in radio stations [all of 15 minutes on one side!]. The blanks were cut directly with a cutting lath connected to a recording source [a radio playing from

a studio for instance], and for a number of differing applications such as recording speeches and other news events. Max Byer was a local manufacturer who made these turntables and the famous 'Byer 66' reel to reel tape recorder [see section on Byer elsewhere]. They were mainly used in radio stations. Hi Fi buffs would seek these turntables out because of the longer tone arm [less error when tracking 12" LP's]. You can get an idea of their size in the photograph, as there is a 12" LP playing on the turntable to give it some perspective.

In the middle is a cassette player, considered 'new' technology in those days, a console microphone and 5 input audio mixing panel which had a 12AU7 in it as the active component. Above that is the speaker switching system which controlled the various areas around the camp. On the left is a reel to reel tape recorder and the 'standby' amplifier. Sitting on top of the standby amplifier is an AWA - AM radio tuner, with the main amplifier on the shelf above. To the left of the main amplifier is the monitor speaker, often causing a howl of feedback as it had to be turned down manually when the console mic was turned on!

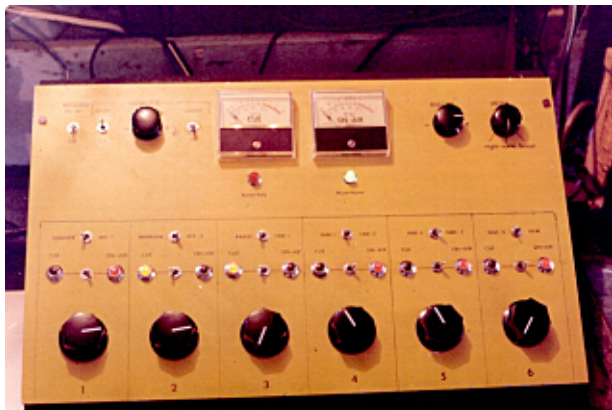
The PA system had 2 x 6CA7 tubes in a push pull configuration which could produce some 50w of output. There was a 100v line output which was used when converting the camp speaker system to a 100v line system. This conversion was done over many years and was done hut by hut. The speaker distribution panel above the mixer allowed isolation of various area in the camp and all outside speakers could be turned off at night [placating the neighbours]. I spent many hours crawling through the roof of every hut in the camp replacing cable for the newer 100v line system as I went. New cable for additional areas of the camp was added as required. My time as technical officer gave me much experience in a number of facets of radio and electronics, with both on air and other duties as part of my responsibility.

Below the reel to reel tape recorder is the 'Master Control', an unreliable hotch-potch of switches for engaging the console mic and line inputs for external devices.

The photo above shows the first round of modifications to the old setup. A new FM/AM radio tuner [for the FM radio mike - a major upgrade at the time], movement of one of the turntables to make way for the new mixer unit, and removal of the old standby amplifier which had outlived its usefulness as it had no 100v output, and could not be used with the new speaker distribution system.

Thanks to a donation from the Powerhouse Rugby Club [of around \$300 at the time], A new mixer to replace that in the 1970 photo was designed and built by myself. It solved a number of problems

with users who had little [if any/mostly no] knowledge of on air production. It came after I had set up the 3OZZ-FM test radio station and was based loosely on the Phillips broadcast mixer layout that was used in that configuration.



Closeup of the the mixer built to replace the old valve mixer in cover photo

I was quite proud of this unit when it was finished. It had an inbuilt limiter [to stop over driving the amplifier], and some floating gain of around 6-10dB to allow for people talking off mic [which happened quite a lot]. It also had a ducking control, which reduced the output of the mixer so that the announcer could talk over the top of music without having to manually turn a knob. This activated when the console mic was switched on. A boost control was installed to up the output for announcements and also linked to to console mic switch. Seperate cue and on air outputs were provided to allow cueing to take place without affecting the current content being broadcast. You could also record from either the cue or on air outputs. Quite a lot for a small box at the time and a lot cheaper than paying thousands of dollars for a professional unit, which LSC&PH simply did not have. It also satisfied the requirement to be simple enough for people to use with minimal training and reliable enough to keep working under heavy usage.

There were also 4 x 35mm projectors in the room next door. Two projectors were installed during WW2 by the air force who had taken over the camp for the duration of the war. These were manually fed arc lamp projectors which pointed inside the mess hut. There was also an outdoor theatre, and the other two projectors pointed outside. The inside projectors no longer worked when I turned up, and they were disposed of to make room in what was a very crowded space. The other two 'outside' projectors were far more recent [1950's], and I watched with interest as the "Cinema Officer" struck the carbon arcs and tuned them to maximum brightness. With each reel only lasting 20 minutes, there was work to do changing reels, threading the projector with the next reel, and changing carbon rods as required. Thankfully

the outside projectors had automatic control of the carbon rods [unlike the 'inside' projectors] and there was no need to keep feeding them in by hand. The winding motor was simply connected across the power to the arcs and would run faster as the arc drew longer, and slower when they came in closer together, [voltage across the arcs would change as they were wound in]. A very simple solution to a complex problem I thought at the time. I was appointed Cinema Officer a few years later when the person doing the job was no longer able to continue.

By this time I had also changed the call sign from SBS to 3RS-FM. 3RS had not been used in the past due to other uses of the abbreviation RS [you can work it out]. This change however was a sneaky method of getting people to actually take notice of the radio and worked well in upping the profile of the station. It also helped with any complaints about the station and content. Your answer would be "Why do you think we are called 3RS!" The FM band had just started to be opened up and is why FM was added to the call sign.

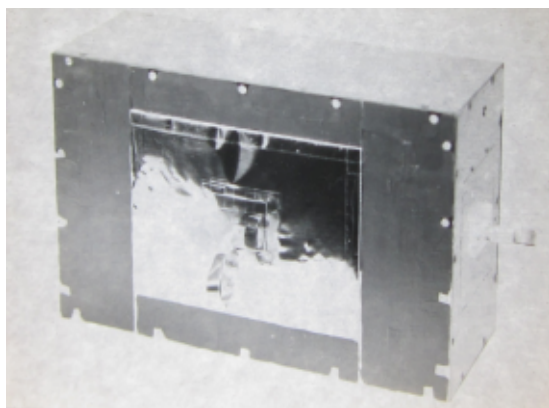
One item of equipment discovered in the technical department that concerned me was the automatic 'camp fire'. Normally a fire would be lit at the end of camp on the Friday evening [with appropriate permits obtained]. The whole camp gathered, sang songs and listen to a few speeches. If it was a total fire ban day, the automatic camp fire would be pressed in to service. I inspected the 'virtual' fire and saw it was a death trap. It consisted of an old windscreen wiper motor rotating a metal cylinder. The cylinder was connected directly to the mains 240v, with four wire brushes made out of coat hanger wire going to 240v power sockets mounted on the side of the box it was built in. This was to give a flickering effect mimicking a camp fire. Not even a fuse for basic protection. Something that would never happen today [one hopes!]. It was disposed of with haste.

WIA - Victorian Division

Originally the WIA Victorian Division [Vic. Div.] clubrooms were in a building on Victoria Parade in East Melbourne. There was a regular turn up to the monthly meetings which often featured a talk or lecture on things of interest to radio amateurs. An interesting story was told about how the Vic. Div. club rooms in East Melbourne were originally purchased. One of the committee overseeing the purchase had found a hole in the floor of the property that the agents had covered up with a piano. When the premises were open for inspection, certain unnamed people would move the piano to reveal the hole. The agents would move the piano back but mysteriously the hole seemed to reappear. [The strategy being that people might lose interest if they saw the condition of the premises - thereby making negotiations easier with the vendor.] The premises were

consequently purchased by the Vic. Div. and were in use for many years as the backbone of amateur radio in Victoria. Weekly broadcasts also emanated from the clubrooms with some relays on other bands being taken by others in the area.

I remember in particular one Vic. Div. meeting on an evening in the early 1970's that was addressed by Les Jenkins [VK3ZBJ]. Les was integral to the Oscar satellite project and was giving a lecture on the satellite and how it was prepared for launch, including its travel to the USA. Apparently there were some difficulties when arriving in the USA, as the satellite had been brought in as 'hand luggage'. However the customs officials could see that it was not something 'normal' and it took a great deal of talking to get it through the security area as there was no tick box on the form for 'satellite'! After much negotiation it was eventually designated a 'personal radio' and went through



Oscar A05 in pre launch configuration with the tape measure antennas

with the rest of the satellite team.

He also described the difficult problem of finding a suitable antenna for the satellite. It needed to be folded up for the launch and then deploy once in space. Many different wires were tried but none would fold and spring out as required. Les then produced a metal tape rule and pulled it out as he described how the antenna was eventually made from two of these for the grand sum of about \$2. There could be no mistake in the antenna length as the calibrations were already on the metal tape!

Then there was another problem communicating with the satellite once it had been launched. A particular problem had developed with the telemetry and it was becoming increasingly difficult to communicate with Oscar. Facing the possibility of losing control, a fix was determined, but there was difficulty in getting the command to the device. Les related the story of how the power from his transmitters was increased in order to achieve the desired result with meters flying off the scale, and NOT looking at them as it MAY have meant he was over the permitted power limit! - laughter from the assembled audience.

The Vic. Div. had components for sale specific to radio use that were hard to source such as Neosid coil formers, various VHF power transistors [which were quite new at the time], Ducon components [capacitors], and those new fangled 'green caps'. A member was designated to be in charge of bringing a large toolbox with all the 'goodies' in it to various meetings of the Vic. DIV., and to other radio clubs at the time. There was usually a queue of people lining up to collect various devices for various projects. Someone had designed a transistorised crystal based circuit board which produced about 1w output on 144 Mhz. You could turn it into an FM transmitter by modulating the crystal. I was fascinated by this as it could be used as a driver for a 10 w transistor power module. It was also possible to drive the QQEO 3/12 valve transmitter I was currently using.

Other People in Radio

Tony Sanderson, VK3AML [Silent Key], was king of 160 metres in the late 1960's and early 1970's. His callsign has now been re-issued to Chris Long. Tony led me [and many others I suspect] in to the 160m band. I first heard Tony when listening from CGS originally before I had a radio license. He had the best signal on the 160m band and His station sounded more like a commercial broadcast station. A pair of KT88's [referenced elsewhere in this article] were used in his AM 160m rig for the modulator. Some old timers may remember VK3AML - who 'owned' 160 metres at the time. New holder of the VK3AML callsign, Chris, has been surprised at the number of people who still have memories of Tony and his AM station or think Tony has been resurrected. He has heard the phrase "I thought you were dead!" many times. An indication of the strong relationship between a callsign and the operator that can develop over the years.

Gil Sones VK3AUI was another amateur who was active during this time. I learnt a lot from Gill, borrowing his FM 'carphone' on a number of occasions. Kevin Phillips [VK3AUQ] would often call in to pick up Gil with myself on the way to the monthly fox hunt. Gill had a large antenna farm located in Surry Hills, Victoria. He also kept an eye on the 27 MHz boys who insisted on trying to disrupt licensed amateurs by creating interference and using profane language on the amateur bands. Unknown to the 27 MHz 'ers, Gil had rather good direction finding equipment, and in league with other amateurs was able to get a fix quite quickly on some of the offending signals [down to their actual address if an amateur with a mobile sniffer was available]. This information was often passed on the the local RI [Radio Inspector]!

I also discovered stores such as Magrath's and Radio Parts, and later Dick Smith for component parts. Ham Radio Suppliers and various disposals

shops such as Walthams Trading Co. There was also Hy-Q crystals, where the crystal for my first rig was purchased.

I was not really aware at the time of the depth of experience in the people I was associating with. Being a young person with lots of other interests, I found radio could be quite a lonely experience, and there needed to be a balance between radio and other social commitments at the time. It was also difficult to have radio conversations with people who did not have a background in electronics. My enthusiasm sometimes got the better of me but soon I could see people had no idea of what I was talking about. For a while there were periods of time where I did not do any radio at all, but eventually came back some years later and picked up from where I had left off - albeit with much more modern gear and after a number of different living locations. I note that there are/were a number of amateur radio enthusiasts that had the same experience during their younger years.

Another example of assistance in my early days of radio was from Robbie Wilkins, VK3AUR [Silent Key]. Robbie was active in the WIA Vic Div at the time and drove me to a weekend radio convention at Mount Gambier. It was great to meet others from interstate and see the workings of a convention. The disposals and junk [other peoples treasure?] on display was most interesting.

VK3's who were living in the Melbourne area at the time would be aware that there were only three simplex channels available. These were FM channels - A, B, and C. There was no formal band plan! Rigs for the FM channels were usually modified 'carphones' or taxi rigs that were manufactured both locally [Vinten] and overseas [Phillips/Plessy]. They were usually set up for a single channel. Some units were modified with a switch, but many unmodified units required pulling out two crystals [for transmit and receive] to change channels manually.

Time moved on and I was able to make some pocket money fixing old radios for various people. Main faults included humming due to dried out electrolytics, replacing capacitors that had turned into resistors [you know what I mean], replacing faulty valves etc. This helped me to gradually increase my knowledge of all things valve, but transistors were on the horizon and valves were rapidly becoming obsolete technology.

After leaving home in 1970 to be closer to my studies, [Film and Television], I started fixing old B & W TV sets. The thought of getting extra money to help me while doing my course at Swinburne College of Technology [now Swinburne University] was a good incentive. Little did I know that the learning curve was going to be very steep, and it often took many hours to find and fix [or not

fix!] a problem. It turned out that I would have to write off many hours as self education as it was not possible to charge for all my time as had first been thought. The outcome was that I learnt a lot, but it did not become the earner I had hoped. I did end up with a room full of black and white TV's in various states of repair, eventually having to throw most out due to lack of storage space [and the ability to fix them with my limited resources].

With the advent of colour TV on the horizon, this became less of an option. Getting into colour TV servicing was something I avoided, as by this time I was well aware of the complexity and knowledge required to be able to service such units. I did learn a lot from 'The Service Man' - A column in the 'Electronics Australia' [EA] magazine which Most OTN members would recall in its various forms and formats [Such as Radio TV and Hobbies]. I did learn many practical things in the pursuit of fault finding, something that requires a very methodical approach and sometimes a lot of 'pure arse' in tracking down a problem or at least localising the problem to a specific area.

The world of the transistor was expanding and valves were being left behind in the technology race. In order to understand more about transistors I started to develop projects using these 'new' devices - again with help from magazines such as EA.

I did have a copy of an old American Radio Relay League [ARRL] handbook from the sixties, not sure where it ended up. This provided me with some excellent material regarding transmission and reception of radio signals. The first radio book I actually purchased was the ARRL "Radio Amateur's VHF Manual", 1972 edition. It was exactly what I had been looking for in regards to material specifically on my area of interest. I was fascinated by the myriad of designs contained therein, and the size of the transmitters that could be built in the USA - up to one kilowatt!

Swinburne College

A number of events occurred during my student days at the Swinburne College of Technology which added to my knowledge of radio and electronics - most of them not related to the course I was doing at the time!

Student Union

Not long after starting my new course at Swinburne, I started taking part in some Student Union activities. This included organising a closed circuit radio station which played in





In the student union office 1971

to the cafeteria area and student lounge. Construction included building a mixing console and turntable system, console microphone and the speaker boxes. The speakers were installed in cafeteria area one weekend while no one was around, as we had never sought permission from the administration! It was the designated student area, so no staff went there anyway.

I also ran for and got elected to the position of Communications Officer as part of the Student Union Executive. The communications Officer had responsibility for the monthly student newspaper SCRAG [for Swinburne College RAG], and other communications with students such as the weekly activities sheet. There was a layout room attached to the Scrag office. All pages were laid out manually on tables. Copy came from an IBM proportional spaced type writer and marked up by hand. My first experience at desktop publishing - using a real desktop! All photographs were collated and sent to the printer who screened them for inclusion in the paper at indicated places.

The Swinburne Radio Club

The Student Union had funds available to support the various clubs and societies that had formed to cater for the differing interests of the students. The most famous club was the drinking club. This club was formed simply to drink any grants it received at the local pub. It tended to have a very short life span as the funds ran out very quickly. The radio club also received some money to go towards the purchase a few items of equipment.

I was involved in the radio club, which had decided to work towards the "Worked all Parks" award. There was only one other person in the club at the time with an amateur radio licence, However the others all had an interest in radio. One of the trips involved a visit to Mt Eccles [overnight], in western Victoria. We used my rig and antenna. A small tent was set up but there was not room for everybody, so I ended up sleeping in the car. The highlight was a 2m VHF contact in to Mt Gambier. I woke up the next day to the sound of the generator being started - and then a series of groans from members of the group. Initially I thought something was wrong. As it had turned

SHIBADEN closed circuit TV equipment

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out, one of the group had started the 240v generator just in order to use his shaver! Everyone else was sporting an appropriate shadow - bush style - in keeping with the outdoor nature of our expedition.

Film and TV course

The main reason for attending Swinburne was to participate in the newly established Film and Television course. It also introduced me to working as a 'freelance' and having to bill people for work done. It was then I set up and registered my business name of "Art Media Services". The idea being to be able to trade as a company that provided "A comprehensive technical service to the media and the arts." Some 15 years later the internet became available and I set up my web site www.artmediaservices.com.au which is still running today.

The video equipment consisted of a 1/2" "J" standard Shibaden video recorder, 3 B&W Shibaden cameras and a Shibaden video switching console. Very state of the art at the time but quickly newer and better [more reliable!] equipment became available. This introduced me to Isopropyl Alcohol - not for drinking I might add! The heads of the J standard recorder kept getting clogged with regularity. Many takes of shows that had been recorded had to be thrown away because the recorder had put 'noise' on the picture, and in some cases sped up or slowed down as the control track also started clogging. Isopropyl alcohol was the cleaning agent and so much was used that it started to be purchased in 1 litre bottles [via the chemistry department].

There was an effects bank available on the switcher, which kind of worked, but the circle effect was more like an ellipse, and the other effects required a level of skill to use that most of the students did not have. Then there started to be a problem where the tops of the switcher buttons would start to fly off when doing fast switching between camera's. This and other problems with the new video equipment started to give the system a bad reputation as it was becoming unreliable. Nobody in the administration was prepared to take responsibility as so much money had been spent to get the gear in the first place.

Many hours were spent in the TV studio producing content that went nowhere, as it all got thrown out once better equipment arrived [after my time there]. Migrating anything to a different format was almost impossible, and timebase correction was something on the horizon known only to broadcast stations.

Another problem was that the TV studio was situated directly opposite the Glenferrie train station on the Lilydale / Belgrave railway line! This meant that train timetables had to be consulted before a take was made in many productions - those that required live sound anyway. Despite being fully soundproofed, and having a massive soundproof door, rumbling sounds could still be heard inside the studio.

In order to help with the personal finances, I was again doing part time work. It did not take long to introduce myself to the head of the Audio Visual Department, as they were looking for someone to manage the P.A. system. This was located in the 'Ethyl' theatre [named after Ethyl Swinburne, George Swinburne's wife]. I had been attracted to the Bio-Box of the Ethyl as it was used for the annual art school reviews, and had the P.A. system and a bespoke mixer installed alongside a Byer tape recorder. Casual payment for workers in the cafeteria were getting all of \$1 an hour, while us technical workers were getting \$2 an hour. Way to go I thought, finally managing to make a little money doing what I enjoyed doing.

Melbourne State College

I eventually managed to get a full time job as Technical Officer in the Music Department of Melbourne State College [formerly Melbourne Teachers College] in 1974. This was a newly created position and involved setting up a recording studio and electronic music studio in a just completed building on the corner of Swanston Street and Grattan Street in Carlton. The music department occupied the entire 5th floor. Head of the music department, Geoff D'Ombra, wanted someone who was able to build electronic projects that could be used in the analog synthesiser studio. This included such items as ring modulators, oscillators and reverb units. There was also a



Close up of the new mixer in the recording studio

recording studio that needed to be set up. He had already purchased two Putney 'VCS3' analogue synthesisers which formed the basis of the electronic music studio at the time. The photo above shows the EMS [Electronic Music Studio] with the two VCS3's and reel to reel recording gear. A number of analogue synthesisers were purchased over my time there including a 'Mini Moog'.

During my years there I completed building the recording studio and created a number of devices for the Electronic Music Studio. The key to analog synthesis was voltage control. Analogue synthesis used a standard of 1 volt per octave and DC voltage was used to make changes in real time to oscillators and other units connected to a particular device. Oscillators ranged from 0.03 Hz [



The recording studio with mixer, 2 and 4 track tape recorders and JBL control room monitor speakers

two minutes] to 10 KHz. You can see from the pictures how elaborate the set up was. There is enough material here for another story so I will leave the world of electronic synthesis for now and may come back to it in a later article.

There was also a close association with The University of Melbourne music school [at least at the technical level]. The academics always thought their own department was better than the others and never missed an opportunity to badmouth those on the other side. The techs however worked at a different level, and used each other to effectively pool all our department's equipment together in an [unofficial] loans system to help out

3OZZ-FM



The Electronic Music Studio

if additional microphones [or other equipment] might be required for a particular project.

The recording studio had to have a mixing desk, and there were no commercial units available [at an affordable price], so the decision was made to build a bespoke mixer. There were a number of



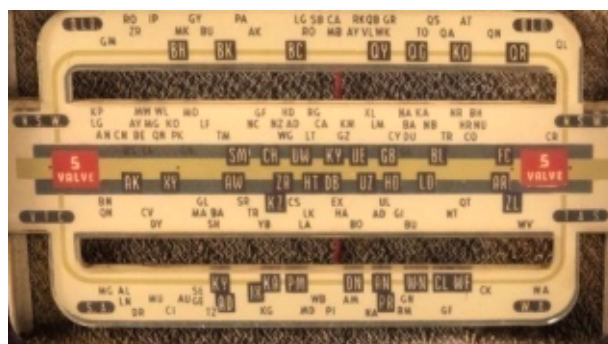
VCS3 and keyboard

demanding requirements for the recording studio, as the area had to support the electronic music requirements as well. Quadraphonic [4 channel] recording was starting to poke its head up and the addition of rear speakers to sound systems was starting to be rolled out. The mixer was a major project which took many months to design and complete. It also expanded my knowledge of the recording process and reel to reel tape recorders. It had 10 x balanced microphone inputs, Equalisation and panning controls and 4 line outputs [for the 4 track recorder]. There were also 6 x line level inputs and 4 x panning modules to allow movement of sound from left to right at the front and rear speakers [and the sides as well!]. The picture shows the mixer in situ with the 2 and 4 track reel to reel tape recorders. There are also some JBL Control Room monitor speakers.

Melbourne State College had a few name changes and eventually became Melbourne College of Advanced Education. I completed my B.Ed [Bachelor of Education] and P.Grad Dip.Ed [Post Graduate Diploma of Education] during my employment there. The college was eventually absorbed into the University of Melbourne, causing me to be made redundant.

After taking a termination package and looking for work for 12 months, I eventually got a job as IT Manager at the Victorian College of the Arts. This job lasted for about ten years. I'll write further about this in another article as there are quite a lot of interesting stories from there which I'm sure RAOTC members would be interested in.

In the late 1960's to early 1970's, there was a big political push to open up the FM band following years of conservative government. The media ownership was in control of just a few people [Murdoch etc], and there was a vested interest in keeping any one else that could be seen as competition from getting on the air waves. The thought that ordinary people might just be able to run their own broadcast radio station was too much to bare! Fancy allowing the public to have access to their own content and the airwaves!



The dial from an Astor 'Mickey'
[c 1952 - Restored by Writer]

Radio dials from that early era of the 1920's to 1960's reflect the fact that you could hard print a dial for a radio with all the stations in Australia, and not have any fear of it becoming outdated. No new commercial licenses were issued in Australia for many years before WW2, and well after that.

Some people may have heard about the 'rogue' transmitter that was transmitting a signal from the campus of The University of Melbourne during the early 1970's. This caused much consternation at the time as there was still a large lobby [Murdock/Packer] which was trying to stop any form of additional radio stations [commercial or public] from getting a radio license. The rogue transmitter was seen as a challenge to the status quo and had to be silenced. It was more about what it represented than the actual transmitter itself. Federal police were called to find the transmitter and silence it. The Radio licensing branch was pressed in to service jamming the pirate radio signal. Try as they may, the transmitter was never found, but the police raided the Melbourne University radio club and took a Yaesu FTdx-400 as a consolation prize. This of course was NOT on the air at the time and the radio club had nothing to do with the illegal transmission [it was in the broadcast band]. The police had needed something to justify their raid, and It took some years for the radio club to get the FTdx-400 back from the police.

I'm not sure if anyone actually listened to this transmission - it was more about public access to the airwaves, and the tight control of what radio



The 3OZZ-FM Radio station

licenses were available at the time. There was a desperate need for more diversity in broadcasting and this was part of the start of a push to open up the airwaves and provide access for other groups to be able to connect with their own particular content.

I was appointed technical manager in early 1976 for a test broadcast for radio 3OZZ-FM at The University of Melbourne. I was also on the organising committee. This test transmission was a pre-cursor for an application for a public/educational license for a radio station in the FM Band [88-108 Mhz]. The transmission frequency was 92.1 Mhz [in glorious mono!]. A consortium had been created between the Melbourne State College Student Union [formerly Melbourne Teachers College] and The University of Melbourne Student Union. My primary involvement was getting the station on air. This involved wiring up and testing the studio equipment, and connecting it all together. The station equipment consisted of a Phillips broadcast mixing panel, 2 x Revox A77 ¼ inch tape recorders, a cartridge [tape loop] machine and two turntables.

This was all done under the auspices of "Parkville Campus Radio". The test transmission went to air on August 4th, 5th and 6th [Wednesday to Friday] 1976. It was decided to broadcast during the week as opposed to a weekend as students would be on campus at the time and help was available to assist people wanting to listen [ie; find the right place on the dial!]. "Off Air" receivers [cheap \$5 transistor AM/FM radios] were purchased by the student union to provide access for listeners without an FM receiver. They were initially sold at cost to anyone who wanted one. Some ended up being given away to interested people, and those who might be able to assist with publicity for the event.

Keep in mind that the FM band had yet to be developed, and up until this time there was only ONE FM broadcast license issued in Victoria. This was to 3MBS-FM, a classical music station. At the time most of the general public were unaware of the FM band as such and had to be shown how to



Testing the 3OZZ-FM Radio station

find stations within this frequency band.

A 10watt FM transmitter and ¼ wave ground plane antenna were loaned to us by 2MBS in Sydney. The antenna was installed on the top of the Raymond Priestly Building [Roughly in the middle of The University of Melbourne Parkville Campus]. The transmitter was housed in the lift machinery room at the top of the building with the aerial cable going to the roof outside. A temporary broadcast studio was set up in the student union building, which was next door to the Raymond Priestly building.

The broadcast was quite successful, with signal reports coming in from all over Melbourne. A number of programs had been prepared especially for the occasion with a number of on air presenters.

The government had changed and we needed to wait until a call for applications for new [educational] licenses was made. A consortium formed between [then] Melbourne State College, the Royal Melbourne Institute of Technology [RMIT] and The University of Melbourne. RMIT already had a 'closed circuit' radio station that broadcast via speakers around the RMIT campus. After a while an educational licence was issued [3RMT-FM], which eventually became 3RRR-FM. The 3RRR board still has some financial support and representation from Melbourne University and RMIT [now RMIT University].

There was also an organisation set up to coordinate applications for licences and assist people with applications called the PBAA - The Public Broadcasting Association of Australia, [Now the CBAA - Community Broadcasting Association of Australia]. Meetings were held in Canberra and delegates were appointed to represent the various organisations that were considering application for a community license or looking for guidance as to how to go about what was quite a complex process at the time. There was also a technical committee [which I was on], which looked at the requirements for broadcast transmission, and make comments on government policy in this area. We also

discussed the 'Common Carrier' concept in relation to Telstra and whether that was a good idea. Telstra had such a stranglehold on communications at the time, but eventually Optus came about partly to try and provide more competition.

DxPedition - Lake Eyre

Around 1973 I was contacted by Bill Rice, VK3ABP [Silent Key] about the possibility of filming his proposed DxPedition to lake Eyre. The lake had recently filled with water from the Queensland floods at the time, and He was intent on sailing the lake as a maritime mobile station and wanted to record the event. I had met Bill though the monthly Friday evening fox hunt , and he was aware that I had done the Film and TV course at Swinburne College of Technology [Now Swinburne University]. Eventually, armed with my 16mm Bolex camera and 20 rolls of Ektachrome [colour] film, we set off for the lake. The resultant film was primarily intended to be shown on commercial TV to help recoup costs but was rejected by the TV station due to not having any sex or violence with which to attract an audience! It was difficult to get anything on commercial TV at the time as we found out.

This trip to Lake Eyre has been well covered in much more detail in an article about Bill Rice by Lloyd Butler VK5BR in the OTN September 2022 edition, so I'm not going in to further detail here. There are also some articles on and by Bill in the A.R. archives. The film of the Lake Eyre DxPedition has now been transferred to video and is available on DVD. You can use this link for more details:

http://www.artmediaservices.com.au/tim/on_eyre.html

Fox Hunting [early 1970's]

Assembly for the fox hunt was at College Crescent in Parkville - just up from Melbourne University. On the first Friday of the month, a rag tag group of people assembled and had a chat before the fox took off. After arriving at the first hiding spot for the night, the hounds were called in by the fox.

Then came the hard bit! Major decisions had to be made very quickly - was the fox on this side or that side of the river! Some foxes would spend hours [days?] before the hunt checking out suitable locations that would see some people getting very wet if they had made the wrong decision!

I used to ride as 'Melway reader' [Melway is a street directory], in a fox hunt team which consisted of myself in the back seat, Gil Sones [VK3AUI] in the passenger seat doing the beam bearings and Kevin Phillips [VK3AUQ] as driver. Kevin had an old Austin A40 and had cut a hole in the roof so that the pole for a 3 element yagi could be dropped through. Most others had to mount on

ski bars and put a hand out of window to turn the beam. Not good these days [protruding limbs from moving cars!]. We were the only car, apart from Bill Rice VK3ABP, that did not have to drive with the passenger seat window open. Things started to get serious once the fox left to go to his first location. We would get bearings and try to follow a path by checking the street directory. We also timed the fox to get a rough idea of how far he might have travelled using dead reckoning. While we missed a few, I was surprised how close we often got to the actual location of the fox even before being called in.

Bill Rice had designed his fox hunting setup with a rotating antenna and readout on a CRT [Cathode Ray Tube]. It plotted the signal strength as the trace turned [radar style] and plotted a 360 degree readout showing all the antenna lobes. Quite impressive. One just had to observe the strongest lobe and the direction it was pointing in relation to the front of the car! Fascinating to watch as you could instantly see the full 360 degree radiation [receiving] pattern of the antenna. Having done a lot of work with Yagi's, it was interesting to see the plot and how it could be used to get an ACTUAL visual plot of an antenna. Certainly beat the theoretical plots one saw in books! When using a standard fox hunting set up of a three element yagi, it is often difficult to discern the strongest signal due to the many reflections that come back. Bills rig showed all the reflections and it was quite obvious which was the strongest signal and the direction it was coming from.

Bill got the prize for the most sophisticated direction finding set up. Being an engineer and designer in the electronics industry, He had a vast knowledge in this area. Two Selsyn motors were employed - one to drive the antenna at about 50RPM and the other provided the 'positioning' information to the CRT with a long persistence phosphor. The antenna output was amplified and the 'S' metre information sent to the other input of the CRT. There have been other articles [in OTN and elsewhere] regarding Bill in more detail so I'm only giving some brief references here.

During the fox hunts, there was always some interaction with the public who were wondering just what these strange noises were coming out of cars. There were men running around with 'sniffer' rigs in all directions. Keep in mind that these particular fox hunts were being run during the evening so it was always dark while the hunts were on. Every now and then there would be a sudden arrival of cars in some obscure lane, in some obscure suburb, which would bring residents out to see just what was going on. I'm not sure if the explanations made any sense to those observing the strange goings on. The warbled modulating tone from the fox transmission [yes some foxes tried to make it an annoying tone!] meant some very strange looks from people when pulled up in a local laneway or public area.

Eastern and Mountain District Radio Club [EMDRC]

I briefly became involved in the early years of the EMDRC [1970's]. There were interesting talks and gear swapping. The club was only just getting started at the time but getting a lot of interest from the eastern suburbs. Drifted away from EMDRC after starting the course at Swinburne College, but could see that there was a need for a group such as this in the eastern suburbs of Melbourne.

The Radio Station that wasn't

I was also involved in preparing a commercial radio station "on paper" for a consortium of people who were applying for one of the newly available commercial FM broadcast licences for Melbourne. They had heard that I had an involvement in community radio at the time [see 3OZZ-FM] and asked if I could help them with their application for a commercial broadcast license. My proposal consisted of two on air studios and a central control room. It was designed so that you could see through the control room to both studios. I had a complete radio station costed and budgeted from on air equipment [broadcast consoles/studio equipment/cart machines/etc] right through to a microwave link and a 10Kw FM broadcast transmitter. [time frame late 1970's to early 1980's].

Despite all this work the application was not successful and did not proceed. One of the Victorian stations that did get a commercial license from this round was Melbourne station EON-FM, which has morphed quite a few times since.

The Byer tape reorder

At some stage during the 1980's I managed to obtain a Byer 66 reel to reel tape recorder which had a number of problems. Of course I had to restore it! This model had two speeds - 3¾ and 7½ IPS [Inches Per Second]. It was also a mono unit [as they all were] and all valve. One of the problems with this recorder was that it would get quite hot during use. Partly because of the valves, but also due to the three, [yes, three!!] heavy duty motors



The Byer 66 Tape Recorder

that were used to shuttle the tape [fast forward and rewind], and drive the capstan. It was after all a professional unit and was built with heavy usage in mind. It also had an inbuilt AM radio tuner that could be recorded if desired. The tuner could also be used as an 'on air' monitor should a journalist need to insert a story live in to a news bulletin, possibly from a remote location.

After replacing a few dubious tubes, The rectifier tube [5Y3G] was replaced with diodes mounted on an old octal valve socket. While the high tension supply went up a few volts, it was not enough to have to change other components in the recorder. There was also one other major modification. That was to install a two track replay head to replace the original mono replay head. An engineer friend of mine made a new 'sleeve' which mounted the stereo head in the same mount as the original mono head. Luckily my job as Technical Officer at Melbourne State College music department meant I had access to all the test gear I needed to align the new head and check its performance.

I did not want to change the 'look and feel' of the original unit, but the head modification could be done without anyone noticing the change. Mono recorders used the full width of the ¼" tape to record on, and this was left intact, so the unit still worked as a mono recorder. The professional recorders being used in recording studios were now two track [stereo] - using slightly less than half of the tape for each track with a guard band in the middle. I built a transistorised stereo tape preamp on a piece of Veroboard and mounted it in the back of the recorder with two line output leads [left and right channels] coming out the back of the recorder, which could be connected to an external amplifier. I then 'stole' some low voltage from the cathode of one of the valves to power the preamp. The existing internal amplifier [mono] was left intact and used as a monitor if there was no stereo amplification available.

Due to financial problems, Byer was eventually taken over by Rola, and they simply took his badge off the front of the units they had inherited and added their own [it became the 'Rola 66']. These reel to reel units were the back bone of radio recordings in the late 50's through to the end of the 60's. Many records were also mastered from tapes recorded by these machines. The recorders were also used by TV and Radio stations [especially radio] and had one distinct advantage. There was a 600 ohm balanced output on all the recorders [both in and out]. It was standard practice amongst journalists to remove the 'microphone' from the mouthpiece of a fixed phone, and clip the recorder directly on to the phone line via the headset. This enabled direct transmission back to the station [and another recorder], of stories that had been just been recorded.

I remember a demonstration by a journalist friend

at the time working for the ABC TV and Radio news. The Melbourne studio had a number of open broadcast quality lines direct to Sydney. They often connected recorders to these lines for the transfer of items between the two news rooms. Connecting a microphone to the recorder also allowed chat between journalists in Melbourne and Sydney. Sometimes the chat actually related to the news, but often it did not!

Many Years Later...



Testing the Arduino project

I have a niece who was working towards a degree in animatronics - and I was able to help her once with the practical side of the course, which has involved 'Arduino' modules. Some designs had been done at the 'virtual' level on computer. She was very impressed when I was able to read out the colour code directly from the resistors for her project and nominate the value without using a multimeter! As like morse code where with practise you hear the various code groups, you can 'see' various common resistance values.

She was worried that her project was not working correctly, but I was able to determine that it was in

fact working, it just needed to be connected to its intended use [a motor] to function as required.

Over the years there have been slabs of time where there has been no radio activity at all. Life gets in the way and other pursuits take priority. As you can see I've always had an interest in radio related things and eventually come back for 'another go'.

I have also had a life long involvement with Lord Somers Camp, and am a life member of that organisation, as well as the RAOTC.

Current shack set up

I now use a much simpler setup than in the past. I have a FT-450-D for HF work [160-10m all mode] and a FT-8800 Dual Tx/Rx for 2m FM and 23 Cm. Trapped dipole [Diamond] for 80/40/20/10 and 6 metres [I added the 6 metres] and a Diamond dual co-ax dipole for 2m and 23cm.

I hope this article has been of interest to OTN members, and might inspire others to start thinking about their own journey in the realm of electronics and radio. OTN provides the perfect vehicle to provide a permanent record of the various activities of members which will be accessible to those who have a similar interest.

My research for various aspects of this article has also allowed me to go down other rabbit holes of the past and may provide the basis for some more articles in OTN. You will find there is quite a lot of material and photographs out there as you explore your own journey through radio, and it just requires a bit of time and patience to collate information and edit it down into an interesting story.

Further information about my radio life and related interests can be viewed at my Website:

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

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