Electrical & Electronic & Telecommunications History Milestones in Australia

Revised: Jan 2007 _(International events are tagged in italics)_

Every effort has been made to present a factual and unbiased historical picture of the electrical, electronics and tele-communications history. Much material has been cross-checked. No warranty, or accuracy express or implied is offered on the material presented or its use.

Corrections and updates to this history gratefully accepted. _Please e-mail David Burger at_ k3hz@ieee.org

---

(1485BC est. A device called the 'Ancient of Days' is hypothe-sised as an electrical imaging machine in various texts, a rendition is shown on the right – see acknowledgements)

(1445BC The description of the "Ark of the Covenant" in Exo-dus 25:10-22, reads like an electrical device, Nikola Tesla mentions this in "A fairy tale of electricity", pub-lished September 9, 1915. Other biblical accounts imply effects from the Ark correspond with exposure to high power electromagnetic fields, and the 1981 film 'Raiders of the Lost Ark' popularise this artefact.)

(585BC Notes from 'Thales of Miletus' show that Amber can be charged by rubbing, noting Amber was attributed the same value as gold arte-facts in Greek tombs circa 1800BC).

(212BC Greek temples were built on hills, fitted with long copper clad poles to at-tract lightning, built in a shape subsequently re-invented by Franklin in the 1700's). Tangential evidence supports the Greeks had linked the electric prop-erties of Amber and that of lightning.)

(250BC~250AD est. Baghdad Battery, Wilhelm Konig reported excavating a 130mm long clay jar in 1938, it had a structure similar to a modern functioning bat-tery – most likely used to electroplate gold onto other metals)

(1600 William Gilbert describes the electrification of substances and coins the word 'electricity' from Greek word 'elecktor' and Latin word 'electricus')

(1660 Otto von Guericke invents a crude machine to produce static electricity)

(1673 Gottfried Liebniz builds a mechanical calculator)

(1729 Stephen Gray distinguishes between conductors and non-conductors)

(1745 Leyden jar was competitively invented by Ewald Jurgen von Kleist - 4 Nov 1745. Pieter van Muss-chenbroek produced the first working example in Jan 1746, with the name coming from Leiden Uni-versity).
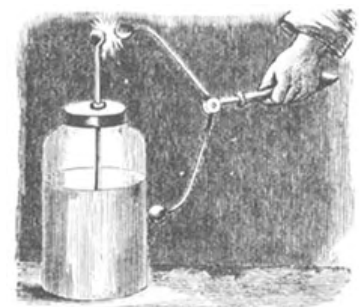
(1747 William Watson discharges a Leyden jar through a circuit and comprehends electric current)

1788 European settlement in mainland Australia is started.

(1792 The Chappe brothers launch a semaphore system. The last use of semaphore
was Algeria in 1860)

(1800 Count Alessandro Volta (1745~1827), developed the voltaic pile primary bat-
tery.)

(1801 Sir Humphrey Davy passed electricity through platinum strips making them
glow, precursor to electric light)

(1807 Jean Baptiste Joseph Fourier (1768~1830) tabled his mathematical treatises)

(1810 est. Pierre-Simon Laplace (1749 ~1827) tabled his mathematical treatises)

(1819 Hans Christian Oersted (1777~1851) discovers magnetic fields around current
carrying wire. His name was tagged to the unit of magnetic field in 1932, and
the first Danish satellite in 1993)

(1821 Andre Marie Ampere (1775-1836) puts observations into mathematical form,
Dominique François Jean Arago (1788-1836) invents electromagnet in Sep-
tember and Faraday devises crude electric motor)

(1822 A Difference Engine and Analytical Engine invented by Charles Babbage)

(1825 William Sturgeon (1783-1850) exhibited the electromagnet,
Hans Christian Oersted isolates Aluminium using electricity, however given the
amount electricity required, Aluminium was classed as a rare-precious metal)

(1826 Georg Simon Ohm (1789-1854) tables Ohm's law, and was awarded the Cop-
ley Medal in 1841, his named was tagged to the unit of resistance in 1872)

(1829 Augustin Louis Cauchy (1789~1857) tables the complex variable and in 1843
enhances differential equations)

(1830 Joseph Henry (1797-1878) used Sturgeon's device to demonstrate long dis-
tance communication by sending an electric current over one mile of wire to
activate an electromagnet striking a bell)

(1831 Joseph Henry and Michael Faraday compete to invent the generator.   Faraday
discovers EM Induction)

(1833 Johann Carl Friedrich Gauss (1777~1855) and Wilhelm Eduard Weber
(1804~1891) build a telegraph device using 2 wires)

(1835 Samuel F.B. Morse (1791-1872) used pulses of current to deflect an electro-
magnet, which moved a marker to produce written codes on a strip of paper -
the invention of Morse Code)

(1837 Carl August von Steinheil found that, by connecting the end of the sending
wire to plates buried in the ground, the return telegraph wire could be elimi-
nated;

Sir Charles Wheatstone and Sir William Fothergill Cooke invented the first British electric telegraph using 5 wires)

1839 Mr Edward Davy (1806~1885), inventor of the relay in 1835, departed England after a messy divorce then settled in Adelaide, South Australia.

(1840 Henry produced oscillations from a condenser discharge)

(1841 Fredrick de Moleyns passed electricity through powdered charcoal generating brief flashes of light. First patent issued for electric light globe.

(1843 Alexander Bain invents facsimile)

(1844 Multiplexing techniques devised;
(William Thomson (Lord Kelvin) calculates the pulse response of a telegraph line)

(1845 Gustav Robert Kirchhoff (1824~1887) enunciated Kirchoff's circuit laws)

1850 Mr Edward Davy was governor of Victoria.

The University of Sydney is established as a joint venture between Cambridge and Oxford Universities, sharing parts of the both crests. Motto translation from Latin "Same minds different skies".

(1852 Weber defines the absolute unit of electrical resistance)

1854 Victorias first telegraph statute of 1854 was based on Canada's Telegraph Act, legislated eight years earlier.

First telegraph line links Melbourne and Williamstown. March 3, the first telegraph line in Australia began operation (six months before the first Australian railway line was opened between Melbourne and Port Melbourne on September 12) and SAMUEL WALKER McGOWAN 1829-1887 was gazetted as general-superintendent of the new electric telegraph of Victoria.

(1855 Transatlantic telegraph cables installed by Cyrus Field and Associates)

1858 The cities of Adelaide, Melbourne and Sydney were linked by telegraph lines including towns along the way like Goulburn.

The world's first commercial refrigeration plant was produced by James Harrison to cool beer at Rocky Point near Geelong.

(A burglar alarm system was invented by Edwin T Holmes, and later his workshop was used by Alexander Graham Bell)

1859 An undersea telegraph cable was laid by the SS Omeo between mainland Australia and Tasmania (~360km) in July by Samuel Walker McGowan (1829-1887). The cable was erratic and lasted only 3 years. McGowan studied under Samuel Morse.

1863 First recorded use of electric light in Australia, at the Sydney Observatory. The power was supplied by batteries. It commemorated the wedding of the Prince of Wales.

(1865 On 17 May the first International Telegraph Convention was signed by 20 countries and the International Telegraph Union, later ITU, was set up.)

(1867 James Clerk Maxwell explained EM Theory and predicted radio waves)

1869 A telegraph cable between Melbourne and Tasmania is commissioned after 3 failed attempts.

1871 Workers on the Adelaide - Darwin Overland Telegraph Line discovered gold near Pine Creek. The mine still operates today. Australia is connected to the rest of the world through an undersea cable Banjuwangi in Java to Darwin on 16th November.

1872 The Overland telegraph line between Adelaide and Darwin was completed (~3170km) – partial museums of 3 stations currently exist at Alice Springs, Mataranka and Darwin. Artefacts of this are understood to exist at Barrow Creek.

(The volt, ampere, coulomb, ohm and farad were defined as electrical units. The old unit of capacitance was called the 'jar').

1875 Work begins on the telegraph line between Adelaide and Perth, a distance of 2532km across the Nullarbor.

1876 The telegraph cable from Sydney to New Zealand goes live.

1877   Mr Henry Sutton (1856~1914) of Ballarat announced he had made 20 versions of the telephone – all within 12 months of Bells historic announcement in 1876. He is credited with the first telephone link in Australia between Suttons Music Store in Melbourne and the Music Factory in Ballarat. The telephone was also reported to have been used between Launceston and Campbelltown in Tasmania.

1878 First commercial telephone service commissioned in Melbourne.
Australia joins the ITU on 27 May.

(Sir Joseph Wilson Swan, passed electricity through carbon filaments in vacuum bottle for the first sustainable electric light. Thomas Alva Edison did the same in 1879, spin doctors at the time incorrectly attributed this invention to Edison, as Edison had many prolific electrical inventions already in place.

Edison's carbon-button transducer; cable circuits introduced)

1879 Electric lights first used at the MCG.
(Professor David E. Hughes discovers the Coherer, a type of detector. Until this time, there were just 4 types of telegraph detectors in use, "Cooke & Wheatstone"," House's and Hughes's", "Morse" and "Bains")

1880 Telephone exchanges originally open in Melbourne with 100 lines, followed closely by Sydney on 1st November and then Brisbane. The first Sydney line

connects the Royal Exchange in Bridge Street with the Darling Harbour goods yard.

Victorian Electric Light Company formed for the supply of electricity in Melbourne for lighting nearby Victoria markets and a public hall, powered from a small power station in Russell Place off Bourke Street. It was the first such company in Australia.

1881 Henry Sutton of Ballarat 'invented' the carbon filament lamp 16 days after Edison – which was only evident much later given the poor communications between continents at that time. He also invented the torpedo, colour printing process, telegraph facsimile and a lead storage battery.

1882 Public street lighting demonstration in Brisbane. Redfern terminal (now Central Station) was the first public place to be lit by electricity, powered by the Regent Street generator.

1883 The University of Sydney Senate adopted revised by-laws to establish two degrees in engineering, those of Bachelor of Engineering and Master of Engineering. The Senate specified three branches of engineering:
- Civil Engineering and Architecture;
- Mechanical Engineering and Machine Construction; and
- Mining Engineering, Metallurgy, Assaying and Mining Law.

(Nikola Tesla (1856~1943) invents the first induction motor)

1884 Chair of Engineering established at the University of Sydney, Mr W.H. Warren.

The large manual telephone exchange opened at the GPO Building – No1 Martin Place.

(Paul Nipkow 1860~1940 obtains a German patent for TV using a disk and selenium cell)

(New York legislated the burial of power and communications cables, but was largely ignored until 1888 when the Mayor Hugh P Grant began cutting down power poles ! – The Australian underground cable rollout plans - Western Australia 2010, Darwin by 2007, Queensland/South Australia have some active projects, Victoria committed to a study due 2007, and is ignored in NSW.

1885 The Telephane, invention used telegraph lines to transmit visual information was an important precursor to television. It was invented by Henry Sutton n Ballarat.

1886 Alfred Lawrence moves to Sydney and starts 'Alfred Lawrence Electrical Merchants and Importers'. Known today as Lawrence and Hanson.

(1887 The theory of cable loading was tabled by Heaviside, Pupin, and Campbell.

Heinrich Rudolf Hertz (1857 – 1894) tested Maxwell's hypothesis with loops fitted to brass doorknobs – basis of the Hertzian dipole. His name was tagged to the SI unit of frequency in 1933)

1888 First permanent street lighting installation in Australia and the Southern hemisphere. Commissioned in Tamworth, two 18kw generators supplied the power. This was part of the centenary celebration of European settlement. The only other cities with electric street lighting are London, New York and San Francisco.

(Almon Brown Strowger devises automatic step-by-step switching, receiving a patent in 1891, with the first live service in 1892)

1889 The Electric Drill was the invention of Arthur James Arnot (1865~1946) in Melbourne who patented it on 20 August. (Pictured). Arnot was president of the Victorian Institute of Engineers in 1899.

Alfred Lawrence partnered with Jerry Hanson to form a company to distribute electrical hardware, the company now known as L&H still operates.

(The unit of Joule and Watt was introduced, with its definition of 1 volt delivering 1 amp defined in 1946 and Joule/second was defined as a Watt)

1890 The Lambton power station in Newcastle opens, the largest in Australia having two 130 HP Westinghouse compound engines. Steam was from two B&W tubular boilers. Electric street lighting was turned on in Newcastle on 31 December.

LM Ericsson sells their first telephone handsets into Australia.

Professor Richard Threlfall of Sydney University is the first person in the world to suggest publicly at a meeting of the Australasian Association for the Advancement of Science that 'Hertzian waves' might be used for wireless telegraphy. Refer to a footnote in J. J. Fahie's Third Revised 1902 edition of "A History of Wireless Telegraphy" (page 291). This was almost certainly "The Present State of Electrical Knowledge" and published in "Report of Meeting, 2 , (Melbourne 1890) 27 -54".

1891 University of Sydney sanction 'Civil and Mechanical Engineering' degrees. Electric street lighting is installed in Penrith, Young, Moss Vale, Broken Hill and Redfern.

1892 First hydro-electric scheme commenced; comprising a 435kW 'Duck Reach' power station on South Esk River near Launceston, Tasmania.

1893 University of Sydney separate 'Mining Engineering' into 'Mining and Metallurgy' and 'Electrical Engineering'.

Queensland's first hydro-electric generation at Thargomindah. Water was from an artesian bore powering a local blacksmiths water wheel. It powered two, 8kW dynamo's.

1895 Tasmania's 'Duck Reach' hydro-electric power station commissioned.

The town of Hillgrove (NSW) operated the first NSW hydro-electric generation on the Gara and Styx rivers east of Armidale.

(1896 Marconi communicated by wireless over 1.75 miles.)

(1897 Lord Rayleigh conceives waveguide, only to be rediscovered in the 1940's.

Marconi patents a complete wireless telegraph system.

(Joseph J Thompson 1856~1940 announces discovery of the electron in April and explained the Edison effect where current travels just one way through a vacuum tube. Thompson received a Nobel prize in 1906.)

1898   First recorded use of wireless telegraphy in Australia – a 500m distance was covered in Adelaide.

Electrification of the Sydney tram lines started, and most of the system was converted by 1910, although the Parramatta steam system remained until 1943.

(Valdemar Poulsen 1869~1942 patented the Telegraphone. It was the first practical apparatus for magnetic sound recording and reproduction and used for recording telephone conversations. It used magnetized length of wire)

1899   First public power station opened in Sydney by the Department of Railways. The station comprised four, 850kW – 600volt DC generators, each driven by a horizontal cross compound condensing steam engine.

Alice Springs Telegraph station 1899

1900   University of Sydney sanction 'Mechanical and Electrical degrees', and in the same year the degree course in Civil Engineering was extended to four years.

1901   The Postmasters General Department (PMG) was established on 1 January as part of Federation.

The first radiogram in Australia was sent from St Kilda to the British warship 'St George' off the coast of Victoria on May 18.

(1902 Oliver Heaviside predicted a conducting layer in the atmosphere)

Professor Reginald A Fessenden suggested that his continuous-wave method of transmission was suitable for radio-telephony, with many historian believing he made the first voice transmission in 1906.)

1903   First government tests of wireless in Australia between Moreton Island and navel stores in Brisbane.

1904   The Lady Mayoress of Sydney, Mrs Sam E Lees switched on the first electric street lights at Pyrmont Power Station (now Star City Casino) at 5pm on 8 July. The powerhouse received a Historic Engineering Marker in Nov 1994. The

lighting went from Redfern north to Circular Quay and Hyde Park to Darling Harbour. Until this time, the Sydney City Council had actively suppressed commercial efforts to deliver electricity into Sydney, even after obtaining consultancy advice to the contrary from Edison 22 years earlier. *Refer to the Energy Australia on-line book at:*
http://www.energy.com.au/energy/ea.nsf/Content/NSW+Who+is+EnergyAustralia

A Telephone link established between Sydney and Melbourne.

1905 The Electric Supply Company of Victoria, electrified the Ballarat tram system as a by-product of delivering electricity to consumers there, the system used 2nd hand trams from Sydney.   Sydney has 519 electricity customers.

1906 First practical demonstration of wireless in Australia for possible commercial use. The first radio transmission from the Australian mainland occurred between Point Lonsdale- Queenscliff, Victoria and Devonport Tasmania on July 12 from a station erected by the Marconi Wireless Co Ltd. A memorial to Marconi is located on the foreshore in Royal Park, just off the Point Lonsdale Rd, opposite Anderson St and adjacent the oval.

On Christmas Eve 1906, a Mr. Fessenden transmitted first audio broadcast in history from Massachusetts. He sent voice transmission using synchronous rotary spark transmitters and using his barretter detectors.

(1907 Lee De Forest (1873-1961) experimented with receiving long-distance radio signals and patented an electronic device named the audion triode valve)

1908 Municipal Tramways Trust in Adelaide electrified their trams.

1909 Mr William G.T. Goodman prepares a detailed proposal to electrify the Glenelg railways in Adelaide. The proposal was turned down in Parliament twice.

1910 The "Wireless Institute of Australia" was formed by a group radio experimenters on 11 March – ham radio! This was the first such society in the British Empire, and today is the longest surviving national radio society. *The first known amateur radio organisation in the world was the "Junior Wireless Club Ltd of New York starting on 2 January 1910, becoming the Radio Club of America on 21 October 1911.*

The 'Australasian Wireless Company' obtains a licence from the PMG to run telegraphy tests with ships at sea on 27 August. It was permitted to handle commercial traffic in 1911 – the first in Australia. It was located at the 6th floor of 'The Hotel Australia'.

1911 A total of 26 private experimental wireless (ham radio) stations were operating in Australia.

The first private automatic telephone exchange was placed in service in Sydney.

The word 'Radio' still had its meaning formally defined in anatomical terms, i.e. not as we know it today. The word had already appeared spasmodically in wireless telegraphy publications since 1902.

1912   The first public automatic telephone exchange is commissioned in Geelong, the first in both Australia and the southern hemisphere.

The ITU Radio Act of 1912 (Dec 13) allocated callsign prefixes to Countries, but excluded experimental (ham radio) licenses. Australia was allocated the prefix group VH~VK. The letter V was a commemoration of the recent death of Queen Victoria and was used as a prefix in other Commonwealth countries at that time.

(RMS Titanic sinks April 12, prompting a distress call change from CQD to SOS. The Titanic used the callsign 'MGY')

1913   Sir Ernest Thomas Fisk (1886~1965) founded Amalgamated Wireless Australasia Ltd, and pioneered Australia's beam wireless service. He died at his home in Roseville.

1914   Hydro Tasmania was formed when the State Government set up the Hydro-Electric Department to complete the Waddamana Power Development.
Electric street lights are commissioned in Goulburn. Marconi type 16 crystal receiver replica by David Walshaw.

(1915 - Multiplexed carrier telephony introduced;
- Edwin Howard Armstrong 1890~1954, perfects the superheterodyne radio receiver;
-The Loudspeaker is invented)

1916   Complete wireless transmitting and receiving stations from AWA were being shipped to New Zealand, East Africa, China, Japan, and the Pacific Islands.

1917   Government calls skilled ham operators into war service, amateur radio licences are suspended for WW1 hostilities.

(Tesla was the recipient of the Edison Medal, the highest honour of the American Institute of Electrical Engineers – now IEEE)

1918   First commercially built wireless receiver using triode valves designed and manufactured in Sydney.

First direct wireless messages transmitted between UK (Waunfawr, Wales) and Australia (cnr Stuart & Cleveland, Wahroonga) on 22 September by Prime Minister Billy Hughes. A monument was erected at Wahroonga in 1935 by Fisk, with a replica presented to Caernarfon Council in 1997. Refer to photo archive.

First direct wireless messages transmitted between England and Australia. Regular radio telegrams being sent between Carnarvon and Sydney.

First electric train service commenced in Melbourne.

(First commercial broadcasting station, KDKA, Pittsburgh, USA)

1919   Pioneering wireless telephone tests between Australian land stations and ships at sea.

First demonstration of wireless broadcasting given in Sydney, station 2SB.

A group of wireless experimenters formed the Waverley Amateur Radio Club (NSW) on 27 January.

Miss Rogers, enquired about joining the South Australian branch of the Wireless Institute of Australia, but after consultation with the other state branches, the councillors informed her " At present, this Institute is unable to admit lady members!"

Amateur radio operations resumed on 1 October – post WW1.

The Institution of Engineers Australia was first established and was granted a Royal Charter in 1938. It now operates within the terms of the Supplemental Royal Charter granted in 1993. In March 2003 it adopted a new common name, ENGINEERS AUSTRALIA.

(Walter G Cady is recognised as the first to use a quartz piezoid to control the frequency of an oscillator. Prof. G. W. Pierce of Harvard University used a quartz plate with one set of electrodes to control the frequency of an oscillator circuit using a vacuum tube in 1923. The Curie brothers identified piezoelectricity in 1881)

1920   Manufacture of radio valves commenced in Australia.

Radio amateurs in Australia occasionally utilise the VK prefix.

The PMG begin to establish extensive underground communications cable tunnels throughout Sydney, and even extends under The University of Sydney. (One tunnel entrance is actually partially visible from a fire exit under Martin Place of the Grand Ballroom at the Westin Hotel.)

1922   First mobile police car fitted with radio commenced service in Victoria.

First ham radio signals from USA heard in Australia by Ross Hull (1902~1938) in Melbourne, these were in the 130m to 200m band (1.5MHz to 2.3MHz band). Ross moves to the USA in 1929 as Associate Editor of QST.

AWA trademark the term 'Radiola' on June 22.

1923   An Australian designed and built high power broadcasting station commenced in Sydney against objections by the Wireless Institute which represented experimenters. The Fisk proposal was accepted and "sealed-set" broadcasting started on November 13, 1923 with 2SB (later to become 2BL). 2FC in Sydney followed on December 5, 1923.

Sydney and Brisbane are connected with a telephone trunk connection going live on October 9.

1924   Stations 3AR in Melbourne commenced broadcasting on January 26, 1924, and 6WF Perth on June 4, 1924.

First radio transmission of human voice, Marconi's, between Chelmsford, England and Roseville, Sydney.

Radio amateurs are allocated 80,40,20,10 and 5m bands by the PMG under advice by ITU.

The PMG's Department abandoned the sealed-set rules, permitting open tuning receiving sets to be manufactured and sold in Australia.

(1925 The IARU is established)

1926 Philips opens its first Australian operation in Sydney to sell the technological wonders of the day - electric lamps and radios.
Ms Florence McKenzie was the first lady ham operator in Australia, Licensed as OA2GA, she had graduated from the University of Sydney in 1923.

The Pacemaker was invented by a doctor, who wished to remain anonymous, from the Crown Street Women's Hospital in Sydney. He resuscitates a new-born baby with an electrical device later called a 'pacemaker'. {also claimed by Hyman in mid 1930's, Hopp in 1949 and Zoll in 1952}

(1926-1937 Television; Mechanical image-formation system demonstrated by Baird and Jenkins; theoretical analysis of bandwidth requirements; Farnsworth and Zworykin propose electronic systems; vacuum cathode-ray tubes perfected by DuMont and others)

1927 Beam wireless service commenced between Australia (Ballan transmit, Rockbank receiving), Great Britain and Ireland on April 8.

The two way radio powered by a pedal-operated generator was invented by Alfred Traeger and quickly became the central tool of Royal Flying Doctor Service and distance education in the Australian outback. (John Flynn Place, Cloncurry)

(The radio act in USA becomes law on February 23, FCC is Established.)

1928 AWA take control of the Pacific radio stations located in Fiji-Labasa, Savu Savu and Taviuni on January 1.

PMG introduces radio receiver license fees.

Radio Australia's first transmitter site was located at Lyndhurst, Victoria. VK3LR and established by the PMG. It had a power of 500 watts and broadcast on a frequency of 9580 kc/s which is now used today at Shepparton. The first antenna was a horizontal halfwave dipole.

1929 First Picturegram (fax) service opens between Sydney and Melbourne. The use of the 'VK' Prefix in Australia for all radio hams in mandated.

1930 World record set for a land-line telephone call, from Geraldton to Cairns, a route distance of 7662km.

(1931 Karl Guthe Jansky, 1905~1950 discovers galactic noise)

1932 The Government established the Australian Broadcasting Commission (ABC) to run the National Broadcasting Service on July 1.

The PMG took over responsibility for broadcasting matters (radio and later television and radio frequency management).

IBM incorporated it's subsidiary in Australia - 7 January with a small office in the Queen Victoria Building.

1933 Traffic lights are introduced to Sydney
(Phonograph records go stereo)

1934 Longest distance 'radio' Picturegram (fax) service opened between Melbourne and London.

Ross Hull commenced VHF long distance experiments at 56Mhz, 110Mhz and 220Mhz after the FCC allow experimenters use of anything above 110Mhz.

The explanation of the Luxembourg effect where a high power shortwave station actually modulate/heats the ionosphere causing co-channel effects to unrelated stations using the same radio path was made by Aussie physicists Professor Victor A. Bailey(1895~1964) and Dr David F. Martyn (1906~1970).

The first car radio is fitted to a car made by Kelly's Motors in NSW.

(Harold Stephen Black 1898~1983 develops the negative-feedback amplifier)

(Joseph Begun invents the first tape recorder for broadcasting)

(1936 Edwin Armstrong's paper states the case for FM radio;
Invention of Coaxial cable is announced at joint IRE (IEEE) meeting, noting that concentric power distribution cables had been manufactured since 1894)

1937 The Northern territory is known as VK8.
(Alec Reeves conceives pulse code modulation;
George Stiblitz 1904~1995 invents the digital calculator, building one in 1939)

1938 Professor Victor A. Bailey predicting it is was possible to create an artificial aurora by means of an intense emission of RF.

1939 Australian amateur radio operator licences are suspended in October for WW2 hostilities. Around 700 coastwatchers equipped with radio monitor around 20,000km of the 36,700km coastline of Australia. The air raid warning code sequence was "QQQ QQQ QQQ *then* their Station ID".

1942 Father John McGrath of Bathurst Island Mission coastwatch station callsign "8SE" reports Japanese aircraft heading toward Darwin at 0937 on 18 February. Message was received by Pilot Office Saxon at 'Darwin Radio' callsign "VID", but the message got lost. Darwin was bombed at 0958 on 18 Feb, Australia's first direct encounter with war. The Darwin attacks continued for another 15 months.

A technology called 'oxometry' took hold in the Faculty of Engineering at The University of Sydney. Reference to it was made in RAF Henlow medical manuals. Not to be confused with the oximeter which measures oxygen saturation of blood.

(1944-1947 Statistical communication theory evolves with Rice developing a mathematical representation of noise; Weiner, Kolmogoroff, and Kotel'nikov apply statistical methods to signal detection)

1945   Australian amateur operators are permitted back on-air in September, and callsigns are issued on 1st come 1st served basis. Later, the new 15m band is allocated and the 5m band is moved to the 6m band.

The Cruise control is invented by Ralph Teetor.

1946   OTC (the Overseas Telecommunications Commission) was formed to provide all international telecommunications.

1947   The aeronautical frequency band of 100 to 108 Mc/s is allocated by PMG.
(The International Telecommunications & Radio conference mandates the use of terms "Kc/s" below 30,000 and "Mc/s" above for Imperial Units)
(Transistor devices invented by Bardeen, Brattain, and Shockley)

1948   Demonstration of first Australian designed and manufactured TV receiver.

(1948-1950 Information theory and coding; Claud E. Shannon publishes the founding papers of information theory; Hamming and Golay devise error-correcting codes)
(1949 "Computers in the future may weigh no more than 1.5 tons", Popular Mechanics forecasting the relentless march of science)

(1950 Time-division multiplexing is applied to telephony)

1951   Ericsson opens up a sales office in Melbourne.

1953   The Mills Cross radiotelescope design consisting of two long ground antennas either in the form of a cross or a T shape was adopted world wide. It was invented by B. Y. Mills at the CSIRO.
(Colour TV standards are established in the United States)

1954   First 220kV transmission line commissioned in Australia.

(1955 J. R. Pierce proposes satellite communication systems)

1956   The first official television broadcast in Australia was made in Sydney from TCN-9 in September from both Willoughby Studios and a church hall studios at 19 Arthur St, Surry Hills on 16 September. Willoughby was a relatively small set-up with just two mid-sized studios and under the control room galley, a very small News Studio. Management was trying to give an extensive idea of what the station 'could do', they regaled the church hall transmit one or two programmes. The main program material was film, live news, and variety show from the second Willoughby studio. The church hall was connected to the transmitter using microwave links. On 5 November, Prime Minister Menzies introduced the Australian Broadcasting Commission's first television broadcast, while the first broadcast from the ABC's Melbourne television studios took place on 19 November, to cover the XVI Olympic Games.

1957 Doug G Lampard and Mr M Thompson publish "A new theorem in electrostatics with application to calculate standards of capacitance". The IEE (UK) awarded the Heaviside prize to this paper.

(Fortran is launched as the first high level computer language)

1958 The famous "black box" flight recorder for recording aeroplane movements was invented at Fisherman's Bend by Dr David Warren (1925~----) prompted by the death of his father in an air crash. David gained his PHD in England. His invention was officially recognised with the Lawrence Hargrave Award in Feb 2002.

The VK8 callsign prefix is assigned to the Northern Territory, it was originally known as VK5.

1959 First 330kV transmission line commissioned.

Aircraft non-directional beacons (300~500Khz band) commenced roll-out in Australia.

(1960 Theodore H Maiman demonstrates the first laser, conceived by Gordon Gould in 1957 and party to a sad but hostile 30 year patent war with Charles H Townes and the US patent office which Gould won. Gould ironically sold the patents to finance the litigation)

1961 Anecdotal evidence of an FM broadcast transmitter operating for a short period in Adelaide.

The 64m Parkes radio telescope is commissioned. Originally envisaged by EG 'Taffy' Bowen, it was designed by Freeman Fox & Partners and built by Maschinenfabrik Augsburg Nurnberg. It received the National Engineering Landmark plaque in March 1997.

The PMG introduces the '000' emergency telephone number into metropolitan areas, noting is wasn't until 2001 that correct mobile telephone call routing to this number was resolved.

(Integrated circuits go into commercial production)

1962 Television was introduced to the ACT.

(Satellite communication begins with Telstar I.)

1963 Quasars Discovered at Parkes radio telescope facility.

The first coaxial television link between Melbourne and Sydney goes live.

(Solid-state microwave oscillators perfected by John Gunn)

(First geo-stationary communications satellite placed in service)

(A permanent hot-line between Moscow and Washington to manage the cold war threats is established on 30 August, it was teletype telegraph line – not a telephone line)

(1964 Fully electronic telephone switching system; No. 1 ESS goes into service)

(1965 Mariner IV transmits a picture back to Earth)

1967 First launch of an Australian satellite WRESAT at Woomera.

1968 First 500kV transmission line commissioned, with a full size 130′ 500kV pylon erected in the grounds of the Royal Melbourne Exhibition building as part of an Electricity exhibition sponsored by the SECV.

(1969 First GaAs FETS announced by Fairchild on Dec 23;

  ARPARNET is established between 4 Universities)

1970 CSIRO Radiophysics launch 'Interscan', a microwave aircraft landing system in use worldwide.

  (Floppy disk is invented)

1971 Television was introduced for the first time to the Northern Territory, with 45 commercial TV stations in operation nationally.

  NEC Australia opens office in Melbourne, and commences manufacturing in 1973.

  (Analogue circuit simulator software using a digital computer- X3AC)
  (First microprocessor, a 4 bit design released by Intel).

1972 Papua New Guinea moves radio callsign prefixes from Australian prefix VK9 to P29 as a UN Trust Territory.

  The substantial fees for University education are abolished by the Whitlam government.

1973 Computer programming was introduced into Australian secondary schools, using punch cards and the Basic language.

1974 Radio and TV receiver licenses are abolished, noting there was little or no enforcement evident since the mid 1950′s.

  The solar powered telephone was first used in Australia for outback homesteads with no permanent electrical power.

  A closed user group mobile telephone system in Melbourne and Sydney was in place with around 30 subscribers in each city utilising a half duplex subscriber unit in the 151Mhz band. The fixed infrastructure was full duplex using a single transmitter of around 1kW with around 4 receivers located in the suburbs.
  (It is unclear when this service actually started, but estimated to be mid 1960′s – help !!)

1975 Broadcasting on the FM band was launched, licenses were granted with one or two frequencies in each capital city. These typically they went to fine-music societies 2MBS (St Leonards), 3MBS (Kew), 4MBS (?), and the University of Queensland Student's Union 4ZZZ at St Lucia.

  The PMG is devolved into three entities, Department of Communications (now ACA), Telecom Australia (now Telstra) and Australia Post.

  Colour television commences in March using the PAL system.

  Australia's original Over The Horizon (OTH) HF radar, "Jindalee", is started in Alice Springs.

1978 Prototype multiple-electrode Bionic Ear was implanted in the first adult at The Royal Victorian Eye and Ear Hospital by Dr Graeme Clark and colleagues. Approved by the US Food and Drug Administration in 1985, the first multiple-electrode Bionic Ear to be approved by any world regulatory body. Oddly, around 60% of recipients ultimately attempt to disable the device.

1980 The first commercial FM station 3EON originally on 92.3Mhz (now 3MMM) in Melbourne took to the airwaves in July, followed by 2DAY-FM and 2MMM in Sydney, 3FOX in Melbourne, 6NOW in Perth and 4MMM in Brisbane in August, and finally SSA-FM in Adelaide in September. 3EON evolved from an FM license purchase by the operators of 3XY (1422kHz).

1981 An NEC large cell standard full duplex PAMTS mobile system began operation in the 502/512Mhz band. The multicouplers used circular waveguides. The assigned number range began with 007.

1983 Mr Richard E. Butler was Secretary-General of ITU from 1 January 1983 to 31 October 1989.

1985 Australia's first commercial communications satellite, Aussat 1 is launched from Florida on 28 August.

A North American standard 825MHz AMPS system was placed on trial service, hubbed from the AXE switch located Parramatta telephone exchange. The first cell site was located at North Sydney exchange. The assigned number range was 018/019. It goes into live service in December.

1987 Telecom Australia release an Australian specific TPH version of ISDN, using a unique protocol stack which remained in the Australian market until 1997, then transitioning to the ETSI standard. The 13 premium free-call number range is introduced.

1989 Higher Education Contribution (HECS) fees were introduced for University (including engineering) courses. University degrees until this time were essentially no-cost since 1972.

1991 The 900Mhz GSM telephone system was launched, and the Australian Telecommunications Carrier market is de-regulated. The GSM system public launch was delayed over 6 months while government wiretapping features were implemented.

1992 The Overseas Telecommunications Commission (OTC) merged with Telecom Australia. Pay Television is sanctioned in Australia on October 1.

Australia's OTH radar, "Jindalee" became an operational unit of the RAAF in 1992 near Alice Springs (JORN). Jindalee's transmitting antennas stretch for 127 metres, and its receiving antennas stretch for three kilometres. A 6 kilometre-long radar array is located at Longreach. Calibration sites located at Darwin and Christmas Island.

1996 The Australian telephone free-call number prefix changes from 0800 to 1800 and 1300.

1997 Australia begins migrating from 7 digit to 8 digit number ranges for fixed telephones.

The world's first 21-cm multi-beam receiving system was installed on the Parkes telescope, allowing astronomers to observe simultaneously 13 separate regions of the sky.

1999 Alcatel closes their submarine optical fibre cable plant in Port Botany, one of 3 such plants Alcatel operated globally.

On 14 December, Energy Australia have a $2M substation fire in Chatswood that affects 30,000 subscribers for around 5 hours. The 45MVA substation was commissioned in 1923.

2000 The AMPS analog mobile telephone system is turned off on mainland Australia, remaining active on Christmas and Cocos-Keeling Islands until Jan 2005.

2001 The dot-com collapse leaves just 80 telco's registered in Australia from a peak of over 1000 during the tech-boom.

2002 Hutchison Mobile is the first mobile carrier to meet the ACIF-C518 compliance for call charging. It involved re-engineering the C518 compliance originally designed for wire-line carriers.

2003 Richard E Butler becomes governor of Tasmania on 19 October for a short but controversial term.

2004 Morse code requirements are dropped for HF radio operations by the ACA on January 1.

The CSIRO built ALFA (Arecibo L-band Feed Array) went into service in April. It allows scans of the sky seven times faster than before.

Corporation Lane in the Melbourne CBD is renamed ACDC Lane.

John Francis Ross AM, receives the Engineers Australia 'John Monash Medal' for 2004 for his detailed history of radio broadcasting, including artefacts for the Telecommunications Museum of South Australia.

(The @ symbol is formally allocated as a new Morse Code character in March)

2005 Telstra uses the FOI act to find out who has filed complaints about them.

ACMA assumes the existing responsibilities of the ACA and the ABA; regulating broadcasting, online content, radiocommunications and telecommunications carriers from 1 July.

2006 The ACMA ratify the 'Foundation radio Licence', and entry level amateur hobbyist licence. The 1981 Whites Cliffs Solar steam power station received a National Engineering Landmark plaque on 11 October. At 1100hrs (0000UTC) on Friday 1st December 2006 the Telstra (OTC) Seaphone service was be shut down. The Seaphone radiophone was the last of the Maritime services that Telstra, and before that OTC, and before that AWA ran. Nearly 100 years of unbroken heritage ended !

2007 A major bushfire caused a failure of the 2,000MW NSW electrical interconnect with Victoria, blacking out over 150,000 people in Victoria on 16 January.