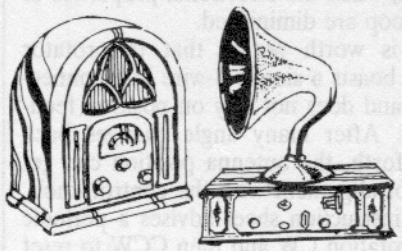
Vintage Radio

by PETER LANKSHEAR



The Atwater Kent 20C

The Atwater Kent brandname was very widely known in the 1920's, not only in the company's home country (the USA) but here in Australasia as well. And one of the classic A-K radio receivers was the model 20C, released in 1925.

One of the most respected names in early American radio manufacturing is that of Arthur Atwater Kent. At the beginning of the century, he had become a very successful maker of automobile electrical components, featuring high quality metal pressings and Bakelite mouldings. In 1907, he invented the single spark, automatic advance ignition system, still in use today.

When radio 'took off' in the early 1920's, his specialist market in automotive components was falling off, but he was in a good position to make finely finished superior radio components including variometers and transformers.

Radios without cabinets

Atwater Kent's Bakelite mouldings were beautifully finished and their rich brown colour became, together with polished metal work, almost a trade mark. By 1923 he was assembling his products into built-up radios.

These early receivers were not given cabinets, but the components were mounted on polished mahogany bases. Known as 'Breadboards', they are today highly sought-after by collectors, and to see one is to understand why. Apart from the novel construction, the combination of lacquered mahogany with finely finished Bakelite and metal, makes a very attractive combination. Few, if any, were sold in this part of the world.

The most successful Breadboard was the Model 10, comprising two RF stages, a grid leak detector and two audio stages. Mr Kent refused to pay royalties to the Hazeltine Corporation for rights to Neutrodyne patents, so his receivers used simple grid resistor stabilisation. His factory, located in Philadelphia, did make some receivers using only two tuning controls, but the standard at this time was the classic three tuning control receiver, produced by literally hundreds of manufacturers.

By the end of 1924, the public were ready for less technical looking radios, so Atwater Kent took the model 10 and put it into a simple mahogany cabinet, naming it the model 20, which sold well.

Most manufacturers used engraved Bakelite or Formica front panels, giving their radios the appearance of laboratory instruments. These panels were expensive and created production bottlenecks. With his usual flair for creating attractive equipment efficiently, Mr Kent produced instead, a metal panel sprayed in a fine wrinkle grey/brown paint, which nicely complimented the mahogany cabinet.

Enter the 20C

His good marketing instincts told him that a compact radio would appeal to lady customers, so he compressed the cabinet of the model 20 down to 50cm long by 15cm depth and height. Only half the height of the model 20, it was, at the time, probably the smallest 5-valve radio on the market. Called the Model 20 Compact (20C) part no. 7570, it was an immediate success and by the end of 1925 some 163,000 had been made.

At this stage, RCA introduced a far-reaching change in valve manufacture, and consequently, US radio receivers for 1926 had to be modified.

At its introduction in 1923, the standard American triode had a bayonet base with four stubby pins. The change for the 1926 season was to substitute the more familiar long-pin base, with filament pins of greater diameter that those for grid and anode. Sockets for these new UX201A valves could be cheaper and have greater pin contact area than the previous UV style.

This change is a very good indicator of the age of early battery receivers. If the valve sockets are of the long pin

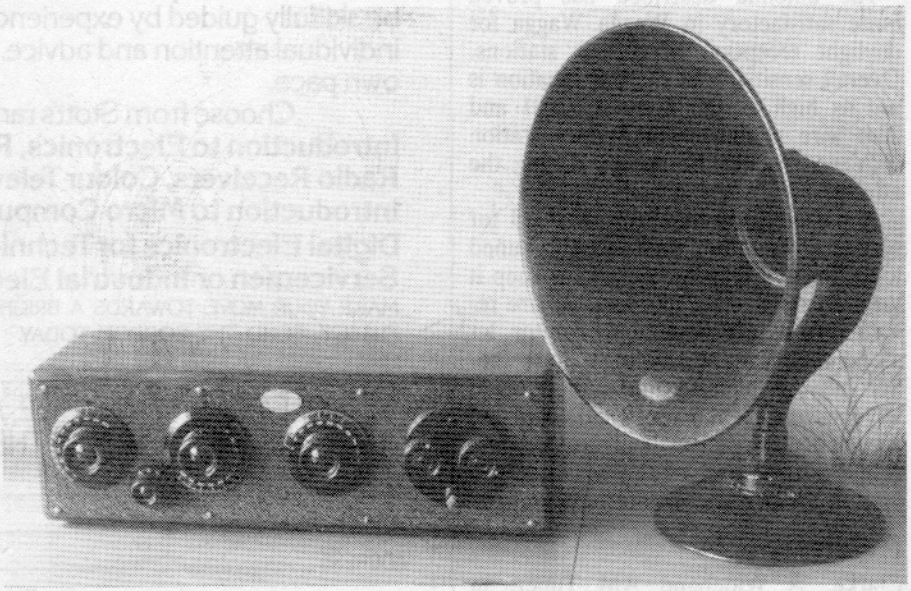
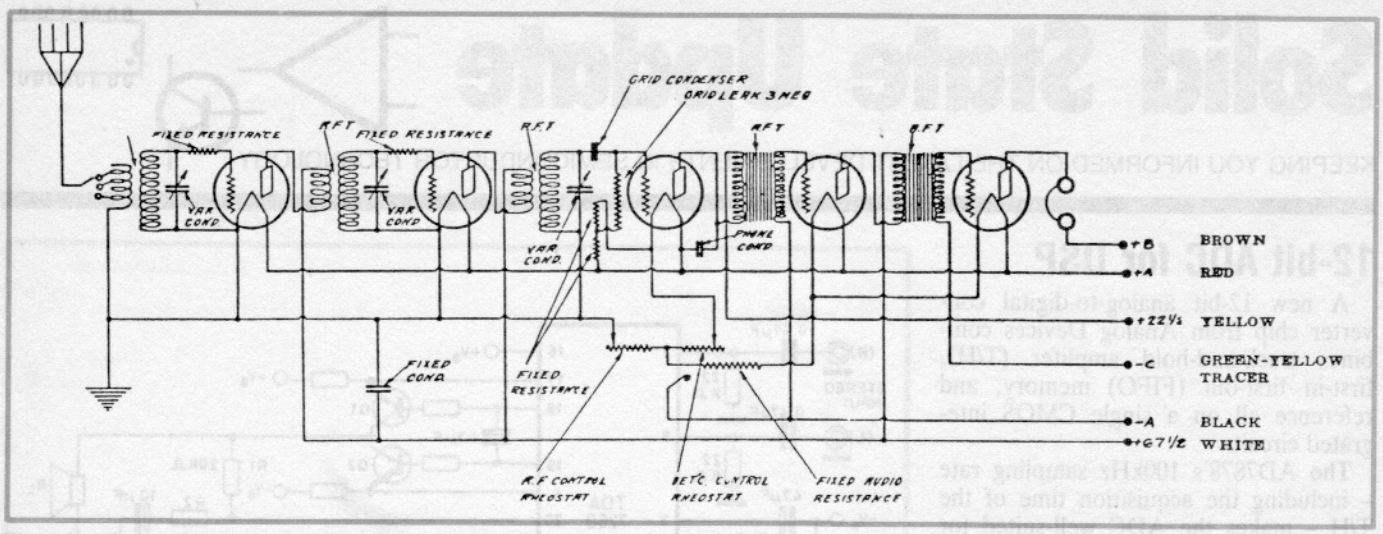


Fig.1: The Atwater Kent 20C was an attractive, well-proportioned and beautifully finished receiver.



The circuit for the Atwater Kent model 20C MkII, part number 7960.

pattern with larger diameter filament pins, the radio is post 1925. There is no mistaking UV sockets. They have a skirt that surrounds the valve base, with a slot or channel for the bayonet pin and the contacts are visible from the top. The post-1925 or UX style of 201A will fit either socket, but of course, the much rarer UV based valves are not interchangeable.

Changes for 1926

Naturally, A-K soon made the socket changes, the new 1926 20C having the catalogue number 7960. This is the version most likely to be found in Australasia. When production ceased in 1927, by which time single knob tuning had become general, 63,000 had been sold.

Other modifications were included in the 7960 pattern. The filament circuits were altered so that the audio valves were not controlled by a rheostat, but ran at the full 5.0 volts. The biasing was also rearranged so that higher HT voltage could be applied to the output stage.

Another change was in the first audio transformer. Originally, the two transformers were of the same pattern, in narrow cylindrical cans. Their construction was of a type that disappeared during the mid 1920's. Called descriptively 'hedgehogs', they were a development of the traditional induction coil and an obvious construction method for an erstwhile automotive electrical manufacturer.

The core was a bundle of soft iron wires centred in a bobbin containing the two windings, and the ends of the iron wires were fanned out and brought round over the outside of the bobbin to close the magnetic circuit. Again using automotive practice, the assembly was sealed in pitch.

In the 7960 model, the transformer connecting the detector to the first audio stage was changed to the more familiar pattern using silicon steel laminations, and requiring a larger diameter can.

The reason for this change was probably that the iron wire core produced insufficient inductance for an adequate bass response when fed from a grid leak detector. As the following second audio stage would have been less demanding, the iron wire core would have been adequate. This retention of earlier components is a characteristics of A-K receivers. In every model can be found earlier style components. New design in Mr Kent's receivers was a steady evolution, more so than with most manufacturers.

Unshielded RF coils

There were no shields around the RF coils. Instead, they were mounted at the rear of their associated tuning capacitors and to minimise coupling, were orientated so that they were mutually at right angels.

Neutrodyne royalties increased the price of a neutralised receiver by as much as 25%. Always an astute businessman, Atwater Kent continued using the cheaper grid resistor stabilisation of his receivers. The 800 ohm resistors were inductively wound, with resistance wire on small pieces of fibre mounted on the rear of the tuning capacitors. It is likely that careful positioning of the coils and the inductive nature of the resistors contributed largely to stabilisation.

To cater for varying aerials, the primary winding of the antenna coil was tapped and connected to a neat little three-position rotary switch. The three tuning knobs were engraved 0-100 and

Continued on page 144

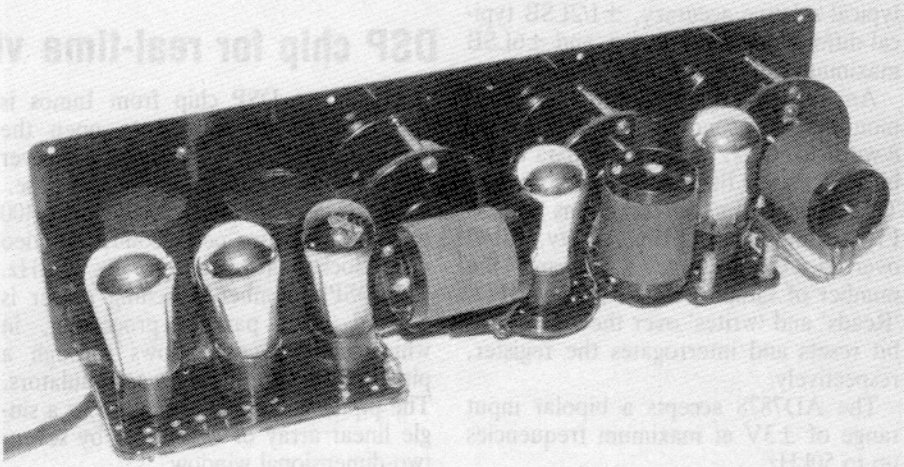


Fig.2: There wasn't much wasted room inside – a very early example of steel chassis construction.

Forum

Continued from page 33

He noted that anyone familiar with human behaviour studies would recognise the signs of an old man fighting to keep up with progress. Hence the letter to Michael Hannan, to recommend that in order to get *EA* back on the rails, Jim Rowe be retired...

Fair enough, he's certainly entitled to his opinion. Perhaps I did get a tad emotional in response to some of those rather insulting letters from SAA protagonists, too – sorry about that, but it's sometimes hard not to get a little heated when you feel you're in the right, and being criticised unjustly.

But retire me? In the normal course of events, it is a bit early at this stage (like about 15 years – sorry to get your hopes up!). Although I won't necessarily say no, should you all decide to take up a collection and make me a presentation of a suitably large cheque, to speed things up. Just make it out to 'The Jim Rowe Retirement Fund' – all donations gratefully accepted!

Seriously though, sometimes the grind of getting the magazine out each month does get a little wearing, especially mornings after half the building has burnt down. Retirement can seem an inviting prospect, even though when I do so I'll probably be bored out of my tiny brain.

So I asked Michael Hannan whether he was unhappy about the controversy that had been generated, and wanted to put me out to pasture. His reaction was short and sweet: "If getting your readers involved like this is bad, let's have more of it!"

Perhaps retirement isn't likely for a while yet then. Ah well, it was a nice thought while it lasted!

And with those comments I think we'll give the double insulation and circuit symbol topics a rest, at least for the time being. Next month I hope to tackle something new again – a subject which should be of interest to almost all of our readers, both amateur and professional.

I hope you'll join me – or at least send a contribution to the retirement fund!

Cabling & Connectors

Continued from page 47

standard, and many printers are fitted with this type of plug. The pin connections for this type of connector are included in the data sheet.

Terminal strips are a basic type of connector that provide a means of terminating or joining wires using screws to lock the wires into the connector. PCB mount types are very useful where a semi-permanent connection is required.

The IDC (insulation displacement) format, available in a wide range of multiway connectors, permits ribbon cable to be attached to the connector by merely compressing the fitting over the cable to cause the connection to be made. Special IDC cable must be used, with this arrangement permitting an almost instant connection to, for example, 40 individual wires.

There are many IDC connectors now available, including most type of D subminiatures, Centronics connectors, PCB edge connectors and a whole range of connectors that have no equivalent other than the IDC type.

The most common IDC connector is probably the IC header, and the sizes vary from 8 pin to 40 pin. As well, there are IC sockets made in an IDC version, again in various sizes. For example, interconnecting two PCBs with a ribbon cable fitted with an IDC IC plug to either end is an elegant way around an otherwise rather messy problem.

In summary, a connector must be compatible with the wire size, be able to handle the required power, suit the environment and be correct for the type of signal being coupled. It is best to go for quality connectors, to avoid electrical 'noise' being generated, or an intermittent connection occurring.

If you have read my previous articles on fault finding, (*EA* Dec and Jan), you may recall that many faults occur in and around connection points. It pays to use the best connectors you can afford, as the bargain versions will eventually fail. Good metal doesn't come cheap these days.

Silicon Valley

Continued from page 69

$US16 million in cash for the operation, and as much as $US10 million more in royalties on future sales of the ion implantation equipment.

Seagate losses bigger than expected

Seagate posted a larger than expected loss for its most recent first quarter. The Scotts Valley disk drive maker said its red ink added up to $US52.8 million, compared to a $US14.7 million profit a year ago.

The large loss came despite a nearly 40% increase in sales, from $US226 million to $US303.2 million. Seagate had earlier announced it would report a loss for the quarter, but the amount proved about twice as large as what most Wall Street analysts had anticipated.

Seagate's problems stem from the firm's apparent error in building some $US300 million worth of new production facilities. Unfortunately, these plants came on-line right when sales of personal computers started to slow down earlier this summer, leaving Seagate with huge inventory problems that has forced it to take millions of dollars in inventory write-offs.

The company didn't specify how much of the $US52 million loss resulted from its inventory control problems.

Vintage Radio

Continued from page 135

as can be seen from the position of the centre one in the photograph, with no stops on the tuning capacitors, they could be rotated through 360°.

A-K eye appeal can be seen in the two filament rheostats controlling receiver gain, which were combined with the on/off switch in a stylish unit – much more attractive than conventional knobs.

The remaining feature of the front panel was the little name plate. These should be polished with care because, typically, they were gold plated!

Few other components were needed in these early radios. There was a 0.3uF HT bypass capacitor, and a couple of mica capacitors in the detector. A short piece of resistance wire of about one ohm was used as a filament resistor, reducing the voltage to five whilst it simultaneously provided bias for the first audio stage.

As grid leak detectors are at their most sensitive with a small positive grid bias, a tapped wirewound resistor across the filament line provided a suitable return point for the grid leak resistor. Most grid leaks of this era were removable and were of similar size and appearance to glass automotive fuses.

No radio of this era was complete without a horn speaker. Normally these horns, which were driven by oversized headphone type units, were made of wood, paper mache or very commonly, spun aluminium. Not so Atwater Kent's horns. He considered these materials to be inferior and all his horns, including the type 'L' illustrated, were made from pressed steel and weighed considerably more than their contemporaries. Finished in dark brown wrinkle enamel, the type L horn speaker is a fitting companion to the 20C receiver.