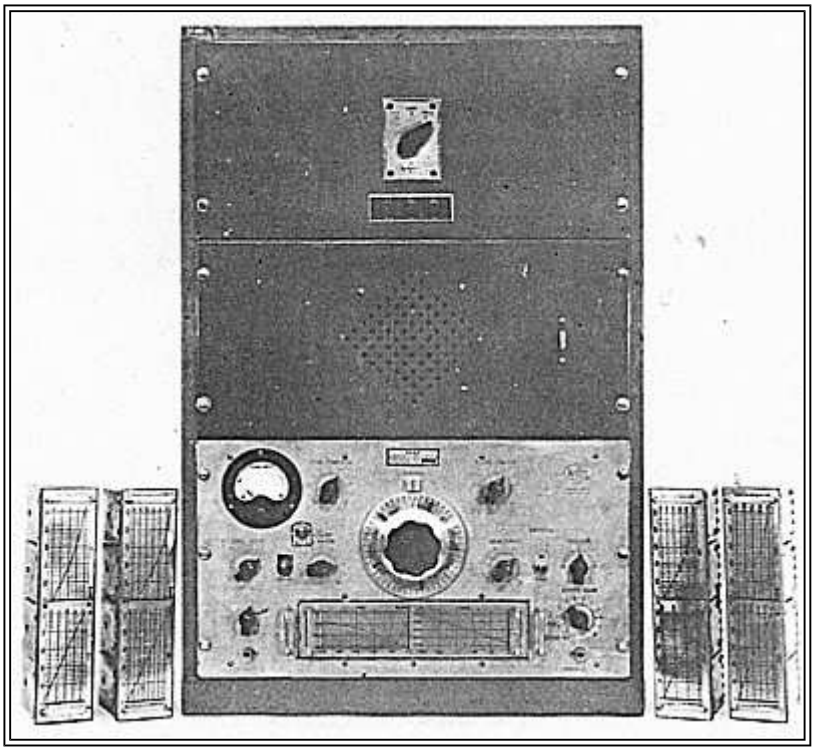


The Kingsley AR7 Receiver is almost a legend in WW2 Australian radio history

Here is some AR7 history a little further down the track

by Lloyd Butler VK5BR

I was interested to see Rob Gurr's article on the work he had done in restoring an AR7 receiver and which was presented in the Adelaide Hills Amateur Radio Society June Newsletter which can be found on the Society web site:- http://www.qsl.net/vk5bar/. This incited me to write a few lines about their use in the Department of Civil Aviation (DCA).

The Receiver called the K/CR/11 was designed and built during the WW2 years by the Kingsley Radio Company in Melbourne and was adapted by the RAAF as the AR7. Articles I have read indicate that about 3500 of these were built and supplied to not only the RAAF in Australia but also to the Services in New Zealand and USA. The Army also called it Army Reception Unit No1. The tuning system was very much based on that of the very popular National HRO. For a complete detail of the AR7, one can do no better than refer to the article on the Internet prepared by Ray Robinson VK2ILV: http://www.shlrc.mq.edu.au/~robinson/museum/AR7/

History of the receiver in the Services is well known but during the years around 1950 era, the AR7 receiver became the standard HF radio receiver for DCA aeradio stations. These had been recovered from previous use by the Services such as the RAAF. I worked for DCA around 1949 to 1953 and was involved in the refurbishing of them in our Parafield regional workshops and in their installation at various aerodromes throughout SA and NT.

Before re-use we stripped the receivers right down to their chassis, redone the cadmium plating and rewired them. Also within the workshops, we constructed Codan (Carrier Operated Device Anti-Noise) units which operated in conjunction with the AR7 receivers and which were a fantastic development to reduce the receiver noise level in aeradio stations.

In the rewiring process, most minor components, such as resistors and capacitors, were replaced with new ones. In general, the plug-in coil box were retained as original except where fixed frequency channels were monitored, we crystal locked the relevant frequency range coil box.

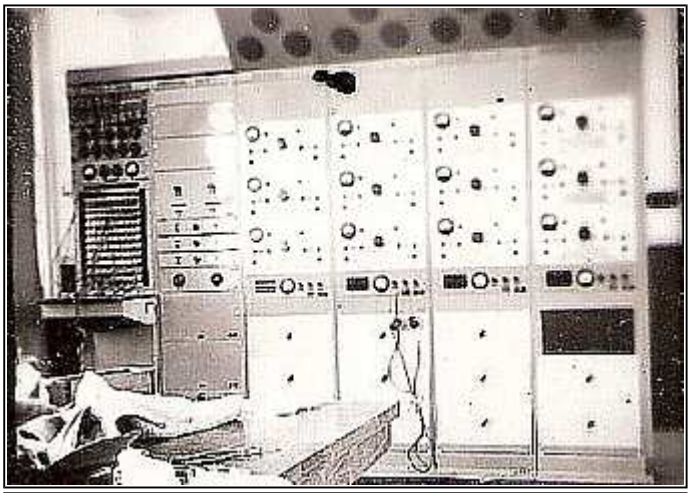
The Communications Officers in aeradio stations, were required to simultaneously monitor a number of different frequency HF radio channels. Before Codan was installed and on days of high atmospheric noise, the total residual noise level could be horrific and must have imposed a terrific strain on the nervous system of these operators. The Codan units completely shut down the receiver outputs and individual receivers only opened on receiving a signal carrier. They were a big step in reducing the stress placed on these operators.

One must appreciate that a simple squelch system, such as used in VHF receivers, would not work too well in the presence of the noise background which can be experienced within the HF spectrum. However the Codan device resulted from a system introduced by James B Rudd, a senior engineer in the AWA research Laboratory and which was documented in the February 1953 issue of the Proceedings of the IRE. The device sampled the receiver 455 kHz IF channel and using an arrangement of special filters was able to separate broadband noise from a narrower band carrier. The output components of these differentially switched the audio output of the receiver. (See Appendix below).

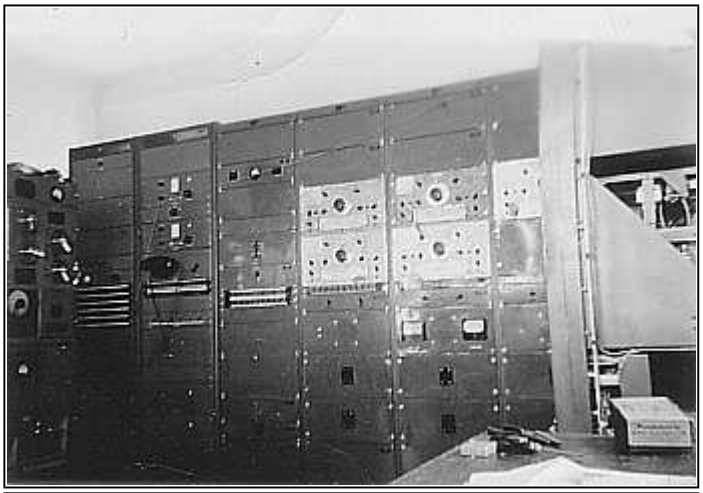
As time marched on, the frequency locked AR7 was replaced by the DCA R20 rack mounted crystal locked receiver which was made by AWA for the specific application required by DCA. The receiver included Codan which was built in as part of the receiver design.

I thought I would include a few pictures of some AR7 installations in which I was involved. (Unfortunately the photos are not good quality - I hope they reproduce). Before I went to DCA, I worked in the Transmission Section of the PMG Dept in Adelaide. The PMG section did a lot of work both for the RAAF and DCA. The first picture is a receiver station at a remote RAAF station at Gorrie, NT. The nine AR7 receivers in the racks are fed from nine rhombic antennas radially spaced around the receiver station and mounted on 27 Metters towers 60 ft high. The rhombics can be reverse switched to provide 18 different uni-directions or 9 bi-directions. I believe the RAAF had a number of similar stations scattered around Australia. (Someone else might be able to give some information on this). I rather think that this particular station didn't get much action as the atomic bombs were dropped on Japan some weeks after it was completed and the war ceased quite abruptly.

The second picture are racks which we installed in the original aeradio station at Leigh Creek. There are four AR7 crystal locked receivers in the racks and the four panels above the receivers are the Codan units.



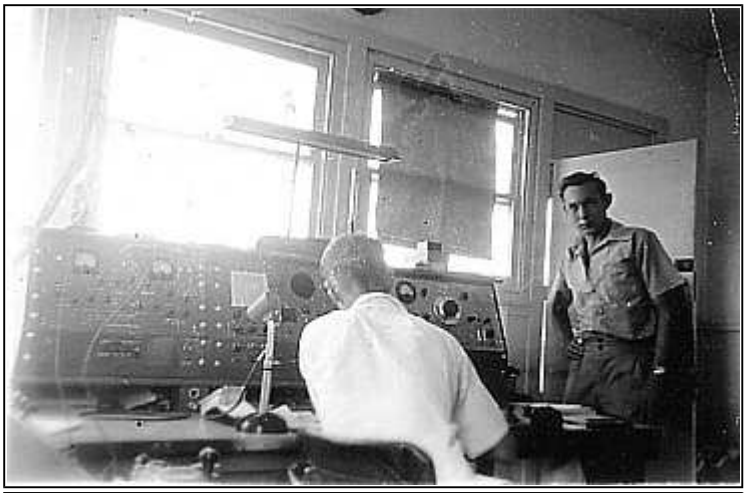
RAAF Remote Receiver Station
Gorrie, Northern Territory



Leigh Creek
Aeradio Station
Receiver and Control Racks

Not all of our AR7 receivers were modified for crystal locking or had Codans. A tuneable receiver was normally provided in the aeradio control console. The third picture shows the operating console at Leigh Creek with AR7 fitted and provided with all plug in coil boxes for continuous tuning (as original). Consoles of similar design (all built in our Parafield workshops) were also installed at Parafield and Mt. Gambier stations.

Each AR7 receiver had its own rack mounted power supply which can be seen in the racks photographed. What I can' t remember is where we mounte the power supply for the receiver in the console.



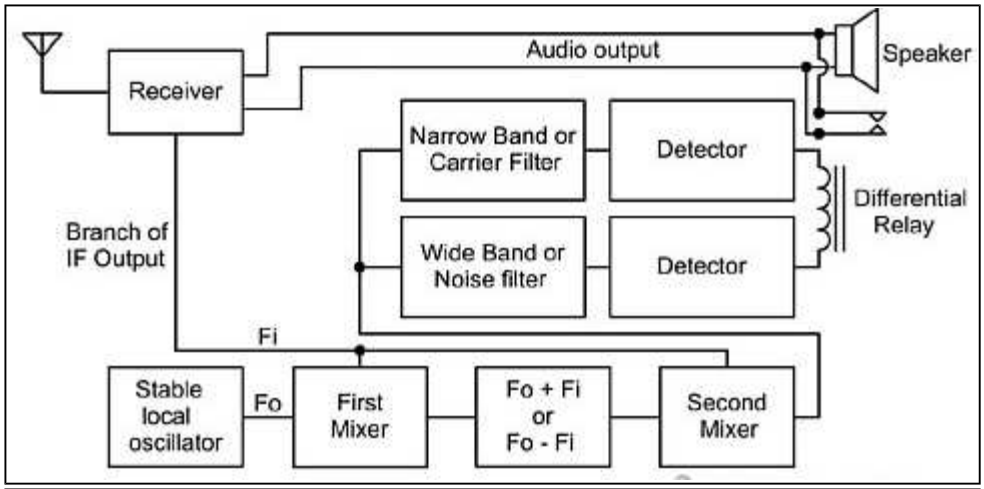
Leigh Creek Aeradio Control Console
Including tunable AR7 Receiver

There must be a lot of old AR7 receivers gathering dust in radio shacks and back sheds, kept for sentimental reasons or as collectors items. I wonder how many have the original wiring and how many were rewired by DCA. How could one identify either? Maybe the vintage of capacitors and resistors or the type of insulation on the wiring might give a clue. There might also be tell tail pick-up of IF signal for the codan.

What I have described here relates to the South Australian and Northern Territory region of DCA. I assume that other regions of DCA would have had similar programmes and I have to leave it to someone else to possibly expand on the use of the AR7 in those regions. Incidentally, the head office of DCA produced their own version of the AR7 handbook as shown.

Appendix - Codan Unit

To explain the Codan a little further, the following diagram was reconstructed from the article written by James Rudd:



Block Diagram of Codan unit used by Rudd with means to balance out effect of frequency Drift.

By using a double mixing system, the IF band is transfered to a new stable frequency band centered at the filter center frequencies.
Not shown in the diagram is a Delay Circuit used by Rudd to impose a relative delay between the two signals fed to the second mixer to improve the performance (This is explained in detail in the Rudd article).