TOTALLY AUSTRALIAN - the A510

Praise From an Outlander, by Dennis Starks
MORE ON THE AUSTRALIAN A-510;
From Steve Hill, & Dennis Starks
CURRENT AUSSIE RADIO EQUIPMENT;
Circa 1966, from Dave Prince
****
POSTWAR BRITISH NUMBERING SYSTEM; From Ray Robinson
Hi Dennis,

When the English WS numbering system (Wireless Set) was reaching capacity, they changed to a new system, commonly known as the Larkspur system in the late 50s early 60s. This coincided with the introduction of new models, which were generally in cast boxes, used FM and the VHF bands. Some were new designs, some were copies.

The A40 from the CPRC-26,
A41 from the PRC-10,
A42 from the PRC-9.

The numbering system meant:
A 0-10 Manpack
B 10-100w Man Portable
C 100-1Kw Vehicle
D 1kw-10Kw Transportable/Mobile
E >10kw Fixed

10-39 3-30mhz
40-69 30mhz-3ghz
70-99 above 3ghz

Ref: Larkspur, Louis Meulstee, Radio Bygones June/July 1995, P20-26

Regards
Ray VK2ILV
<robinson@srsuna.shlrc.mq.edu.au>

ed) Louis Meulstee is the Dutch author for an excellant series of books(two known at this time) entitled "Wireless for the Warrior", A technical history of Radio Communications Equipment in the British Army. Vol. I Wireless Sets No.1-88.
Published by the same company as Radio Bygones:
GC Arnold Partners
9 Wetherby Close, Broadstone
Dorset BH18 8JB England.
British Library number ISBN 1898805 08 3.
It is not known whether this book is yet available in the U.S. or Australia but it is a very worthwhile addition to your library.
****

TOTALLY AUSTRALIAN, the A510

Praise From an Outlander, by Dennis Starks

FOREWORD

I feel somewhat strange about writing this article, me being an American writing about an Australian set. Especially as I have never seen either it or it's manual in the flesh. I sincerely hope that with the material previously written, & that provided by Steve Hill, I can do this great little radio the justice it deserves. I further expect to correct my lack of material, both hardware, and printed mater with Steve's help, or any other volunteer, in the very near future, translation, I'm gonna get me wonna these neat little bastards.

IN THE BEGINNING

The A510 is a miniature tactical HF transmitter/receiver man pack set built by Amalgamated Wireless Australia (AWA) in the mid fifties. Though manuals are dated 1956, one of it's first public introductions was by way of a Cover Page Photo on the November 1954 issue of "Radio and Hobbies", which was followed by an article entitled "Radio for the Army" in the December issue of this same magazine of Australian origin. Though the text of this article indicates that other material had previously been written in newspapers etc, examples of these have not been found. As the set was completely designed, and built in Aussie Land, it instilled a great deal of well deserved national pride which it still enjoys today. Though the above article is very well done, it is greatly lacking in information as it applies to the technical aspects of the Radio, I/E frequency range, use, power output, tube line up, power requirements, design, etc. In this respect it is very similar to WW-II vintage U.S. publications where the publishers and sources are over protective of the possibly sensitive nature of the information they might divulge. In fact, the paranoia in this case is so acute, that even the model number of the radio is not divulged even though the article contains numerous excellent pictures of the set, both inside and out. Even at that, the article is very good and gives us some valuable insight into the development and use of the set, Especially as it was written after some actual use in the field, with Korea named specifically. Hereafter when referring to this article we will simply call it (ref.#1).

Dated prior to the above, January 3 1953, as featured in a issue of the AWA Journal(I suspect an In-House publication produced by the manufacturer), in an article entitled "Answer to Jungle War", the A510 is described, and it's production announced, with an initial order of 1400 sets having a cost of 340,000 pounds (pounds as in monetary system, not weight, who knows what that is in real money?). Here it is reported that the radio set's prototypes had been recently tested under fire(actual combat) in Malaya. Further, the A510 is compared to sets currently in use (I wish I knew what these were), and is said to be 1/2 the weight at 17lbs vice 34, it's batteries have 1/2 the weight yet twice the life, double the frequency range of the existing set, and contact times to the net stations cut from 10 minutes to 50 seconds. This last would lead us to think that the set it replaced was not operable without being set up. Possibly a British set of WW-II origin like the W.S.#48 or #68 either of which would match the information given. Hereafter this article will be referred to as Ref.#2. The text goes on to say:

"The new set has created considerable interest among Service Chiefs in Britain, and America. No set so light, compact, and powerful has yet been developed anywhere in the world. Experts believe the new Australian set may become widely used by other countries".

As I am not expert on British equipment or development, I cannot speculate as to the impact this may have had on them, I do know that several British sets both before after the advent

of the A510 share some very common characteristics. In the U.S. development was going on with equipment having similar operational parameters. It's also known that foreign equipment was routinely tested if for no other reasons than it's design concept, or packaging. This is indeed the case with the Canadian CPRC-26. During this same decade, the U.S. had progressed far beyond the use of miniature tubes(as used in the A510) in any of it's portable equipment. Instead, SUB-miniature types had been in widespread use sense post WW-II. American designers were then preoccupied with trying to develop practical applications for the then relatively new transistor, and had completed prototypes of such radios as the PRT-4/PRR-9, and PRC-25 among others. Only one radio emerged during this time period that might have been influenced by the A510, this was the PRC-7 developed for the Navy. We do not know if the PRC-7 ever entered production. Regardless, it's internal & external design were completely different than the A510. I for one, would have been most delighted if the U.S. had acquired at least a small quantity of these little sets.

THE RADIO SET,
While I generally describe sets of this type as Man-Pack, or Back-Pack, the A-510 really fits neither. The former usually being a set that while transportable by one or more men, is not operable while in motion, and must be set up for operation in a stationary manner. The later, as a set that is worn on the operators back, and is operable from this location while in motion. The A-510, while it could indeed be setup for simi-fixed operation, thus extended range, it could also be operated while in motion, being worn by the operator. Though not on his back, and in a manner distinctive to Commonwealth equipment! The set was worn in two canvas bags around the waist of the operator, usually across his stomach. The transmitter in one, the receiver in the other, connected by an umbilical cable. The photos available would make it appear that this was a rather cumbersome arrangement, especially with an 8ft whip sticking out the top of this tiny transmitter, but it must have worked. Another peculiarity found usually only on Commonwealth equipment, is the internal desiccating material contained inside the cases to remove humidity including also an indicator to show if humidity has leaked into the unit. This along with the extremely rugged construction of this set clearly show the radios intended purpose in life, and the environment that it and it's users would be expectedly operating in. To include an extensive use of the vast experience the Australian Army has gained in many years of operations under these conditions. Indeed Ref.#1 states;

"World War II taught many lessons about man-carried radio sets, and these lessons have been well learned, and absorbed."

Both the transmitter, & receiver are housed in cast aluminium, watertight cabinets each measuring 3.5 x 6.5 x 8.5 inches. These dimensions are inclusive of the batteries, which are contained inside each unit (further details on battery placement later). The set has a combined weight of 20lbs, which includes all the ancillary equipment when being worn by the operator. These ancillary equipments are carried in two each separate canvas bags "Satchels Signals", one containing the handset, whip tuner and whip aerials (Aussie for antennas), while the other carries other miscellaneous accessories.

The built in ATU allows a large variety of antennas to be used including several different wire types or an 8ft whip. The antenna connector is designed such that the whip antenna tuner (basically a tuneable base load coil) clips onto the connector. This whip antenna also includes a ball and socket joint to allow whip movement. A couple of the usable wire type antennas are, a dipole with a balanced feeder, or a short wire antenna with a counterpoise, both are in turn provided with marks indicating wire length, for the purposes of tuning the antenna. The counterpoise may also be used to improve whip antenna performance.
Two weighted guy ropes are used for suspending these wire antennas from trees.
A typical accessory package includes an 8ft whip antenna with spare, headset with a built in boom microphone, a miniature key that can be clipped onto the operator's body or the

transmitter for CW operation, a telephone style handset that can also be used in parallel with the headset, the rod tuner for use with the 8ft whip, a hand crank generator, spare batteries, and three each wire looms for the associated antennas.

THE RECEIVER

The receiver is a high quality five valve (that's Aussie for "Tubes") superheterodyne type with performance rated as excellent by all accounts both past and present. It features 2-12mc operation with two bands, VFO control, AM and CW modes. Front panel controls include a lockable frequency tune control, volume, band switch, and a pushbutton that controls the frequency dial light, lastly, two headset jacks similar to those inline types found on the CPRC-26.

A very novel approach to mode switching saves the set from wasting precious space on it's tiny front panels. Plugging in the CW key automatically switches the set from AM to CW operation. This action simultaneously turns on the receivers BFO, and switches the transmitter to CW. There is no separate BFO pitch control, which to my mind is a waist of panel space on any receiver regardless of it's size. The basic power required for the receiver is 1.5vdc for the heaters/panel light, and 90vdc B+,(or HT "High Tension" as the Aussies like to call it). This normally provided by the set's internal batteries (A & B respective), which would allow ten hours of continuous operation. The heater battery is contained in the receiver, while the B+, and bias (-7.5vdc) batteries are housed inside the base of the transmitter.

For those interested in such things, the tube line-up is as follows;
1T4, 1R5, 2ea 1T5, 1S5 in order from the antenna to the headphones.

THE TRANSMITTER

Contained in a near identical case as the receiver, is it's companion transmitter. It also operates over 2-12mc, both AM, and CW, with an RF power output of about one watt (500mw AM). Using crystal control, it has provisions for operation on up to four preset channels.

Front panel controls include an antenna tank tune, a dual control that is ganged for both channel selection and antenna load, a function switch that selects between OFF/AM/CW/R, 'R' being receiver only. An extra tiny panel meter provides antenna tuning indications, and test the set's batteries, it is aided by a switch with positions A/B/NET, where A & B are used for the best indication while tuning the antenna, and of course NET for 'spotting' the receiver. As with the receiver's frequency dial, the panel meter is also illuminated with control via a momentary switch. Also present are the antenna jack/mount, and the CW key connector. The transmitter uses four tubes to accomplish it's task, these include a pair of 3A4's in the output, another as a crystal oscillator, and a 1T4 as a grid modulator. Power requirements are the same as the receiver, excepting for the additional -7vdc bias.

While it is impossible to adequately here describe the internal skunk works of either units of this set, suffice to say, they are a marvel of mechanical engineering, and quality construction. As can be expected in a radio of this size, and capabilities, the internal parts are very densely packed, amazingly so!!

A FINE HERITAGE

Besides the theatres of conflict already mentioned, Ref.#2 refers to testing and lessons learned in jungle warfare in "[the islands], and more recently in Malaysia", we don't know

exactly what was meant by "the islands", but the text go's on to say;

"The saving of time in establishing communications may make the difference in capturing bandits or letting them slip through the net".

The A-510 is definitely known to have served with distinction along side Australian forces in South Vietnam, AT LEAST until it's probable replacement by the U.S. PRC-64 beginning in late 1965. I do not believe it was completely replaced in all avenues of military service until the advent and widespread fielding of the PRC-F1 series in the early seventies. The later follows closely the design/use concept of the US PRC-74, having the same frequency range, but provided with far greater mode and operational versatility. After this, the A-510 continued to serve with popularity in Army Cadet units until it was relegated to government disposal stores (The Australian surplus system) in fairly recent years. As too has recently been the fate of the PRC-64 and only preceding this radio by a very narrow measure of time.

THE A-510 TODAY

Today the A-510 enjoys great popularity with collectors and users alike, both in Australia, and abroad. Several are known to still be on the air, and used on a regular basses. One set in particular is running around the South Pacific in a Yacht, and is used daily for CW contacts. Another set out of New South Wales is on the air nightly on 80 meters CW. Steve Hill's set is on the air, using a home brewed inverter power supply, and contacts have been made.

In it's country of origin, the A-510 is most highly regarded by radio affectionates and is considered a national treasure, rightly so! It was completely designed and built domestically, with an extensive knowledge of Jungle Warfare that few if any Army in the world can boast. This combined with the radio's significant contribution to history.

I can find no better way to conclude this story than the ending used in the article printed in 1954(Ref.#1), "From our observation we can record that not only has the army received a remarkably efficient and robust radio set, but the Australian engineers who produced it have rendered a great service to their country".

Dennis Starks; MILITARY RADIO COLLECTOR/HISTORIAN
military-radio-guy@juno.com

Acknowledgements;
Much of the material presented here was extracted either from the articles listed in the text, or information provided by Steve Hill with my sincere thanks.
Copies of the articles mensioned were provided by Steve Darveniza, also along with some personal observations. **********

MORE ON THE AUSTRALIAN A-510;
From Steve Hill, & Dennis Starks

SH) I find it quite interesting that the radio that replaced it, the PRC-64 is inferior to the A510. The PRC-64 is a lot smaller and lighter but... The PRC-64 cannot be used on the move which I would think is a major disadvantage for a front line radio. The PRC-64 has more power, but not much, the receiver is limited to four crystal channels, the controls are user unfriendly, and internally the design leaves muchroom for improvement.

DS) While I can also question the existence of the PRC-64 in front line tactical units, and also sight some failings. The basic truth is that the PRC-64, & the A-510 were designed with two completely different concepts in mind, with a corresponding 20 year difference in communications doctrine, and procedures.

The A-510 was designed as a small unit, front line tactical set with the Old School practice of early WW-II mind. This being that HF freqs would penetrate jungle foliage better than VHF. While this is true, for patrol units, on the move, never being separated from other bodies by more than a couple miles, the difference is negligible. And when combined with the added bulk of the A-510, and the extreme frequency congestion and management problems of a modern army(especially with 4 or 5 armies in the field in relative close proximity), any advantage of the A-510 in this role could be quickly outweighed even by the lowly PRC-10. While the A-510 would indeed have some merit over the PRC-64 in use as a simi-fixed installation. It lacked the ability to be used with a code burst generator (GRA-71) which received every bit as widespread use in the Australian Army as it did with the U.S.'s. Further, the PRC-64's use of mechanical filters in its receiver allowed for closer channel spacing thus less frequency congestion/conflict. Lastly, and probably most important, the PRC-64 was far cheaper to produce than the A-510, especially in quantities. As I've reported, the A-510 is a marvel of mechanical engineering, design, and quality construction. This all has a correspondingly high cost in materials, and specialized parts. The PRC-64 excepting for it's far cheaper stamped out aluminium case, was built entirely from "off the shelf" parts.
We can surmise that at the time of Australia's entrance into the Vietnam conflict, there probably wasn't a sufficient quantity of the A-510 on hand. If there were, battlefield casualties would have quickly reduced their numbers. Australia has a traditionally small peacetime army, with an even smaller military budget. This combined with the above would easily spell the demise of the A-510.

SH) I built a power supply to allow my A510 to be operated. This is necessary as batteries are not available. My power supply consists of a 1.5Volt cell for heaters, a 9Volt cell for bias, and a home brew inverter powered by a 12Volt sealed lead acid battery to make the 90V HT. The power supply fits nicely into the battery compartments, allowing me to use the set on the move. I have had one QSO with the set. My set is serial number 1734. It is in good condition, despite looking used. None of the rubber has perished and all the accessories are in good condition.

DS) you make me green with envy! Some time you might detail the supply you used. I believe you once said it utilizes a filament transformer turned around backwards.

SH) The A510 is a beautiful little radio that I enjoy having, however due to lack of power output and being crystal controlled, it has limited value as a ham set. I believe there is a guy in Victoria who uses his A510 regularly.

DS) while I might agree with the xtal control being a hindrance; definitely not it's power output. This makes it all the more fun! A very young man about 200 miles distant from me, built himself an AM transmitter entirely from junk solid state CB radios (finally a good use for them). Its output was less than 1 watt. To the great amazement of all he regularly participates in daytime round tables on 75 meters, covering a four state area. And many more hams will argue the virtues of 1 watt on CW.

Steve Hill VK4CZT
<SHILL@onaustralia.com.au>

Dennis Starks; MILITARY RADIO COLLECTOR/HISTORIAN
military-radio-guy@juno.com
****

CURRENT AUSSIE RADIO EQUIPMENT; Circa 1966, from Dave Prince
G'day again, Dennis.

The following may be of interest to you and/or the group. This info is taken from the Royal Australian Corps of Signals book "Field Signal Equipment Data Summary - 1966". The equipment is listed as per the index of the book and the 'status' (in brackets) from the summary text. This book was apparently still being used in 1969 because it has handwritten notes and dates till that time.

The 'status' is at 1966 but where equipment became obsolete after that year up to 1969, I have added that info.

C = Current Standard, D = In Development Stages, O = Obsolete
---

Radio set A510 (O)