



AWA Newsletter

#66

June 2011

A Member
of the
SARL



Antique
Wireless Association
of Southern Africa

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AWA Committee:

- * President—Don ZS5DR
- * Technical Advisor—Rad ZS6RAD
- * Net Controller—Willem ZS6ALL
- * Secretary/PRO—
Andy ZS6ADY
- * Western Cape—John
ZS1WJ

Reflections:

I am sure I have told the story many times of my first HF rigs, a Hallicrafters HT37 transmitter and an SX100 receiver. These rigs were given to me by my signals officer in the Commando in the Northern Cape, one Johan van der Linde ZS3EE. Somewhere he must have either pitied me, at that stage a serious CB'er, or thought I had some potential to become a Ham.

Anyway, these rigs found their way home with me after a short stint of a weekend camp and I proceeded to re-build the transmitter.

The receiver worked after a good clean up and a 110v connection and I was astounded at the quality of the receiver.

After doing my exam, for

the second time, I first worked for a year at least using 2m, until I became so frustrated at listening to other hams using the HF frequencies.

When we moved from the Northern Cape to Gauteng, I decided I needed something more compact to use for an HF rig. By then I had completed my stint on CW and had progressed to phone.

The arrival of the FT200. I purchased this rig from Roger at Lima Electronics in Durban and it had been modified to run off 2x 6146 finals. I had reached the stage of more modern equipment.

Then came the FT901, also purchased from Roger. Wow, this was now getting to the big league.

The only problem was every time I read some of the latest ham brochures, my mind would boggle at the thought of the FT1000, and the Icoms with their CAT. And the absolute modern rigs that were available.

Often I would look at my FT901 and wonder if it was worth it. Then came the FT902 with the WARC bands, and all the accessories that went with it. The scope, transverter, tuner, external VFO. I had a big station.

As I look back on all the changes, I realise, valve rigs were really what I wanted. They were like the Chev Biscayne and the Ford Galaxy. They had an attraction that no one could explain.

Best 73

De Andy ZS6ADY

Wikipedia—The FET

The first patent for the field-effect transistor principle was filed in Canada by Austrian-Hungarian physicist Julius Edgar Lilienfeld on October 22, 1925, but Lilienfeld published no research articles about his devices, and they were ignored by industry. In 1934 German physicist Dr. Oskar Heil patented another field-effect transistor. There is no direct evidence that these devices were built, but later work in the 1990s show that one of Lilienfeld's designs worked as described and gave substantial gain. Legal papers from the Bell Labs patent show that William Shockley and a co-worker at Bell Labs, Gerald Pearson, had built operational versions from Lilienfeld's patents, yet they never referenced this work in any of their later research papers or historical articles.

The work emerged from their war-time efforts to produce extremely pure germanium "crystal" mixer diodes, used in radar units as a frequency mixer element in microwave radar receivers. A parallel project on germanium diodes at Purdue University succeeded in producing the good-quality germanium semiconducting crystals that were used at Bell Labs. Early tube-based technology did not switch fast enough for this role, leading the Bell team to use solid state diodes instead. With this knowledge in hand they turned to the design of a triode, but found this was not at all easy. Bardeen eventually developed a new branch of quantum mechanics known as surface physics to account for the "odd" behaviour they saw, and Bardeen and Brattain eventually succeeded in building a working device.

CW Activity:

Another month of activity has come and gone and conditions have been up and down like a yo-yo. The only thing that remains constant is that CW contacts are not affected by the changing band conditions.

It's always amazing to me to hear the hardened CW operator picking signals out of the noise that I find difficult to hear, never mind even decipher. But it happens all the time. I listen to guys like Barrie ZS6AJY when he's on the AWA net and he will soon hear stations and decide whether they are Dx stations operating elsewhere or someone trying to call in on the net.

I think we have all heard stories of CW operators who were able to hold a normal conversation with you and have a CW

contact happening in the background. Suddenly they will say, "Excuse me, I just want to answer that quickly". Then rattle off at 40 WPM and then come back to the conversation.

Now that is something to yearn for. I still battle along at 15WPM and then if there is QRN/M on frequency, it becomes even more difficult.

What is the answer? I believe for anyone wanting to carry on CW, the answer is "practice". Certainly not something I do enough of and maybe that is why I am stuck at where I am.

If you would be interested in more practice times, then drop us a line. KARTS (Kempton ARC) has asked us to present CW classes perhaps on a Saturday afternoon to a group of interested operators.



Something I don't think I am capable of doing, but perhaps you are, or know someone who may be interested in holding these classes. Let us know.

CW is still a wonderful means of communication. Lets keep it alive

DE ZS0AWA/CW ...--

SSB Activity:

Band conditions have not been brilliant these last few weeks, but when 40 is open, it's wide open and running a good QSO on 5-10w quite easy.

It's really great to hear the Western Cape AWA on 7070 on a Saturday morning, but they are also being driven by not so good band conditions on 40m to perhaps try 80m.

Activity is often good and 40m is very often buzzing with activity and one has to look for an open part of the band to conduct any QSO.

This was proved to be the case with the AWA QSO Party held over the weekend of

7&8 May. It was truly good to hear so many stations on frequency. On the SSB section on Sunday a total of 115 different calls signs were recorded on the various logs submitted. This is the most stations recorded on the AWA QSO Party since it's inception

It would have been nice to hear more valve rigs, seen as that is what we are all about, but of course we welcome anyone with any rig to join us. Obviously, the scoring system is made to favour those who use valve rigs, even if you use a Hybrid, you can still double your points.

Our congratulations must go to Pieter ZS3AOR, for an outstanding effort from the

wilds of Namaqualand, for scoring the most points and taking both the AM and SSB section using Yaesu Twins. Well done.



FR/FL 50B Twins

AM:

The AM nets have been running well with some surprise call signs coming in and joining us.

Saturday mornings are still the best time and even though the band is opening a bit later in the winter, good conditions are still the order of the day on 80m.

The band only opens now after 06:30 in the morning, which gives one a chance to lay in a bit later, but with the winter setting in, that is always welcome.

This last Saturday I measured a cool 2 deg C in my shack at 06:15. This was soon altered to a balanced 15 degrees with the help of a heater and some good valves heating the ozone.

The AM section of the AWA QSO Party was also well attended with a total of 40 calls signs being counted on the various logs received. In October 2008 we had 77 stations calling in on AM in the QSO Party.

Wednesday evenings have been good at stages, but still plagued with a lot of QRN and not such great band conditions. But still we try our luck to see if we can at least work a few stations on AM in the evenings and hope that band conditions will change.

Do listen out for the AWA call sign on AM and send us some listener reports if you cannot join in on the net. They will be greatly appreciated.

The Western Cape seems to remain elusive

on 80m and we often listen out for one or two of the Div 1 stations to perhaps call in. We have had them in past, so they could quite easily be worked again.



Collins 75A-4 Rx

Building a 1929 Hartley Transmitter

In response to the article published in last Months Newsletter, Tim ZS6IM contacted me with this information and pictures of his build of this transmitter:

1929 Style Hartleys Transmitter By Tim Bullock – ZS6IM

“Trust that little voice in your head that says: “Wouldn’t it be interesting if...” ..And then do it”

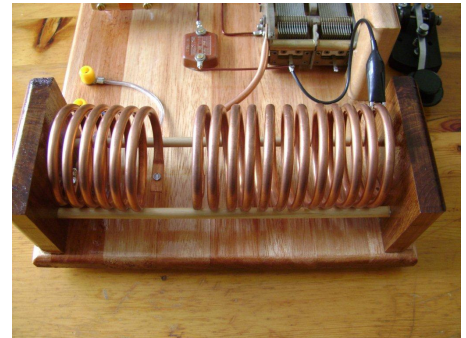
Very wise words indeed and ones I took to heart the first time I came across a picture of a 1929 Hartleys Transmitter. All those cool looking coils and the big tube in the middle, right there and then I knew I just had to build one; come hell or high water. Now that’s all well and fine, but what if you have never built a valve transmitter, or a valve anything for that matter? The answer was found by consulting the Hams best friend “Google” The only caution I can offer is to watch out for information overload, it would seem that everyone and his dog in the USA are building them by the ton J.



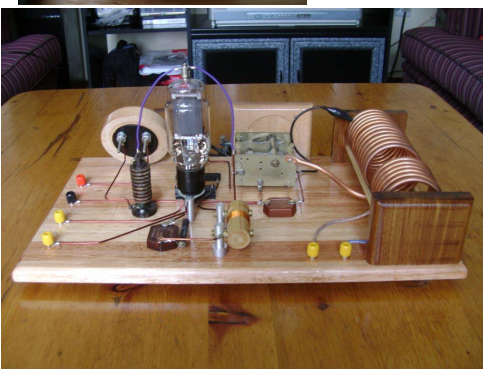
So having armed myself with the requisite information, I started my search for the hardware I would need to fulfil my dream. I was fortunate enough that an older Ham who was a friend of a friend, gave him a box with some valves in, which subsequently found their way into my possession. And even more fortunate that one of those valves would be right for my particular purposes.

A trip to the local air-conditioning supply house furnished a roll of ¼ inch diameter copper tubing which was used for the tank coil and antenna coupling coil. I set out to make the coils first for the simple reason that it is a mechanical process and at least I understood that. It took a while to find a suitable piece of pipe around which to wind the coils. Have you ever tried to buy 60mm diameter PVC pipe? Well don’t bother, apparently it is not a standard size. Fortunately another Ham came to my aid and donated a piece of 60mm diameter Tuffnol to me.

The process of winding the coils turned out to be straight forward. Take the diameter of the pipe, the number of turns required and by the magic of “Google” search for the formulas to calculate circumference and multiply that by the number of turns to calculate the length of tube required. Take the end of the tube, flatten 2 cm of it in the vice and do the same at the other end. Drill a 3mm hole through the flattened end and use a screw and nut to secure it to the 60mm pipe at one end. Secure the other end of the tube in the vise and whilst keeping tension on the pipe, wind the tube up thus forming the coil. Yes, I know that sounds complicated, but it is easier to do than describe and it works a treat. I formed coils for 80M, 40M, 20M and the antenna coupler. In the end it turned out to be over-kill as I elected to just fit the 80M coil and put a crocodile clip on to tap for the other bands. Using the KISS principle (Keep It Simple Stupid) seems to be the best advice here.



That done and it was time to search for a suitable base to construct the project on. I found a flooring shop in Fourways with an off-cut section at the back of the shop. That supplied me with a piece of laminate floor off-cut for the base, some Cherry wood, Kiaat and a nice piece of Oak. The base was sanded and the edges given a once over with the router to round them off after which a couple of coats of varnish was applied. Two pieces of Kiaat were used to form the ends of the coil support and a 6mm diameter dowel-stick from the local hardware store formed the rails on which the coil rests.



Next came the grid coils, of which I made three for the three bands. I used Oak to form the coil supports, turning them to 25mm diameter, wound the coils and varnished the result. Brass screws made up the contact and support hardware. For the variable capacitor and the plate current ammeter, Cherry wood was chosen to add some contrast. The variable capacitor had to be inlet into the wood as the shaft was quite short. A bit of elbow grease and some sharp chisels made short work of that. A dial and index which I found in my junk box was used to give me some form of position indication for tuning.

When it came time to fit the ammeter to the Cherry wood, the only tool that I had to hand was a fly-cutter. Do yourself a favour, rather go out and buy a suitably sized hole cutter. It took me two days of blood, sweat and tears to get the wood “hacked” to a rough shape. It was my trusty lathe that saved the day, otherwise it

was going to be supported by some brass strips. It was touch and go, but in the end, I think the wood surround looks nicer.

At this point, it was back to pen and paper as I tried various positions of the parts to see what would be the best layout on the base. Priorities here were straightest runs for leads, and placement of coils, chokes and caps. As usual, compromises had to be made, but in the end the overall appearance is quite pleasing.

With the tank coils, tank capacitor and ammeter positioned and mounted on the base, it was time to fit all the rest of the hardware. Some mounts were made from aluminium to support the valve base and grid coils and jack plugs fitted along the edge of the base for the HT and filament supplies. I then used 2mm copper wire to wire it up, as it is self-supporting and looks sort of like what I imagine would have been used at that time. To form the centre tapped filament resistor for the keying circuit, I used two half-watt resistors of 47 ohms and some solder tags. The result was then coated with some air drying modelling clay, lifted from the XYL's art workbox, and sanded to size before painting with a matt black paint.

Now, as this project was only loosely styled on the 1929 Hartleys, some changes were made both to accommodate the hardware that could be located at the time, and to improve safety. The HT was applied to the plate (shunt-feed) and not via the tank circuit (series-feed) as in the original, and then a tank blocking capacitor was introduced. This removes the high voltage from the large exposed tank coil. The original Hartleys used a type 10 valve and the closest I could get was a Radiotron 830B. Still, it is pretty, with all that lovely glass and its innards sexily bathed in an orange glow.

Each and every Hartleys I have seen has been built differently according to what the constructor could lay his hands on at the time. This endless variation is part of the appeal of constructing a Hartleys, as it is limited only by one's ability and imagination. It's simplicity is also a big draw card particularly for one such as myself. Nostalgia is the final ingredient in this heady mix of intoxicating ether and I can only imagine what it must have been like sitting in one's shack with signals chirping and shifting with the wind and weather.

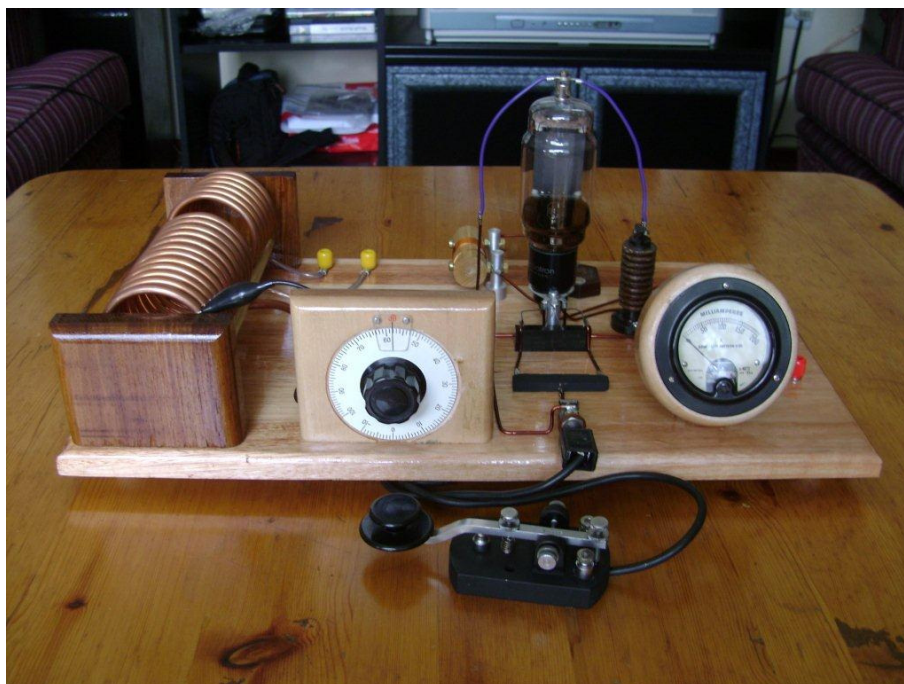
So roll on AWA QRP weekend, and who knows, that signal you are hearing could be coming from a single glowing tube lovingly coaxed to life by a gnome-like figure crouched over the desk and dreaming of a more noble time when real Hams built their own equipment, lovingly, piece by piece.

Perspective is the key, life a sculpture. Choose the angle that suits you best.

73

Tim

ZS6IM



The Battle of the Beams – United States Version

John ZS5JF

Introduction

Although the British scientists perfected the early version of radar, and gave the secrets of this to the Americans early in the war, it must not be forgotten that the Americans with their superior manufacturing base were quick to realise the potential. When America was dragged into the war after the Pearl Harbour bombing by the Japanese in 1941 the whole game plan changed. The long range bombing by the USAAF later in the war against Japan is an interesting story.

Enter the Ferret Aircraft

As the war progressed to its conclusion, in late 1944 the USAAF decided to begin bombing raids on the Japanese islands and mainland using the new Boeing B-29 Super Fortress bomber. These were part of 20th Airforce Group based in Saipan and Guam. This meant they had a 17-hour round trip flight and required extra fuel tanks to be fitted to ensure enough range.

However, before any significant raids could be flown it was decided that it would be prudent to learn more about the Japanese Radar and a plan was put together to send several recon flights of B-24 aircraft fitted with receivers to probe for enemy radar signals. These *Ferret* B-24M's numbered 6 in total and each was especially fitted out with not only multiple receivers but also sophisticated photographic equipment to record possible radar sites. In order to gain sufficient range and endurance all unnecessary equipment was stripped out and large internal extra fuel tanks were fitted in the bomb bays. The only armaments remaining were the twin tail guns.



Radar receivers fitted in racks

In addition to the *Ferret* B-24's two specially modified Mustang P-51s were also based at the 20th Airforce Group fitted with long range tanks and air to ground missiles. These were used to attack and destroy the Japanese radar stations. The Japanese Mitsubishi Zero aircraft was too slow to catch the turbo-charged Mustang with a superior speed and rate of climb.

Initial flights did not turn up too much enemy radar activity and it was suggested that the enemy were not likely to turn on the radar for a single aircraft. Consequently the *Ferrets* accompanied USAAF bombing raids

and the extra activity forced the enemy to activate the radar systems.

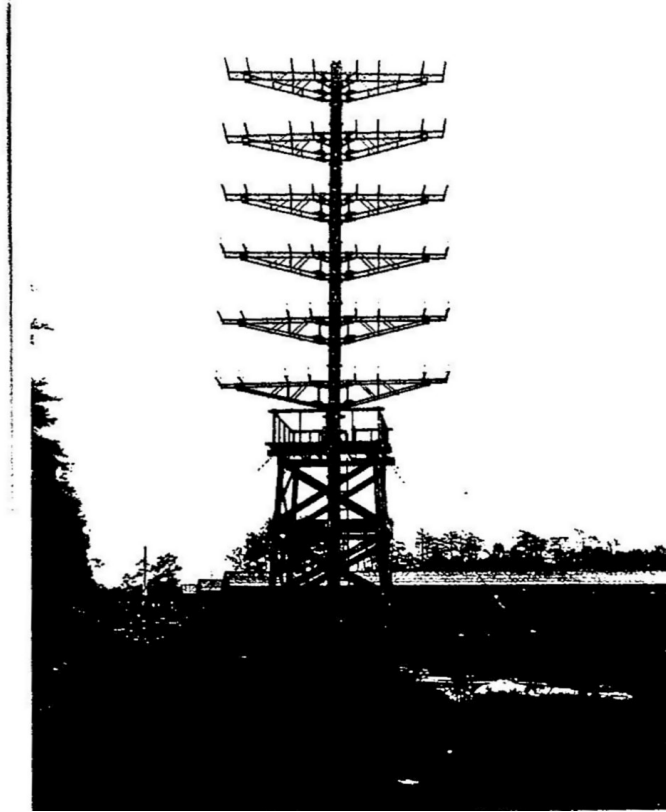
The primary long-range radar used by the Japanese Imperial Army was known as Tachi. They constructed this as an exact copy of the British Army GL-2 gun laying radar. When Singapore was over-run by the Japanese the British Army destroyed all the GL-2 radar's before they fell into enemy hands. Unfortunately in the haste to evacuate a radar technician who had recently returned from a training course in England left his notebook behind. Using this and the remains of the GL-2s they built a replica, down to the finest detail – even using the same red and green glass for the display tubes.

Listening In on the Enemy

Intelligence gathering is one of the vital aspects of warfare and so the USAAF set up monitoring stations to eavesdrop on Japanese military communications. From the bases in Guam and Iwo Jima the 20th Airforce Group had monitoring stations, but the range was limited and to get closer to the enemy it was decided to equip the *Ferret* aircraft with extra equipment. The *Ferrets* now had two additional radio operators drawn from Japanese-American (Nisei) linguists. Earlier flights had carried non-Japanese speaking radio operators but this made it difficult to ascertain if the traffic was useful or just chit-chat. These extra operators monitored ground and air traffic channels. Later the Guam air base personnel added voice recorders to the receivers and extra seats for the operators in which had been the second navigator position in the aircraft. The navigator was moved from the nose to the flight deck behind the pilots, working with the radar operator to precisely plot the aircraft's location, using the SCR-717 navigation radar.

First Ops

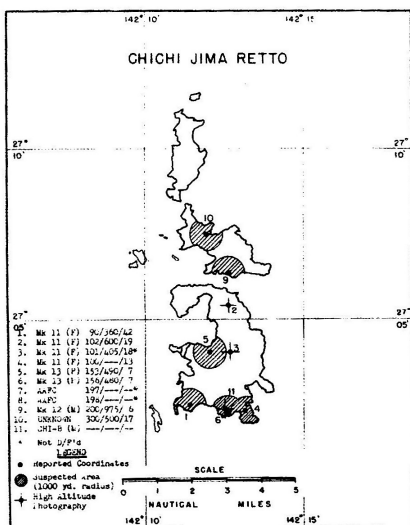
The first operational mission was on May 18 1945 with B-24M 44-41981 aircraft flying for 14-1/2 hours against installations in Haha Jima. The long transit north from Guam and over Iwo Jima limited the B-24M Liberator to three hours of circling over the target area. Having acquired a radar signal the radar receiver operators used a DF antenna slung under the aircraft to obtain a precise bearing to the radar. The pilot then flew along this bearing until the DF signal reversed in direction, hence they had just passed over the target area. By a sequence of square box searches the radar site was pin pointed and photographed by the crew using high-resolution telephoto cameras on board.



The final days

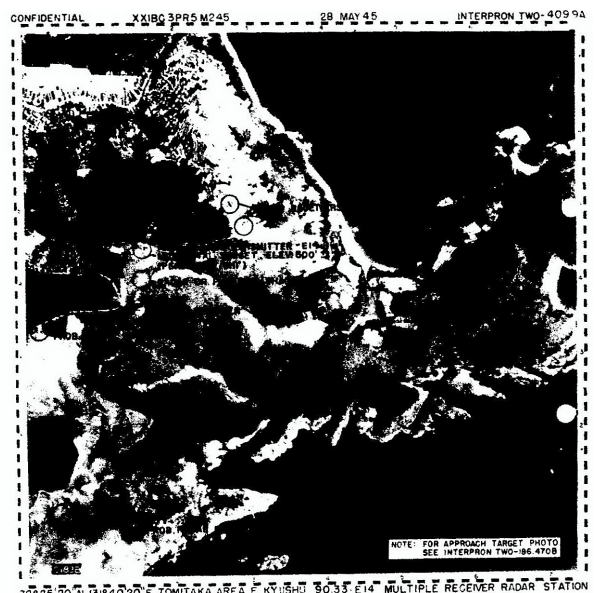
Now that all the aircraft crews were thoroughly trained in the search technique, multiple missions were flown to map other Japanese radar sites. Ferret-6 wrapped up a long mission with a 25-hour flight to Hamamatsu on August 2, shadowing 500 B-29s bound for Honshu. There were also two missions on August 6 with the Ferrets pulling out about the same time as three very special B-29s took off from Tinian on a world changing mission to drop the atomic bomb on Hiroshima. Despite this attack the war continued for a little longer and several more intelligence gathering flights probed deeper into the Japanese mainland. On August 8 one sortie was flown off Kyushu and one the next day off Shikoku. On August 14 three Ferrets flew from Guam to support daytime B-29 strikes on Hikari. The crews landed at Iwo Jima for an overnight rest and flew back to Guam the next day; the war was now over as Japan had surrendered.

Japanese Tachi radar



Right - High altitude photograph of Japanese radar sites

Left - Photo converted to map



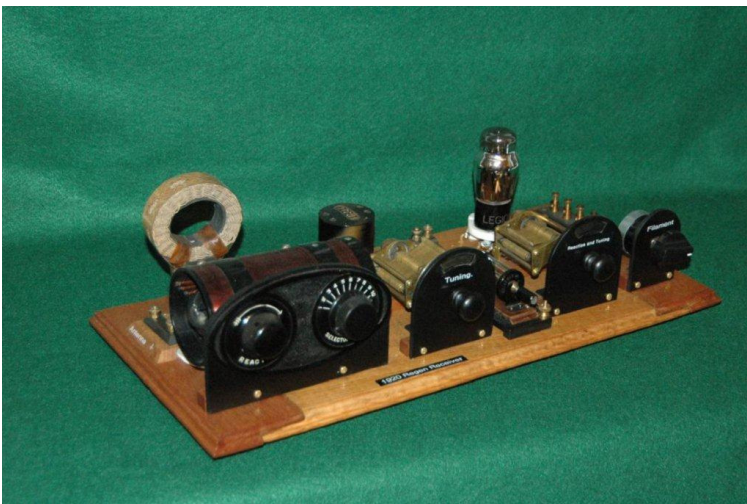
AWA AM and SSB QSO Party:

Congratulations to all who took part in the QSO Party on the 7th and 8th May 2011 and a big thank you to all who participated for making it the success it was.

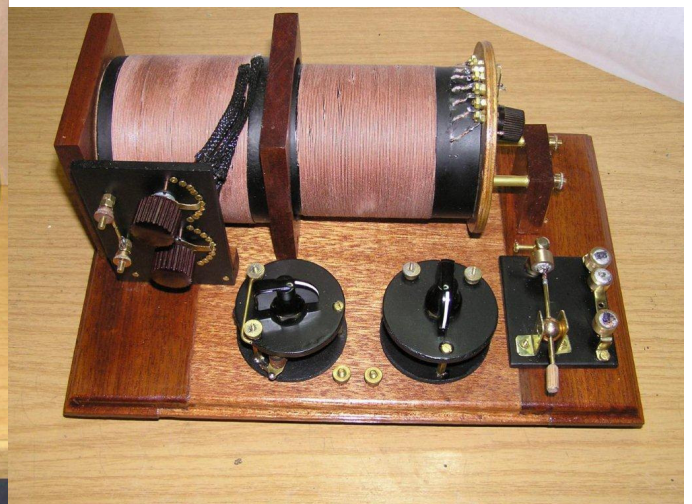
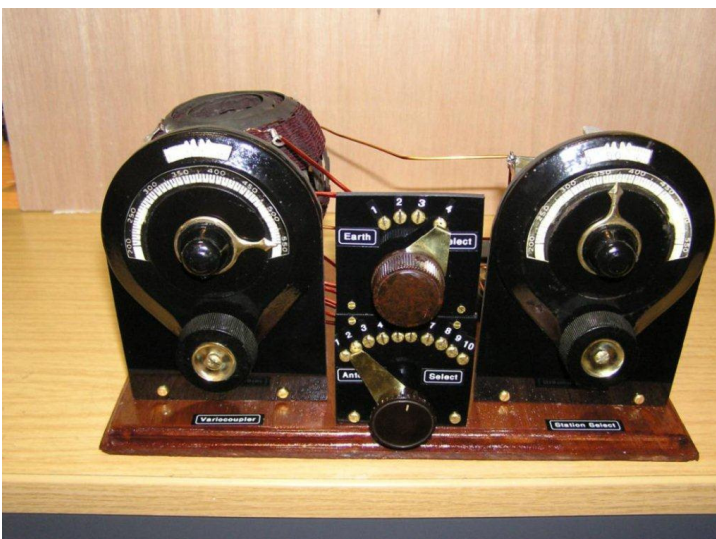
- AM: First Place—Pieter ZS3AOR 45 Points
 Second Place—Pieter ZS6XT 29 points
 Third place— Gideon ZS4SRK 22 Points
- SSB: First Place— Pieter ZS3AOR 111 points
 Second Place— Marius ZS4MP 102 points
 Third place— Pieter ZS6XT 91 points

There were a total of 40 stations on the AM section and 115 on the SSB section. A great turnout, even though conditions on the Saturday for the AM section were terrible.

The ZS0AWA station operated by ZS6ADY and ZS5DR managed 66 points on the AM section and 378 On the SSB section. Certificates will be on their way soon to the top places.



Some Home Brew projects from
 Syd ZS1TMJ



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Antique Wireless Association
of Southern Africa

Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio transmitters and receivers. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association.

Notices:

PLEASE NOTE CHANGE IN MY EMAIL ADDRESS— andy6ady@vodamail.co.za

For Disposal:

Kenwood TS-520 in very good working and cosmetic condition. It is "full house" with the narrow CW filter and the 12 volt inverter installed. This rig has the original S2001 finals and does not appear to have had much use. Complete with dynamic mic, power cables for 220 mains and for 13.7 volts DC and manual on CD ROM. Output 100w on mains operation and 45w on 13.8 v (mobile). R1850. Contact Rad ZS6RAD 082 557 8459 or email rad.handfield-jones@pixie.co.za.

**NET TIMES AND FREQUENCIES:**

The following are times and frequencies for the AWA nets:

AM Net—Wednesday evenings from around 18:30 (depending on band cond and QRN): Saturday mornings from around 06:00 or when band conditions allow. Frequency—3615.

SSB Net—Saturday mornings from 08:30. Frequencies—7070 with a relay on 3615.

CW Net—Saturday afternoon from 14:00. Frequency—7020.
(Times given are CAT or SAST)