AWA Newsletter

 # 99

April 2014

Affiliated to the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

* President—Ted ZS6TED
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
* Western Cape—John ZS1WJ
* KZN—Don ZS5DR

Reflections:

How time flies when one is having fun. Looking back we see that we are already 5 months in to the New Year and what have we achieved in that time ?

I know for the AWA we are going ahead in leaps and bounds.

The AWA website is up and running and going through the final stages of tweaking. You can find the link on the back page of the Newsletter.

The SAIEE museum is coming along with Richard at the helm. Our Open day with Karts Flea market is scheduled for May. The AWA Valve QSO Party will be on the 2nd weekend of May.

So, activity there is plenty of (to quote my friend Yoda) and we just hope that you are also able to become as active as we are at the moment, keeping those valves glowing.

I have seen a number of valve rigs being advertised on the SARL website, which means there is still a lot of interest out there. One of these days, you will be able to place your adverts on the AWA website and hopefully things will move a lot faster.

When I think of where we have come from over the past 11 years to where we are today, one has to ask, what role has modern technology played in the growth that we have seen ? Well of course, the answer would be that without modern technology, we would probably not even exist.

The newsletters are all done by computer. The passing around of information, the scheduling of skeds. The gleaning of spares suppliers and parts availability.

Lets face it, if it weren't for modern technology, it would take us a long time to get anything done.

One could argue of course, that if it weren't for the valve, where would we be today ? I have never seen any good pics of it, but I believe the first computer was also valve driven, and would fill any normal size home, could it be ?

Sadly though, even with all of this technology around, the demise of the valve and valve equipment was guaranteed, had it not been for the many who decided they were as good if not better than any modern day equipment, and saw to it that the valve lived on.

The valve is dead, long live the valve.

Best 73

DE Andy ZS6ADY

WIKIPEDIA

Under certain operating conditions, the tetrode exhibits negative resistance due to secondary emission of electrons from the anode (to the screen). The shape of the characteristic curve of a tetrode operated in this region led to the term "tetrode kink". In general, if the anode voltage exceeds the screen voltage, this region is avoided, and good performance can be expected. But this lower limit on total tube voltage drop prevents widespread adoption of tetrodes for consumer amplification applications. Secondary emissions from a screen have the effect of pulling the screen upward, toward the anode voltage. This implies the need for both source and sink current capability in the ideal screen power supply. A bleeder resistor can usually be selected to prevent the screen voltage from getting out of control. Arcs from the anode generally hit the screen. As such, special care is required in design of the socket wiring, to provide a direct discharge path for arc current. The undesirable nature of the tetrode kink led tube designers to add a third grid, called the suppressor grid; the resulting vacuum tube is called a pentode. More modern tubes have anodes treated to minimise secondary emission.

The negative resistance operating region of the tetrode is exploited in the dynatron oscillator, although this was practical only with earlier tubes with high secondary emission.

EIMAC 4-250A power tetrode

CW Activity:

CW is alive and well in SA. I do not say this lightly either because there has been quite a bit of activity around this past month.

Eddie ZS6BNE has bee reporting regularly of DX contacts being made after dark almost every evening during the week. Many of you will know, that Eddie does not run high power, but prefers anything below 5w. His reports of good Q5 contacts to many different parts of the world are quite exciting.

The usual AWA nets on Saturdays have been giving good results on 40m, but then Thursday evenings from 19:00 the conditions down to the Western Cape have also been excellent.

Regular contacts with Adrian ZS1TTZ and Dirk ZS1X have been made with good results, with some Div6 stations also appearing at the regular times.

The bands in general have been pretty good and one can listen from around 19:00 and hear the noise slowly dissipate as the band changes and conditions improve.

Over the weekend, 20m is also producing some good results on CW and many DX stations can be heard.

Give call and see how many stations will come back to you.

OM John ZS6JBJ dropped me an email from W land where he is making regular contacts on CW and tells me the locals there are asking where all the ZS stations are on the DX bands.

We say good bye to Om Dick ZS6RSH who returns to the US after spending about a year in SA and has become very well know on CW here in SA. Dick has also only worked QRP and mostly from the back porch in his garden or some secluded spot on a park bench, or out in the bundu. Dick has experimented with various stand alone antennas with excellent results.

Do come along and join us on the net on Saturday afternoon, or simply come up on 40m and call CQ and see what happens.

Ray GE0ML Collection

SSB activity:

The bands are probably still not at their best, with the result being that there are still a lot of changes in band conditions during any QSO of a lengthy period.

One minute a received signal can be at 5/9 and the next its down in the noise. Quite disturbing when you think of it.

For the Western Cape net, please remember that the Saturday morning net has now moved to 80m and can be found on 3630 for the winter period from around 07:15.

After the Easter weekend breaks and all the others that go with it, Saturday 10th May, we will be back to relaying the 40m national net on 14140 to the Western Cape.

Remember to join us on Sunday 11 May from 15:00 to get in on the Valve QSO party. You don't have to be in it for the points, but it would be nice to hear as many as possible on the bands using valve equipment.

In past years, I think there have been more solid state rigs on than valve equipment, but hopefully that will start to change as more and more valve rigs are restored. So dust them off, connect an antenna and mic, and lets hear how many we can get in the log book using hollow state technology.

Full details are on the page 7.

Hopefully band conditions will be good enough in the late afternoon to evening to get some Div1 stations on 40 and who knows, 80m may be good enough to get some good contacts for a change.

The last few years, 80m has not proved to be very successful, but we can only hope.

Drake T-4X

AM:

Conditions on AM are certainly not great, but a big improvement from the summer storms we used to suffer with.

The Saturday morning session is still going well and conditions there are pretty stable. The only difference is, now one has to drag yourself out of bed when its still really dark to catch the best of the band conditions.

Wednesday evenings have proved to be more successful than in the past, with the band giving some pretty good conditions without the usual QRN pounding in and making life difficult.

For some reason, the Wednesday night groups have grown in number on the odd occasion with a good few more than we have had before.

Remember the Valve QSO party on Saturday afternoon from 15:00 on AM. Please stick to the frequency allocations as AM will disturb many others on the band with its wide transmissions.

We are looking forward to hearing many of you on AM so do get your rigs up and running.

Full details appear on page 7.

The last few years, bands have not been that great for AM, but maybe this year we will get that breakthrough we have been waiting for. I still need to get some Div1 stations in the log on AM and hopefully we can do that this time round.

Here's to hearing as many of you as we can on AM and hope that the bands are kind to us. It could prove to be a very interesting weekend.

Heathkit DX40

Vintage satellites part 2
by Richard ZS6TF AWA Historian

Just 4 years and nine months after the first satellite Sputnik was launched, Telstar, the world's first privately financed telecommunications satellite was launched on 10th July 1962. Conceived as a complete broadband space relay system for telephony and television designed by Bell telephone Laboratories and owned by ATT, The project was part of a multi-national agreement between the United states AT&T, Bell Telephone Laboratories and NASA , British Telecom, and the PTT in France to develop experimental satellite communications over the Atlantic Ocean. The US ground station was in Andover, Maine, the main British ground station was at Goonhilly Downs in south-western England, and the French ground station was at Pleumeur-Bodou in Brittany.

Telstar was Launched aboard a 50 ton Thor-Delta rocket from Cape Canaveral into an elliptical orbit completed once every 2 hours and 37 minutes, inclined at an angle of approximately 45 degrees to the equator, with perigee about 952 kilometres and apogee about 5,933 kilometres from Earth. The satellite was spin-stabilised. Technology for geo-stationary satellites was still 2 years away.

Roughly spherical, measuring 87.6 cm top to bottom, and weighing 77 kg, Bell telephone labs had to design Telstar to fit into NASA's rocket. It was a masterpiece of packaging on a framework of magnesium supporting an aluminium skin with 72 facets; 60 of these housed 3200 solar cells generating 14 watts into 19 NiCad rechargeable batteries to power the electronics. Containing 2528 discrete semiconductors, these were encapsulated in poly-urethane foam and sealed in an aluminium container suspended on nylon cords to absorb shocks and vibration.

The uplink was on 6390 MHz, received on the upper omnidirectional array of small box shaped antenna cavity elements around the satellite's "equator" and the downlink on 4170 MHz was transmitted from the similar array beneath. One TV channel or 60 duplex telephony channels was handled by the same transponder which converted the received 6 GHz microwave signals to be relayed to 4 GHz. After amplification in a traveling-wave tube amplifier, the only thermionic device employed on board, they were retransmitted at a constant power of 2 watts irrespective of received signal levels. The helical antenna on top was for tele-commands from a ground station and transmissions for positional purposes on 136 MHz.

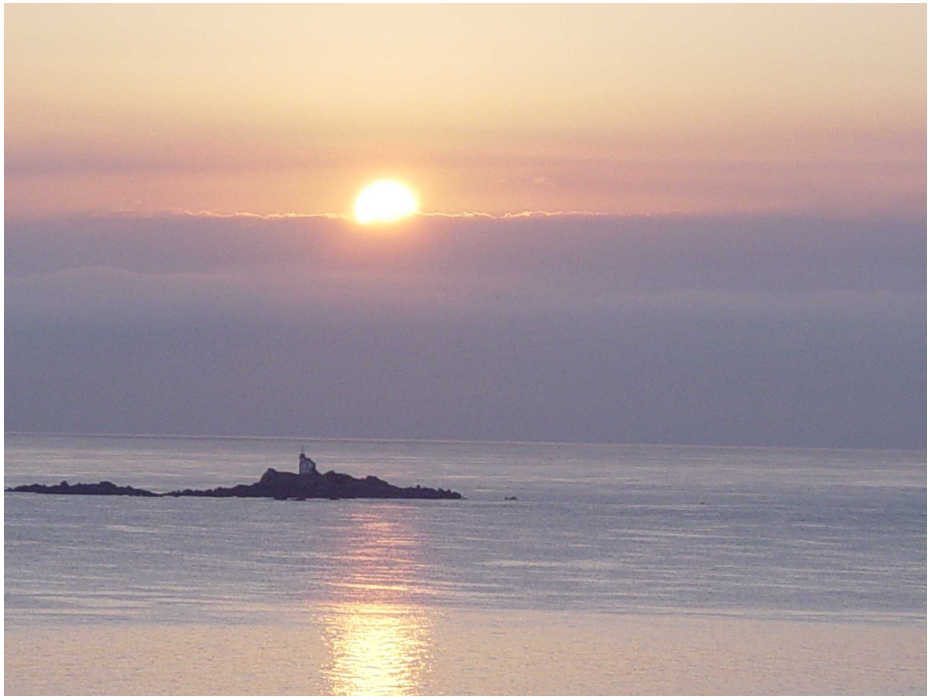
More ground breaking technology was used in the ground stations; those at Andover and Pleumeur-Boudou were designed by Bell telephone labs and used the largest horn antennas ever constructed. The British antenna was a conventional 26 meter diameter paraboloid.

Low satellite power and high path losses meant that the ground antennas had to be huge, yet mobile enough to track Telstar from horizon to horizon. Transmissions were limited to the 20 minutes in each orbit when the satellite passed over the Atlantic Ocean.

The horizontal conical horn antenna with a parabolic reflector at its mouth, weighed 380 tons and was 54 metres long and 29 wide. It had an aperture of 330 square metres, rotatable in the horizontal plane on a circular railway track and rotated on its axis on bearings. All this was contained in a white Dacron radome, 65 metres in diameter. Ground antennas had to track the satellite with a pointing error of less than 0.06 degrees as Telstar moved across the sky at up to 1.5 degrees per second. This was achieved with servo motors under the command of two radars- a coarse acquisition system accurate to 2 degrees which, when the satellite had been acquired, handed over to a pursuit radar accurate to a hundredth of a degree to lock automatically on Telstar's position. To receive the signal of less than a microwatt, a synthetic ruby Maser amplifier immersed in liquid helium at -269 degrees C, was located at the Apex of the horn.

Telstar 1 went out of service prematurely on February 21, 1963 an unwitting victim of the arms race. Both the USA and Russia detonated high-altitude nuclear bombs in the Earth's Van Allen Belt where Telstar 1 went into orbit, causing a vast increase in radiation which progressively destroyed Telstar's fragile transistors. It successfully relayed through space the first television pictures, telephone calls, fax images and provided the first live transatlantic television feed. It was the first satellite used to synchronize time between two continents, bringing the United Kingdom and the United States to within 1 microsecond of each other (previous efforts were only accurate to 2 milliseconds).

Telstar 2, nearly identical to Telstar 1 was launched on May 7th, 1963. At this time your AWA historian was in Brittany as a guest of CNET (Centre national d'études des telecommunications) as an exchange student apprentice between British Telecom and the PTT (French post and telecommunications). He spent some time in Lannion whilst gaining experience at Pleumeur-Boudou where operations had settled down to an efficient routine, leaving time to enjoy exploring the Brittany coast by Velo-Solex, and developing his technical French with the aid of some oysters, and a glass of wine or two.
Telstar 1 & 2 are both still in orbit as silent testimonies to the precision of 1960's rocketry in the analogue era. It was a window of history which was closed in 1965 with the launch of the first commercial geosynchronous satellite, Intelsat I ("Early Bird") rendering the technology of Telstars 1& 2 obsolete.



View from the beach near Lannion, Brittany.France

DESCRIPTION OF A VFO AND RF AMPLIFIER OF AN AM TRANSMITTER

Compiled by Sakkie Coetzee ZS6BPA

I hope the couple of hints and kinks in this note will assist you to have lots of pleasure in constructing valve type transmitters.

The heart of the AM transmitter is the variable frequency oscillator (VFO) in my case a commercially manufactured unit by Geloso 4/102 that produces frequency from 80M up to 10M. It consists of 3 stages namely Oscillator Multiplier and Buffer or sometimes known as the driver stage. This VFO gives sufficient drive for RF amplifiers that can operate well in excess of 100w RF O/P. When supplied with a regulated voltage of + 150 V DC to the oscillator after +/- 15 min warm-up it is found that the VFO runs quite stable without drifting.

The RF Carrier from the VFO is fed into the control grid of the 6146 valves and adjusted for a max grid drive of 5 Ma, which is enough to drive this transmitter to an O/P of 100 Watts.

The Pi-network can match an impedance load from 20 to 130 ohms therefore making it versatile to get a 100% transfer of RF energy to the load, either antennas or dummy loads etc.

The tune procedure is monitored by a Milliamp meter connected in the cathode circuit of the 6146 valves, as the cathode voltage is much lower than the anode voltage this is a good safety factor.

At the RF O/P connection an RFC choke is connected to ground which serves as a safety factor in case of the failure of the RF coupling capacitor which is connected between the anodes of the 6146 valves and the Pi-network.

The screen voltage of the 6146 valves should not exceed + 180V as recommended by the manufacturers. As seen in the schematic of the RF AMP there is a wire wound slider resistor connected from the HT + 700V to the screen grids and adjusted for the + 180 Volts.

The heaters voltages of the 6146 valves is 6,3 volts AC.There are 6883 valves which are the same, but require 12 volts AC for the heater elements.

By doing research in Amateur handbooks and taking a good look at the display photo's of the construction and lay out of these transmitters and various different projects that have been practically proven, excellent results are possible for the home constructor. When doing a layout to maintain a high Q Factor of these RF stages it is important to keep the bypass capacitor leads as short as possible. Do proper screening of the various RF sections, and rigid solder joints and earth connections.

SAFETY FACTORS TO CONSIDER

Seeing that fairly high voltages are used it is of good practice when testing is done, while constructing these transmitters, to make use of a wooden or insulated work bench and a rubber mat to stand on, and putting your free hand behind your back or in the pocket of your trousers HI! It is of most importance to be sure of the measurement test you want to carry out and your multimeter set to the correct position IF NOT YOU WILL CERTAINLY DESTROY the test instrument. Correct value fuses and circuit breakers fitted to the equipment and power supplies.

Do not use digital multimeters to measure HT and LT voltages when Rf energy is present, as digital multimeters could be DAMAGED if RF gets into the instrument via the test leads. Do your measurements with an Analog multimeter of the AVO or Simpson types. When HT voltages measured are of higher value than the range of your multimeter apply an HT probe with the correct ratio.

The output stage in the AM transmitter consists of 2 x 6146 valves a Pi-network constructed from a single gang Variable tune capacitor +/- 300 Pico farads, a switched coil inductor for the various bands with an inductance of +/- 24 micro Henry's , and a multi-gang Load capacitor of +/- 1000 Pico farads. It is of good practice to use ceramic coil formers as heat does not effect this type of material for expansion, as it would to bakelite or PVC formers. During the early days of AM transmitters constructors made use of imported Barker Williamson coil stock which was freely available, lately only found in junk boxes at the flea markets. It is advisable to put a request to some of the old timers that could give a helping hand in obtaining these antique components, or an idea in manufacturing some coil stock.

TUNE PROCEDURE FOR THE AM TRANSMITTER

Compiled by Sakkie Coetzee ZS6BPA

Preliminary checks before switching on the supply to the Transmitter.

1. Make sure that Power On switch is in the Off Position.
2. Connect Wattmeter and Antenna to the RF/Output connector type SO 239 on the rear side chassis of the transmitter.
3. Connect fly lead from antenna connector from rear side of the receiver to the BNC connector on the rear side chassis of the transmitter.
4. Connect mute cable between receiver and rear side of the transmitter chassis.
5. Make sure that mode switch is in the Stand/by position before switching on the power/supply switch.
6. Select correct frequency on the band switch and RF output stage.(PI NET Work)
7. Turn Grid Drive control 30% clock wise.
8. Turn Plate Tune Capacitor 50% open.
9. Turn Plate Load Capacitor 10% open.
10. Turn VFO to approximate operating Frequency .
11. The Mic Gain control as well as the PU control should only be set at 9 o'clock.
12. Connect Mic to mic input jack socket.
13. Connect tape/rec or CD Player to PU jack socket.

NB! All operations to tune up Transmitter must be snappy!!

TUNE UP PROCEDURE FOR THE TRANSMITTER

1. Power switch to ON position power on indicators will indicate that the transmitter is now switched on and in the Stand/by Position.
2. Wait for +/- 15 minutes for the transmitter to stabilize and that the heaters on all the tubes can heat up.
3. Mode Switch to Zero/beat position tune VFO to a null point by listening to the signal on the receiver and switch back to stand/by position.
4. Mode Switch to Zero/beat position again and adjust grid drive to 5 Ma on Grid drive milliamp meter and switch mode switch back to Stand/by position.
5. Switch mode switch to the operate position and adjust Plate/Tune capacitor for a dip on the RF/Amp Plate current meter which at this stage will then be reading between 90 to 120Ma and at the same time monitor the watt meter and it will indicate an RF Output of approximately 45 to 50 Watts and switch mode switch back to the stand/by Pos.
6. Mode switch back to the operate position again and turn Plate Load capacitor to read a maximum of 180Ma on the Plate current meter and monitor the watt meter at the same time and you will se that the RF output could be between 90 to 110watts into the feed line feeding the antenna.
7. When in operating mode the idling current should read 60Ma on the Modulation meter.
8. When speaking into the Microphone by adjusting gain control the modulation meter should not peak higher that 120 to 130MA.
9. When playing music from either the tape/rec or CD/Player by adjusting the PU gain control it should not exceed 110 Ma on the modulation meter.

Steps 5 and 6 can be repeated to fine control to set up the AM transmitter.

Hope that this practical explanation of setting up a AM station could assist future enthusiasts planning to construct or invest in a complete AM transmitter and enjoy part of the antique mode of our fantastic hobby.

NB!! It is good practice to monitor your output signal by using an Oscilloscope or if a Scope is not available construct a RF detector and use a set of dynamic earphones to listening to your transmission.

A SHORT BIOGRAPHY OF MYSELF AND AMATEUR RADIO

In the year of 1970 I became interested in Amateur Radio due to OM Louis ZR6AA who I have known as a youngster who invited me to a monthly meeting of the East Rand radio club that was held in the garage on the premises of the late OM Stan Nel ZS6BJB where I was fortunate to meet some excellent guys enjoying this scientific hobby of ours which is known as Amateur radio or Ham Radio, where the prefix of HAM is sometimes used and not knowing the meaning, it stands for HELP ALL MANKIND as we all know by now that communication by Radio Amateurs has saved many lives during times of disaster.

The bug of Amateur Radio bit me immediately after that first monthly meeting of the ERB. I attended and started shortly after to study for the exam to obtain the radio-operating certificate. As an electrician by trade I attended the college where the late O/M Van van Tonder ZS6ANJ was a lecturer in Mathematics and Electrotechniques which helped me tremendously when it got to the calculus part of radio. Our Chairman of the ERB at the time was O/M Duppie ZS6BDD who was involved in the commercial field of Radio Comms and was running an excellent HF Mobile station. Lots of assistance came from him to those interested in HF Mobile to solve ignition and mobile noise that was picked up by the receiver.
At the monthly meetings he would bring along lots of surplus components, which came in very handy for the home constructors.

As a new comer to the hobby O/M Mike ZS6AFG took a couple of us and lectured us for one whole year every Tuesday evening at his QTH from 19h00 to 22h00 hrs and we managed to cover the whole of the RSGB amateurs handbook which gave us a good basis of radio theory to start of with.

The late Arthur Coetzee ZS6EU and the late Jimmy Bishop ZS6TQ also had a big input on the beginners and myself by giving excellent lectures at the monthly club meetings explaining radio theory and bringing along their gadgets to demonstrate what it is all about. What was of most importance is that all the theory taught by these guys was shown to us in practice in their radio shacks and workshops.

After passing the exam I was coached CW by the late Jannie Moore ZS6AFC and a brush up before the test was done by O/M Andre ZS6BKL at present ZS1BKL which is still active doing some brass pounding, I then passed the CW Test after a period of 3 months and it is still a very good reliable mode to communicate with. As I gained quite a lot of electronic experience on the application of valve theory, I was lectured electronic theory of solid-state devices and practical application by ZS6BNA O/M Jan Nel at Atlas Aircraft, which was of a very high standard.

After having success in passing the theory and CW test I was fortunate in assisting quite a few new candidates to pass the theory as well as the morse code test, where one of the guys was a paraplegic guy who did the theory test verbally and passed successfully. In 1995, I started to build myself a real AM Transmitter I met up with lots of guys practicing antique modulation and it became a reality again to construct an AM Transmitter. Thanks to one of the pioneers of this mode of operation, O/M Munro ZS6IN now ZS5IN, for all your ideas and technical assistance to get my AM station going again. I soon realized that practical experience in constructing amateur radio projects are not covered in full by books written by scientists but in doing it practically in your workshop.

COMMENTS

At present we are a couple of radio amateurs by names Duppie, Fanie, John, Mike, Ted, Joe, Claude and myself that over the years have assisted and helped one another where ever we can, your friendship are well appreciated. I would like to thank all those who assisted me in becoming a Radio Amateur it was a big challenge as it is still today and I'll practice this scientific hobby with devotion.

Antique Wireless Association AM/SSB Valve QSO Party:

This is a phone contest held over 2 sessions on Saturday 10 and Sunday 11 May 2014.

On Saturday afternoon 10 May, 15:00 to 19:00 SAST the AM section will be held with Contacts on both the 40m and 80m bands for points.

On Sunday 11 May from 15:00 to 19:00 SAST the SSB section will be held with contacts on both the 40m and 80m bands for points.

Frequencies - 40 metres: 7,053 to 7,100 MHz and 80 metres: 3,603 to 3650 MHz

Exchange - Call sign, RS and consecutive serial numbers starting at 001, plus type of radio used, eg HT37 Tx.

Points scoring: All valve radio - 3 points per contact; Hybrid (valve & solid state) - 2 points per contact; Solid State Radio - 1 point per contact.
Multiplier - All valve radio - 3 points per contact;
Hybrid (valve & solid state) - 2 points per contact;
Solid State Radio - 1 point per contact.

Certificates will be awarded to the first three places in each category.(AM/SSB)

All logs to be submitted to :
Southern African Antique Wireless Association,
PO Box 12320,
Benoryn,1504.
E-mail: andyzs6ady[at]vodamail[dot]co[dot]za.
Closing date for log submissions: 31 May 2014.
Please refer to the SARL Contest Manual for any queries

CONTACT US:

P.O. Box 12320
Benoryn
1504

Mobile: 082 448 4368
Email: andyzs6ady@vodamail.co.za

Get your backdated issues at http://groups.yahoo.com/group/AWA_SA/

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's and associated equipment. 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:

Net Times and Frequencies:

Saturday 06:00—AM Net—3615
Saturday 07:15—Western Cape SSB Net— 3630
Saturday 08:30— National SSB Net— 7140; relayed on 14140
Saturday 14:00— CW Net—7020
Wednesday 19:00— AM Net—3615, band conditions permitting.

AWA Website is operational;

Visit the website at : **http://awasa.org.za/** and register on the site._

WANTED:

I am looking for bases for RS1003 valves, and B9D bases for el513/pl519 valves.

Either new or good condition used acceptable. Please include in next AWA Newsletter if possible.

My cell No. 0824865280

Thanks.

73 de John ZS5JX

For Disposal in working condition:
National HRO receiver

Andy Swanepoel ZR2ACJ.
11 "Westcamb Mews"
Griffin Road,
Cambridge West,
5247.
East London.
Cell: 082-8492 651
Email: zr2acj@gmail.com

AWA Open day and Karts Flea Market:

24th May 2014 at the same venue as last year. (Impala Voortrekker Centre in Allen Grove, Kempton Park)

Visit the KARTS website for directions.
