AWA Newsletter

#64

April 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:

The end of the first quarter of the year is already at hand and winter is fast approaching.

Fortunately for us here in the Southern Hemisphere, that does not mean fighting snow storms and blizzards to get to work or get the children to school in the mornings. It does mean less thunder storms and therefore less QRN.

Often the cold fronts will cause a bit of QRN as they speed their way across the country, but it's never as bad as the summer time, and then of course there are those wonderful Highveld winter days that can actually get quite warm.

Here in Benoni in the mid winter it gets down to about 3-4 deg C, but I know there are many parts of the country that are quite cold. It used to amaze me to hear OM Peter telling us of temperatures of –13 on a good day in Molteno. Brrrrrr!

But even then, band conditions are good and one can work most places in the country without too much noise on the bands.

Growing up as a young lad (a good few years ago) in Queenstown, I can remember the winter days and even the times we had snow, but never really that cold, that one could not function.

How well I remember one of my Dx Contacts with a ham who lived on an island in the middle of a river in Canada. During the winter months, he used his truck to travel across the frozen river to the mainland with average temperatures in the region of –35.

How blessed we are to live in this land of braavleis, rugby, sunny skies and amateur radio. (Made you all think there).

But the shack can become a warm and cosy environment in which to spend time. Especially when warmed with the tender glow of a few valve radios. This is the time to sit back and really enjoy the hobby.

This is what I enjoy the most and it is always such a pleasure to operate my radios and chat with many of you across the country, be it on CW, AM or SSB. Maybe even on the odd occasion on PSK.

Best 73

De Andy ZS6ADY

Wikipedia—The Transistor

Importance

The transistor is the key active component in practically all modern electronics, and is considered by many to be one of the greatest inventions of the twentieth century. Its importance in today's society rests on its ability to be mass produced using a highly automated process (semiconductor device fabrication) that achieves astonishingly low per-transistor costs. Although several companies each produce over a billion individually packaged (known as discrete) transistors every year, the vast majority of transistors now produced are in integrated circuits (often shortened to IC, microchips or simply chips), along with diodes, resistors, capacitors and other electronic components, to produce complete electronic circuits. A logic gate consists of up to about twenty transistors whereas an advanced microprocessor, as of 2011, can use as many as 3 billion transistors (MOSFETs). "About 60 million transistors were built this year [2002] ... for [each] man, woman, and child on Earth."

The transistor's low cost, flexibility, and reliability have made it a ubiquitous device. Transistorized mechatronic circuits have replaced electromechanical devices in controlling appliances and machinery. It is often easier and cheaper to use a standard microcontroller and write a computer program to carry out a control function than to design an equivalent mechanical control function.

Usage

The bipolar junction transistor, or BJT, was the most commonly used transistor in the 1960s and 70s. Even after MOSFETs became widely available, the BJT remained the transistor of choice for many analog circuits such as simple amplifiers because of their greater linearity and ease of manufacture. Desirable properties of MOSFETs, such as their utility in low-power devices, usually in the CMOS configuration, allowed them to capture nearly all market share for digital circuits; more recently MOSFETs have captured most analog and power applications as well, including modern clocked analog circuits, voltage regulators, amplifiers, power transmitters, motor drivers, etc.

CW Activity:

Well conditions still continue to improve on the bands and there is a lot of activity out there.

I have not managed to listen to much Dx on the bands, but 40m has certainly been active locally.

The CW net has been working well as a result of the improved bands and it's so good to be able to have contact with the stations not too far away who always used to be skip.

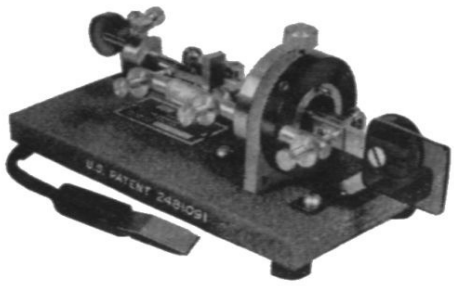
I have had a few CW contacts over the weekends, not including the CW net and it is good to hear some new stations on CW again. Maybe they aren't so new to CW but certainly to my logbook they were.

I have decided to try and improve my CW and the only way to do it is to get on frequency a lot more and call CQ. So if there are any more of you wanting to get back in to CW, listen out for the calls and come back and have a bit of a chat. It's the only way to keep it going.

News from the QRP group is that conditions on 80m have also been good and contribute well to the group of stalwarts who meet every morning on 3579. 599 reports are not too uncommon at the moment, which is encouraging for QRP enthusiasts.

I listened to some of the CQ DX contest and was absolutely amazed at the speeds some of these guys operate at, and the way the exchanges are made.

Not really my cup of tea, but certainly for some a great deal of enjoyment. I still seem to break out in a bit of a sweat even in our local CW contests. Maybe the answer is to become more proficient . It may help to reduce the amount of sweat loss that occurs.



Send me some reports of your CW contacts and let us know how active the bands really are for the CW enthusiast.

DE ZS0AWA/CW …-.-

SSB Activity:

I can only echo here what I have said in the CW column. The bands are great and the activity is good. Over a weekend there certainly is a lot more activity than there used to be, so it's good to hear all those closet sleepers coming back again.

The AWA SSB net continues to do well and Willem gets a great thrill out of going National every Saturday morning within as short a period as possible.

It's wonderful to hear up to 28 stations calling in on a regular basis on the SSB net during the hour that we are on frequency.

80m seems to have lost it's popularity, but still gives consistent results. The few stations that do call in are good Q5 copies, but not as strong as the 40m stations these days.

Over the rest of the weekend one can always here stations chatting somewhere on the bands. 40m still very active and 20 and 15m also producing good results.

I do not have the WARC bands, but listening to some of the stations giving reports, 12 and 17m also producing some excellent results.

So in general, it has taken a while, but there certainly is a vast improvement in the conditions which is what we have all been waiting patiently for.

Remember the SARL 80m Club Championships and enter your logs for the AWA. This month is the digital contest on Wednesday evening the 30th March. CU there.

Yaesu Twins

AM:

The AM net has been quite active this last month and well attended. Each Saturday we have had no less than 7 to 8 on frequency. It may not sound like a lot, but when 5 of those calling in each play an MF, that gives you about 25 minutes at least, between each over you have.

A session from 06:00 to 07:30 goes extremely fast and time is not enough for all the stations.

Thank goodness there is a lot of patience in an AM net and everyone waits their turn.

The quality of AM transmissions also improves every time some one comes up on frequency and the MF transmissions are getting really good.

But don't just take my word for it, come along and join the net, even as a listener, and you will see what I mean.

Reports are received from a few listeners and conditions to Div 5 even keep going for quite a while.

Power is really not the be all and end all of an AM transmission, as some of the stations are running at a max of 25w carrier, which in effect is equal to a 100w SSB transmission.

There are always those with slightly more power, as in any gathering of Hams, but they are certainly not in the majority. The Collins 32V-3, pictured, runs at 80w carrier with ease and was specifically built as an AM transmitter in the 50's. There are some AM rigs built to run at 1Kw, but I haven't heard of any on air in SA.

AM is really a wonderful mode to work in. Do join the net on Saturday morning from around 06:00 on a Saturday on 3615 and reminisce about the "Good ole days".

Collins 32V3

RESTORING A 1937 UTAH JR

Background

Utah Radio Products of Chicago, IL is perhaps better remembered today for its transformer products rather than for its radio kits. Yet, like many of the other transformer manufacturers of the day-Stancor, Thordarson and UTC come immediately to mind-Utah began to offer a number of transmitter kits. The line began with simple two-tube tabletop units and grew to include high power floor rack models.

The radio kit concept was shrewd. Many depression-era hams were burdened with budget and time constraints and/or were stymied by the lack of tooling and technical skills.

Utah realized that it was a simple matter to offer a kit, complete with pre-punched and drilled sheet metal, which the average ham could assemble with minimal hand tools. Aside from the profit realized selling the kits, this familiarized the ham of the day with the offerings of the company, and quite possibly led to future component sales.

Unfortunately many of these transmitters are lost to us today. Like much early radio gear from the 1930s these rigs have fallen victim to parts cannibalization, been discarded because of component failures or obsolescence, or donated to wartime scrap drives. But there is great joy to be found in discovering, restoring, and operating one of these icons from our radio past. The folks that take the time to get these artifacts on the air deserve much commendation.

Information from the rig's schematic diagram, which is supported by Raymond Moore's excellent book Transmitters-Exciters and Power Amplifiers, suggests that Utah first offered the Utah II. for sale in late 1937 and that production of the kit ended in 1939. Aimed at the new ham, this was an entry level kit selling for $15.95, not cheap in depression dollars, but still reasonably affordable.

Aside from the transformer, Utah appears to have sourced most of the other components from standard manufacturers of the era. The two air variable capacitors came from Cardwell, the plate meter from Triplett, the switches and keying jack apparently from Switchcraft.

The Utah II. tube complement was rather simple, consisting of only a 5Z4 rectifier and a 6L6 oscillator, providing a RF power input stated to be 25 watts. No modulator was included or offered, so the Utah Ir. is strictly a CW only rig. Despite the rather simple circuit design, Moore's book claims band coverage from 160 to 10 meters with appropriate crystal and coil sets.

Condition as Found

Overall, I found my unit to be in good condition for a transmitter now approaching its 75th anniversary. The exterior black wrinkle finish on the cabinet was in very good condition, needing only a thorough cleaning. I find that a lanolin based hand cleaner, like D&L or GoJoe, works very nicely in cleaning the

decades of grime from the paint, but always test a small and inconspicuous area first.
Although the cabinet was in good order, the chassis of the RF and power supply decks were another matter. Both were showing signs of rust forming under the paint, and in several spots moderate rust pitting of the metal was observed. I therefore planned to strip down and refinish both of the sheet metal chassis with a powder coating process.

I began the restoration project by removing the power supply deck from the cabinet for inspection. Upon disassembly on my workbench to replace the missing line cord, I discovered that someone had replaced the original Utah power transformer with a Stancor unit, but had failed to wire in the leads. Fortunately the original Stancor specification label was still on the end bell covers, and it was easy to reference the transformer voltages and current rating.

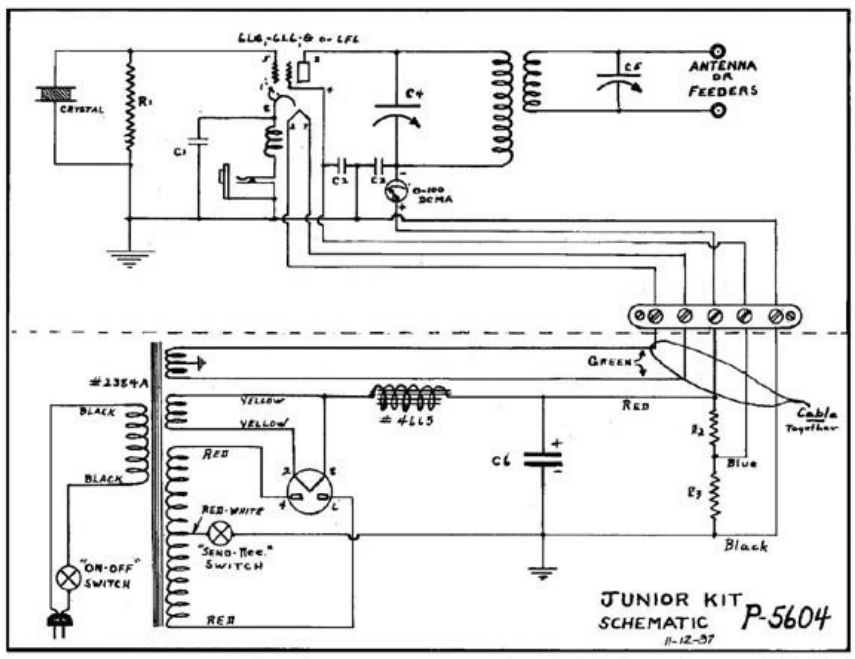
The RF deck was another story, quite complete, but very much in need of a good cleaning. In addition, it was quite apparent that the kit builder was not well skilled, and most of the soldering required re-work. As these kits were sold as an entry level transmitter, often to newly minted hams, one would expect, and often find, that lead dress, assembly and soldering are not quite up to commercial standards.

Disassembly

Prior to any disassembly, I always photograph both the chassis and wiring. Not only is this process good for the requisite "before and after" photos, but it serves as a very handy guide during reassembly. While this may sound redundant in cases where schematics are available, the photos show lead dress and layout in a manner that is nearly impossible to convey with just a schematic.

My standard process for cleaning a small chassis, especially if heavily soiled, is to use Simple Green and a shop rag to wipe it down. Next, I turn the deck on its side and spray a heavy coating of cleaner on the top and underside. Once this is allowed to work its magic for perhaps 5-10 minutes, I rinse clean with tap water. After a 5-10 minute stay in a 200-degree oven followed by an overnight air drying, it's ready for reassembly.

In this case, though, because of the air variable capacitors, I resorted to dishwasher cleaning. Most air variable capacitors, because of the multiple individual plates, are very difficult to clean properly without damage. However, since any dirt here provides an easy arc-over path, it is well worth the time to thoroughly clean the plates, and a dishwasher makes quick work of this task



I disassembled and removed the components (except the air variables) from the RF deck, inventorying all into Ziploc bags to ease the future
rebuild. I then ran both the RF and power supply decks through my dishwasher, placing them on the upper rack to avoid heat damage.

This treatment really does wonders and no damage occurs if the system is run at low temperature. The units emerged looking like new, and I took a few moments to clean and tighten all hardware as well as to lubricate the shafts on the air variable caps.

With the chassis now stripped, I sent both off to the powder coater with instructions to remove the old paint and refinish in a low gloss black to match the original color. After a week at the shop, both chassis were returned to me looking like new, the rust was gone and the finish looked very much like a vintage paint product.

Putting It All Back Together

With the chassis now freshly refinished, I set about reassembling the unit. The first task was the rebuilding of the power supply deck, properly wiring in the replacement power transformer. Thankfully, whoever had chosen the transformer so many years ago had chosen well. It fit right in place on the deck using the original mounting holes. All I needed to do was to bolt it to the chassis and then extend the leads, which in the past had unfortunately been shortened. The next step was the restoration or replacement of the shorted filter capacitor. This capacitor was enclosed inside a cardboard housing and sealed with wax. A modem replacement would simply not look right here, so I decided to instead rebuild the original capacitor.

It was a challenge to melt out the wax and remove the shorted capacitor from the fragile cardboard housing. I had first considered melting the wax out with a heat gun. However I was concerned about the use of heat on the now-brittle cardboard housing and decided to use a microwave oven. A few minutes in the microwave was all it took to soften up the wax, allowing easy removal of the failed capacitor and installation of a modern replacement. I then re-melted the removed wax and poured it back into the cardboard case. The repaired unit looks like the original 1930's equipment.

The assembly of the RF deck took just a little more time than that of the power supply, lead dress being important here. However, the process was quite straight forward and it took only a few evenings to assemble the deck ready for testing. A careful inspection was made of the 75m plug in coil, and the Arcturus 6L6 power tube was checked. The air variable capacitors, fresh from their trip through the dishwasher, gleamed like new.

On the Air

The unit worked the first time it was fired up.

With the installation of the proper 75 meter crystal and the connection of my light bulb dummy load, we were in business. Careful loading and tuning brought the plate current up to the Utah suggested 80 mA, and the little 25-watt light bulb glowed brightly.

Since this is a link-coupled rig, it prefers a high impedance antenna, ideally a balanced one. I did find, on the suggestion of Larry NE1S, that I could use an external air variable in the antenna line to tune the impedance to better match the Utah Jr's. narrow loading range.

While the Jr. transmitter was one of the more humble of Utah's offerings, it is a very robust, simple and quite solid transmitter. Paired with a receiver of the day, say a venerable National HRO or FB- 7, it would represent a very respectable station for the ham newcomer.

Today, the end operation of such a vintage station can be a joy. The operator has to be occupied not just with the logging of call signs, but also with loading tuning and transmit/receive switching. These are activities we miss out on with today's solid state transceivers-the tactile feeling of really operating, not just listening.

More Information

John Dilks, K2TQN, the author of the wonderful vintage radio column published each month in QST, wrote an interesting piece about the Utah JI. in the March 2007 issue. John has some additional information and photos of the Utah JI., as well as an archive of his other articles, on his website-which can be found at www.eht.com/oldradio/arrl/2007-03/UtahJrtransmitter.htm.

Raymond S. Moore's excellent reference, Transmitters-Exciters and Power Amplifiers, ISBN 0-9618882-3-7, mentioned earlier, is another resource for information on the Utah and other vintage transmitters. Covering a span from 1930 to 1980, Moore has compiled a wealth of data on early and late transmitters.

Power Supply and RF deck after disassembly

Coming Next

I'm quite interested in devoting future columns to A W A member transmitters, especially rigs built to pre WWII designs. If you've got something that you feel is appropriate, please contact me.

Author's National FB7/Utah Jr. station. Key and receiver power supply not transmit/receive shown.

Edited by Bruce Howes W1UJR
An Article from AWA Website USA.

Rust Removal--Minimizing Soldering Residue--Replacing a 262 kHz I.F. Transformer

Electrolytic Rust Removal

This method of removing rust from radio chassis and other parts did not originate with me. I read it on the antiqueradios.com forum and tried it out on an Atwater Kent chassis which had heavy rusting on one corner from a mouse nest.

Get a plastic bucket big enough to immerse the part in. A 5 gallon bucket from the hardware store or a rectangular plastic trash can is ideal. It must be plastic--not metal.

The electrolyte is composed of sodium carbonate (washing soda) at the rate of 1/2 cup per gallon (5lt) of water. Do not use baking soda (bicarbonate). I get my washing soda at the grocery store in the laundry products section.

The anode can be iron, but it will corrode heavily in the process. I used a piece of sheet lead for my anode because it is inert. You will need a fairly heavy current, on the order of 10A for a chassis, to remove the rust in a reasonable time.

Bend the lead anode over the edge of the bucket to hold it in place and suspend the part by a copper wire close to the anode. Use wood board laid over the top edge of the bucket between the anode and part to keep them from falling into contact. The arrangement is shown in the sketch.

Pour in enough electrolyte to cover the part and apply the current. There will be a vigorous evolution of gas. Oxygen is liberated at the anode and hydrogen at the rusty part. It is this atomic hydrogen that does the work according to the equation below:

$$6H + Fe_2O_3 \rightarrow 2Fe + 3H_2O$$

This reaction is self-limiting. When the rust is gone, gas continues to evolve, but there is no further action on the metal. You can walk away and come back later to check on progress. The de-rusted part will have a black coating of iron particles which can be washed away with a brush. The surface will be pitted where the rust was, but there is nothing that can be done about it. The metal is gone and can't be replaced.

After the chassis is clean and dry, I paint the pitted areas with aluminum paint which has a bit of black paint mixed in to give it a slight gray color. While the paint is still wet, I wipe it off the leave paint only in the pits. This prevents future rusting and blends the area in.

The chassis I treated was nickel plated. The process had no effect on the plating. I haven't tried it on painted parts, so I don't know if it will strip off the paint.

Washing soda has been used for a couple of centuries by housewives, so it is safe and does not harm the environment. Used electrolyte can be poured down the drain. *Don't get it in your eyes, and don't inhale the mist which the gas bubbles throw off. It is highly irritating. Do the process in an open area so the hydrogen can escape and not build up an explosive concentration. I work in the garage.*

Here is more in the series of very useful tips from Lane Upton (Salt Lake City):

Over the years I have seen considerable restoration work where the residue from soldering was very obvious. I have been able to minimize the residue by the following procedures and cautions:

1. Use solder with low rosin content, such as Kester #24-6337-8817.
2. Be sure the soldering iron is well up to temperature before using so that most of the flux is vaporized. Mine is adjustable, and I use it between 750 and 800 degrees F. for this type of connection.
3. Pre-tin all materials before making the final solder connection. After tinning, clean all residue from the item before making the final connection.
4. Many of the old insulated wires have a residue from the rubber undercoating which makes them very difficult to tin. I have found by careful use of a small amount of non-corrosive soldering paste they can be easily tinned. Be careful that the fabric outer insulation doesn't wick up the soldering paste because it will discolor the fabric.
5. When the final solder joint is completed, clean with a suitable solvent being sure to cover surrounding areas to prevent splatters. Post-It note sheets are ideal for covering panels etc.

Here is a great restoration fix from John Kaetz, Jr. (Bessemer, AL):

During restoration of a Gloritone 99A, a condition sounding like "silver migration disease" became apparent. It only occurred occasionally so it took a good deal of time to pin it down to the output IF transformer. It didn't respond to the limited things that could be done to repair it. The IF transformer was a 262 kHz unit, close-coupled and single-tuned, appearing to be alternate layer wound. The can was 2 inches tall by two inches square--not exactly an off-the-shelf item.

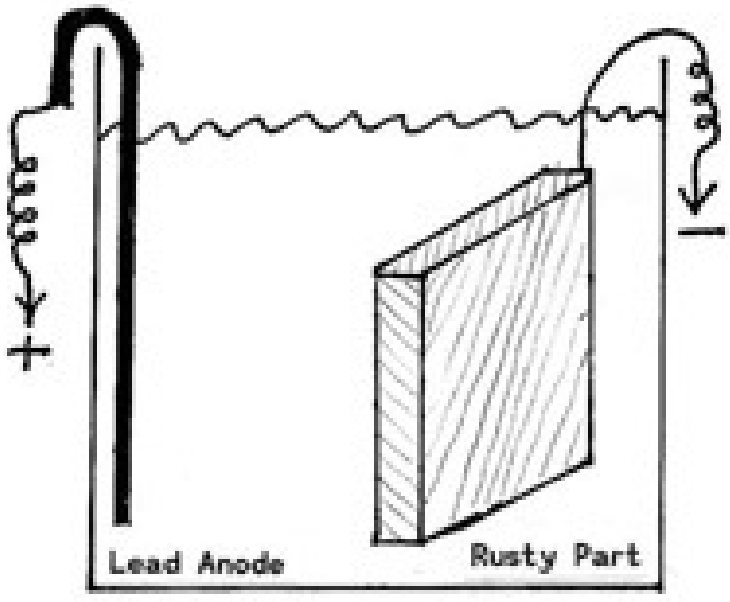
Remembering that auto radios frequently use 262.5 kHz IFs and having a few junkers around, I found an old 12 volt B+ tube type containing a couple of 3/4 inch units mounted on the PC board. One was removed, checked and looked good. The height was exactly the same as the old IF can but otherwise posed a challenge to mount in an acceptable manner.

I found a piece of 1/2" wide by 0.05" thick steel strip, cut a piece 2 3/8" long, and drilled a hole at each end to match the mounting holes in the chassis for the old IF can. I then drilled a hole in the center large enough to pass an alignment tool through for the hex hole tuning slugs and two small ones on each side of the center hole 3/4 inch apart for the mounting ears.

I filed the edges a bit to get more clearance for the terminals, then stuck the ears through their holes and soldered them in place, thus securing the can to the strip. The terminals straddled the steel strip, hanging off each side. The assembly was placed over the holes in the chassis from underneath to get a bit of headroom in the old can, and then the old can was bolted over the whole thing. From the top it looked just like it did from the factory. I didn't even have to drill a hole in the top of the old can for alignment, being able to pass the tool all the way through the bottom slug from underneath the chassis to tune the top slug.

I then wired it up, being careful to use the proper connections previously sketched, did a touch up alignment and it worked perfectly. In fact, overall performance was better than the old one when the old one wasn't breaking down. The replacement, not being close-coupled, has better selectivity.

This method would work for a variety of different situations and the mounting base could utilize perfboard that might be more easily worked to fit different transformers or mounting situations. It might not even be necessary to ground the new can because it is inside the old one, which is grounded.



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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 yester-days 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:

AWA Open Day:
Please take note, this has been moved to the 16th April to coincide with the SARL AGM in Vanderbijlpark. Flea market tables will still be available and of course a display of some fine antique radio and test equipment. Please bring along some of your goodies to put on display.

The old Vaal Technicon (now Vaal University of Technology)'s GPS co-ordinates are as follows:
26 deg 42 min 38.5 sec South
27 deg 51 min 38.81 sec East.

From Alberton take the R59 South
Pass Vereeniging, take the Vanderbijlpark T/O. It now becomes the R42.
Carry on past the Makro (on RHS) and Pick and Pay (on LHS). At the next traffic light turn left. VUT is on LHS gate about 150m from traffic light.

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)