THE WEST RAND AMATEUR RADIO CLUB

August 2011
Volume 12, Issue 2

ANODE

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Anode Editor's Comments

Volume 12, Issue 2
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OM Joop ZS6C

I believe Oom Joop is making good progress following his operation. Last I heard he has been moved to a general ward.

Tree Planting at the Club

As special thank you to Johan ZS6JVV and Dirk ZS6DVV for arranging and collecting the indigenous trees donated to the club by OM Abe Grove' ZS6BMX. Nico ZS6NJV also donated trees saved from doom after a relocation. These tree will be planted in 2 weeks time on the 27th August . Please be a part of this special day.

RAE Training

The RAE training has started and it is hart warming to see the effort put in by the lectures. Well done all.

Club 2M Yagi antenna

Thank you to Johan ZS6JBG for the donation towards materials purchased to construct a long 2M Yagi for the upcoming VHF UHF contest.

The same gratitude to Johan ZS6JVV for arranging the and collecting the materials. Big Thank you to Roy ZS6RLM for the construction and time spend on the antenna. Can't wait to roll in the QSO's.

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The Broadband 'Thick' Dipole for '2 metre's

Special points of interest:

- Contact details on back page
- Ham-Comp Latest on web site.

Once upon a time, John (the first ZS6WL) and I constructed several '2 metre' dipoles and tested them in the lab at Telkor. The premise for the design was to make and manufacture an aerial that needed no tuning (or adjusting), and would cover the whole of the '2 metre' band with excellent s.w.r. / return loss. It should also cost very little and use readily available parts.

Recently I have been looking for my notes about this aerial (antenna in US English). I still can't find them. Not really a surprise but very annoying as I wrote everything in those days into my 'day book'. The original design made use of the "Egatube" or plastic conduit that could be found at any building site or house construction in the form of off-cuts or tossed 'T' pieces that no longer had screws. It used 20 mm aluminium tubing for the element conductors of the dipole. [Reality check! This so called 20 mm aluminium tubing isn't 20 mm! It really is 19 mm outside diameter. So it fits into the conduit tubing fittings.]

I must have given away my '2 metre' dipole as the only sample I have left is the 6 metre antenna. This was identical

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The Broadband 'Thick' Dipole for '2 metre's

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in construction but with quarter wave elements for 50-54 MHz. As I was struggling to get into the West Rand Repeater from the lounge, I thought I would build another '2 metre' dipole.

Why a 'thick' dipole?

The bandwidth of an aerial is defined by the length to thickness ratio of the conducting elements. So a thin wire aerial has a very high 'Q' factor and will be only usable over a portion of the band. We made several of the monopole aerials for the 70 cm band using 3 mm brazing rod mounted on a SO239 connector. When testing, we found them to be an almost perfect match to 50 Ohms over the entire 70 cm band. The length of the 'pole' was only about 170 mm. So 170/3, 56 approximately, is the ratio. This gave rise to the realisation that to cover the entire V.H.F. aircraft band we would have to build a 'huge tube' aerial. John actually used other words to describe the aerial tube but I can't recall them here.

The elements for the '2 metre' aerial are 20 mm tubing (19 mm) with a length of 490 mm. This gives a ratio of length to outside diameter of 24.5. Adding plastic caps (furniture feet protectors) may add some capacitance. So some adjustment may be needed after testing at 144-146 MHz. If you do cut it short, do not panic. You will probably only be using it around 145 MHz anyway. It will probably resonate and match 50 Ohms better at the slightly higher frequency.

You are operating from where?

When I worked at Telkor with John, I lived in an old mine house in East Chamdor. This was quite far away from any potential lightning strikes and on a moderately high piece of land. Surrounded by trees, I was fairly safe.

When we moved to Roodekrans, the first summer was spectacular to say the least. The church grounds a few tens of metres away had a large re-enforced concrete statue of a pair of hands praying. This got struck fairly regularly and the area around this had a lot of induction which destroyed all sorts of electrical and electronic equipment.

Then 'they' built the gap filler TV transmitter called the 'Roodekrans' transmitter. This 150 metre tall structure is a marvel of engineering and provides a lightning spike for the top of the hill side. For the most part it drains away the electrostatic charge built up around it. But when it gets struck, that's when the induced voltages in the surrounding area's conductors occur. These induced voltages are extremely destructive. Phones, phone lines, fax machines and modems do not last very long here.

The 'other mode' of lightning which most radio amateurs are familiar with is the electrostatic discharge. This static crack transfers to all aerials locally and over great distances. Whilst the magnetic field dies off rapidly as the distance increases, the electrostatic discharge adds to the QRN heard on H.F. Radios. This is what kills the 'front end' of your receiver. Usually the R.F. stage transistor and any other components associated with the aerial input. Well at least around here (Roodekrans) it does.

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The Broadband 'Thick' Dipole for '2 metre's

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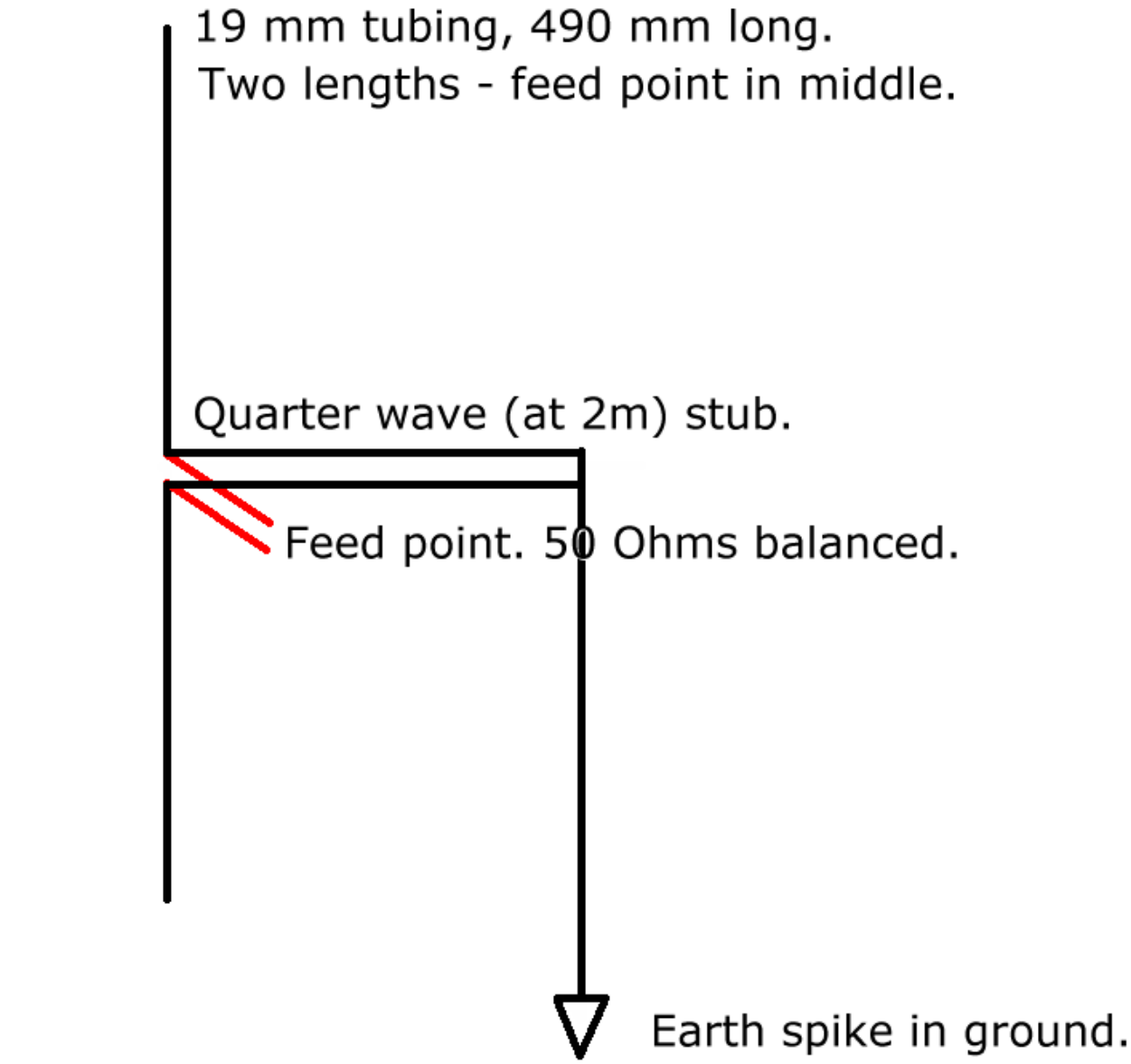

2 metre 'thick' dipole circuit.

So a dipole's no good then?

No dipole is ‘good’ in South Africa. If it is a piece of wire in the air with no discharge path. So the dipole I am going to make has to have a d.c. short circuit. So a 'stub' must be added to the aerial assembly to provide a d.c. path to ground. It would be nice if it went directly to an earth spike as well. This happens to be one of the main advantages of the J pole or 'slim Jim' aerial. As both have d.c. short circuits for a discharge path.

The other 'thing' to remember is that a dipole is a 'balanced' aerial. That means that the pair of elements are supposedly fed in opposition to each other and neither is at earth potential.

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The Broadband 'Thick' Dipole for '2 metre's

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When we are talking about an H.F. aerial this becomes tricky and physically difficult with vertical polarised aerials. As the length of elements can be very very long. With horizontally polarised aerials, this still makes life difficult, especially for cluster house dwellers.

Waterproofing and Corrosion protection

Put anything outside the house for a long time and it will rust, corrode or degrade in one way or another. The UV from the sun degrades any plastic and makes it brittle. The rain and condensation will rust any ferrous metal. Aluminium oxidises with the air and forms a 'skin' of high resistance. This does affect VHF and UHF aerials. But the purer forms of aluminium used for television aerials (SABS approved) can withstand a few years of external use.

Remember that dissimilar metals have a potential difference and will react to each other. Ultimately forming a poor contact and causing high resistance or even worse, a diode! [which could mean transmitting on all the harmonics of your transmitter.]

My personal preference for 'protection' is clear Polyurethane lacquer sprayed onto the metal and plastic surfaces. So clean the aerial aluminium with sand/emery paper and wipe clear of dust and aluminium particles. Then spray at close quarters, the clear spray onto the elements. Do this after you have assembled the aerial. If you undo the mounting self tapping screws, remember to spray over the area to cover the exposed metal. Do this after you have replaced and re-tightened the screws.

Balanced 50 Ohm feed?

Yes, the aerial is a ‘‘balanced’’ circuit. The two elements are fed in anti-phase. Whilst the ‘‘earthy’’ one can be substituted with a large piece of grounded conductive metal. It will need to be about 40 x lambda in diameter! (theoretical) Unfortunately mobile monopole aerials attempt to use the car as this ‘‘ground plane’’.

So we need to use a ‘‘balun’’, fabricated from some parts that can withstand fairly high transmitted powers. The ideal component is a section of coaxial cable. If you are going to use QRP (low power), then a ferrite transformer can be used. A simple solution for testing purposes is a ‘‘push-push choke’’. Remember to keep the ‘balance’ in the aerial, run the coax cable about the ‘earthy’ part of the circuit.

Testing the Aerial

1 Mount the aerial on a bracket away from any objects such as metal fences or walls. Make the distance at least 5 times the wavelength. If you can place it in the centre of an empty aircraft hanger. But if you can't do that, try and mount it at least 5 * lambda (wavelengths) away. It would be better if it were 10 * lambda away but you probably don't have the real estate for that.

2 Connect any test equipment or hand held transmitter to the aerial using a very short cable and place the equipment in the plane of least signal impedance. This will generally be the centre mounting tube. So make this reasonable in size to support the aerial but not too long so the sag makes the aerial 'slant polarized'! If necessary do the S.W.R.[1] / 'Return Loss'[2] testing with the aerial mounted above the equipment and horizontally polarised.

3 Place the signal strength measurement

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The Broadband 'Thick' Dipole for '2 metre's

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equipment at least 10 * lambda away from the aerial. It should also be in the correct "plane" and polarised to match the aerial polarisation under test. So a vertically polarised aerial should be tested with a vertically polarised signal strength meter.

Test Equipment

Having 'put away' most of my equipment and sold nearly all of my radios, I need to test this aerial with some equipment before using it. I may need to rescue a few items from the garage.

Sweep Generator

I made a lot of use of swept frequency generators whilst working in electronics. In my first job, I had a 0.1 to 1000MHz sweep generator by Telonic. Later on, I had the use of an HP spectrum analyser and tracking generator that could sweep over an even larger range of frequencies. When I had nothing at home, I made a simple sweep generator that covered 120 to 200 MHz. This I used to check various tuned filters and front-ends for frequency response. It can also check for return loss using another item that I made; a 50 Ohm broadband return loss bridge.

So its time I went in search of these items and set up to test the new 2 metre aerial.

[much more in part 2, JB]

Notes:
1 S.W.R. means "standing wave ratio". A ratio of voltage or current sent to the load referred to the reflected voltage or current.
2 "Return Loss" means pretty much the same as S.W.R. but gives it in another way. It means the least amount of reflected voltage or current from the load (aerial). The greater the "return loss", the better the match and the lowest amount of reflected signal power.

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In our next instalment

- How I had to blow the dust off the "wobbulator". [The spell checker nearly choked on that.]
- How I made a QRP balun for testing purposes.
- Checking thirty year old test equipment.
- How to placate the neighbours.

Anode Editor's Comments

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EPR Cycle Race 13 August 2011

The Cycle race is again the ideal time to test your equipment and take out the braai or picnic basket. Rory ZS6RBJ and Myself ZS6PVT will be at control station operating on the 145.625 MHz repeater and HF 40m as always. The 70 cm cross-band repeater will again be running at 433.625 simplex. This repeater give perfect coverage in Magaliesburg and Orient. Also try the reveres repeater function to talk direct to the base as a alternative to working via the repeater.

80m Contest

Thank you for all the log's received. The participation by club members was as always fantastic. Thanks to everyone. Let's get ourselves organised for the Digital and CW leg of the test. Please feel free to ask should you need assistance with the digital side.

VHF UHF Contest

Thank you to Johan ZS6JVV for the arrangements already made and securing the site as well as the camping arrangements. Have a look at the photos on our web site . Please book your camping spot as soon as possible with Johan.

SARL 80 Metre Club Contest – 27th July 2011

The committee received 14 logs for the July leg of this contest, which was a phone contest. From the logs, it was determined that 224 QSO's were made by the 50 stations that participated. The station coverage is – Zambia = 1 station; ZS0 = 1 station; ZS1 = 2 stations; ZS3 = 3 stations; ZS4 = 7 stations; ZS5 = 9 stations and ZS6 = 27 stations. There were 48 Class A licence holders and 1 Class B licence holder participating.

The 14 logs come from ZS0 – 1 log; ZS3 – 1 log; ZS4 – 3 logs (two clubs) and ZS6 – 9 logs (one club).

1st West Rand ARC, 129 points – 9 logs
2nd Bloemfontein RAC, 39 points – 2 logs
3rd Sasolburg ARC and North Cape ARC – 26 points each from 1 log each
4th Antique Wireless Association, 4 points – 1 log

The overall results for the competition after four contests are:

1st West Rand ARC, 291 points
2nd Antique Wireless Association, 55 points
3rd Bloemfontein RAC, 39 points
4th Northern Cape ARC, 29 points
5th Sasolburg ARC, 26 points
6th Port Elizabeth ARS, 17 points
7th Sandton ARC, 9 points

Pic-A-Star

Pic-A-Star is an SDR radio designed by Peter Rhodes, G3XJP, which was serialised in RadCom. It also appears in the RSGB Radio Communication Handbook. Milton Keynes ARS and Milton Keynes Museum are inviting all constructors of Pic-A-Stars to a one-day get together. This will be on Sunday 11 September from 11am to 4pm at the Milton Keynes Museum.

Constructors of the Pic-A-star project are invited to bring their radios for a gathering and exchange of ideas. Star add-on circuits are also welcome. Entry will be free, but it would be nice to leave a small donation to the Museum. Constructors of other equipment designed by Peter are also welcome but the emphasis will be on the Pic-A-Star project. There will be test equipment and an antenna available on the day. Further details and directions are available online at www.radio-kits.co.uk/pic_a_star/

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event.htm.

ARISSAT-1 deployed from ISS

After a long history of delays, AMSAT-built amateur satellite ARISSAT-1 was successfully deployed from the International Space Station on Wednesday 3 August. Cosmonauts Sergei Volkov and Alexander Samokutyaev hand-released the satellite, also known as Radioskaf-V, around 0243UTC.

Initial reports say that the 2m downlink is working well, but full operational capability is not yet active. More information on the satellite can be found at www.arissat1.org.

If you want to know when it is going over:-

http://www.amsat.org/amsat-new/tools/predict/satloc.php?lang=en&satellite=ARISSat-1

ARISSat-1 is a microsat developed as a follow-on to the SuitSat-1 project. The satellite was launched to the ISS on January 28th, 2011, with deployment into space during an EVA (spacewalk) on February 16, 2011.

The satellite will downlink live SSTV images from four onboard cameras as well as 24 greetings in 15 languages on the FM voice frequency 145.95 MHz. The BPSK-1000 sig downlinks as SSB on 145.920 MHz, with the CW signal below the BPSK signal to be used as a tuning indicator for the BPSK signal. Telemetry and amateur radio call signs of those instrumental in amateur radio in space will be transmitted at 145.919 MHz. For the amateur radio operators there is a 16 kHz wide transponder for two-way contacts. All of the transmissions and receivers use newly created software defined radio technology.

The BPSK-1000 signal will include alternating telemetry and experiment data packets. Telemetry data will include spacecraft subsystem information such as temperature, voltage and current measurements. The Kursk State University experiment will be sent as 5 packets for a total of 2k of data. The data is collected for 90 each day. This experiment will sample the change in vacuum as the satellite slowly re-enters the atmosphere.

Frequency Information
Mode V FM (Voices Messages and Telemetry): Non-Operational
Downlink 145.9500 MHz FM

Mode V FM Imaging (Robot-36 SSTV from on-board cameras): Non-Operational
Downlink 145.9500 MHz FM

Mode V SSB Telemetry (BPSK-1000 bps): Non-Operational
Downlink 145.9200 MHz BPSK

Mode V SSB TLM Beacon (CW-2, active with BPSK-1000): Non-Operational
Downlink 145.9190 MHz CW

Mode U/V (B) Linear Transponder (Inverting): Non-Operational
Uplink:
435.7580 - 435.7420 MHz SSB/CW
Downlink:
145.9220 - 145.9380 MHz SSB/CW

Portugal gets amended 6m band

The National Communications Authority of Portugal has accepted a proposal to amend the upper frequency limit on the 6m band, effective from 4 April 2012. That coincides with the date of the complete switch-off of the analogue TV broadcasting transmissions and the changeover to digital terrestrial television. The new limits of the band allocation for Portugal will be from 50 to 52MHz once analogue television disappears

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Anode Editor's Comments

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from that spectrum.

Dutch amateurs get new frequencies

Amateurs in the Netherlands now have access to bands at 500kHz and 70MHz. This after the Dutch Minister of Economic Affairs, Agriculture & Innovation issued a Decree on 6 July changing the National Frequency Plan. The revised band plan shows an amateur service bands at 501 to 505kHz that will remain available until 1 January 2014. It also shows a new allocation from 70.0 to 70.5MHz that has no time limit.

See! It doesn't just happened here!

The Limerick 2m repeater on 145.725MHz is now on the air again after being shut down due to vandalism at the repeater site. Limerick Radio Club is grateful for the many generous donations received, which have gone towards installation of a new security door. A new run of hardline coax has also been installed from the hut to the mast.

Listen to this Julius!

According to legend, when Winston Churchill and his lifelong foe Clement Attlee ran into each other at a row of urinals in the House of Commons, Churchill stood as far away as possible. Attlee asked, "Feeling standoffish today, are we, Winston?" Churchill replied, "That's right. Every time you see something big and well-working, you want to nationalize it."

Definitions

CB is a social facility for those with no technical qualification nor competence. You must use type-approved equipment which you are NOT allowed to modify. You are restricted to one band, and to a very low output power. (More power, in fact, than your GSM phone, but still very low)

Ham Radio is related, but not closely. Ham Radio is also a social facility, but with a difference. You are allowed to construct your own transmitting gear and use it on a multitude of bands, and at very high powers. With such privileges comes responsibility. You must demonstrate that you have a minimum of technical know-how, and for this purpose you must pass an examination, The Radio Amateur's Examination.

Mouse. -- Where morse meets house.

The West Rand Amateur Radio Club
Established in 1938
KG33XU 26.14122 South - 27.91870 East

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1715

Phone: 083 267 3835 (Chairman)
Email: **zs6wr.club@gmail.com**
Web page: www.zs6wr.co.za

Bulletins (Sundays at …)
11h15 Start of call in of stations
11h30 Main bulletin start

Frequencies
Output: 439.000 MHz 7.6 MHz split
Input: 431.4 MHz (West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay when possible)

Radio Amateurs do it with more frequency!

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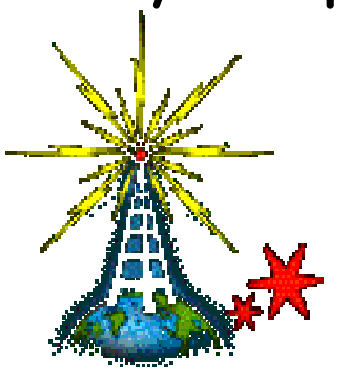
West Rand members - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

See Club website at www.zs6wr.co.za for all ANODE back issues.



We need your input! Email us articles, comments and suggestions please.
zs6wr.club@gmail.com