THE WEST RAND AMATEUR RADIO CLUB

March 2005
Volume 5, Issue 8

ANODE

Inside this issue:

Editor's Comments

March 2005

We are coming near to the end of the lightning season and it looks like going out with a bang! This last fortnight has seen total destruction of a couple of pc's, modems and some fatalities. (Reported in the Roodepoort Record)

Are you aware of the lightning in your area? A lightning detector is a simple device to build. Do you unplug the phone line from your modem? The one client who had his pc wiped out in a flash has had to buy a new pc. He left his modem plugged into the phone line whilst leaving his pc "idling". He now has a three phase circuit breaker on his power and a relay isolating the phone line from his modem that disconnects the line when the power is removed from the pc.

Had any PayPal emails recently?

Another way of parting unsuspecting Internet users from their money is called "phishing". Its where the villains send you an email that purports to come from a bank or money transfer agency. They ask you to send them all your details. Guess what happens next? This is not to be confused with the new SARS tax return

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Build A 9 dB, 70cm, Collinear Antenna From Coax

By N1HFX

Recently the RASON technical committee was hard at work at the repeater site repairing our 2 meter repeater antenna. One of the members commented to me that I should write an article about collinear arrays so that we could all build our own. While it is not always feasible to home-brew a commercial quality antenna designed to take hurricane force winds, it is very feasible to built a collinear antenna for average use.

This article describes a collinear antenna made from very inexpensive RG58/U coaxial cable and encased in PVC pipe.

Before we start building we need to cover some ground about the characteristics of coaxial cable. First remember that there is something called the velocity factor for coaxial cable. For RG58/U coax it is typically .66. This means that when we calculate the length of ½ wavelength in free space we need to adjust its size by multiplying it by the velocity factory. Simply put, RF slows down by the velocity factor when travelling through coaxial cable. All that aside now, lets calculate the ½ wavelength of RG58/U coaxial cable with a frequency of 444 Megahertz:

½ wavelength of coax = 300 / F / 2 * V

Where F = Frequency in Megahertz

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Special points of interest:

- Contact details on back page (updated)
- New email address for Anode and ZS6WR. See back page

Editors Comments & News

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which states: "Send us all your money now".

If you have nothing to do.....

Try www.fourmilab.ch for some funny and interesting topics. Includes information about the moon and software displays of the heavens from anywhere on planet earth. Also some tales about the early days of big computers.

In this issue

We have some circuits for you to peruse. These have been scanned in from old ham periodicals.

Over the last few years, I have been examining some of the Ham software available for calculations. Some could be described as "first world programs", where the program is completely functional but so overloaded with frippery that it looks like MS Office. At the other end of the spectrum there are simple programs that have no user interface to speak of and do the work well but with no explanation of method or source of work. Certainly these programs are the work of dedicated radio amateurs who have a right to charge for the use of these programs. However the over the top ones are not worth the money.

Recently I came across an example program for Visual Basic that allows the user of the program to define functions and produce graphs and data on an ad hoc basis. This program was a splendid example of programming prowess and internally (in the source) described what he was doing with the program. He had provided skeletal methods of loading and saving the user defined functions. No automatic use of data was provided as this had to be manually entered. The program worked well with a minimum of 'frippery'. Wouldn't you like to try your hand at this?

JB

Note the QSL cards behind Tony Hancock. From the "Hancocks Half-Hour - The Radio HAM"

Circuits! Circuits!

A four transistor 3.5MHz direct conversion transceiver.

Couldn't get much simpler could it?

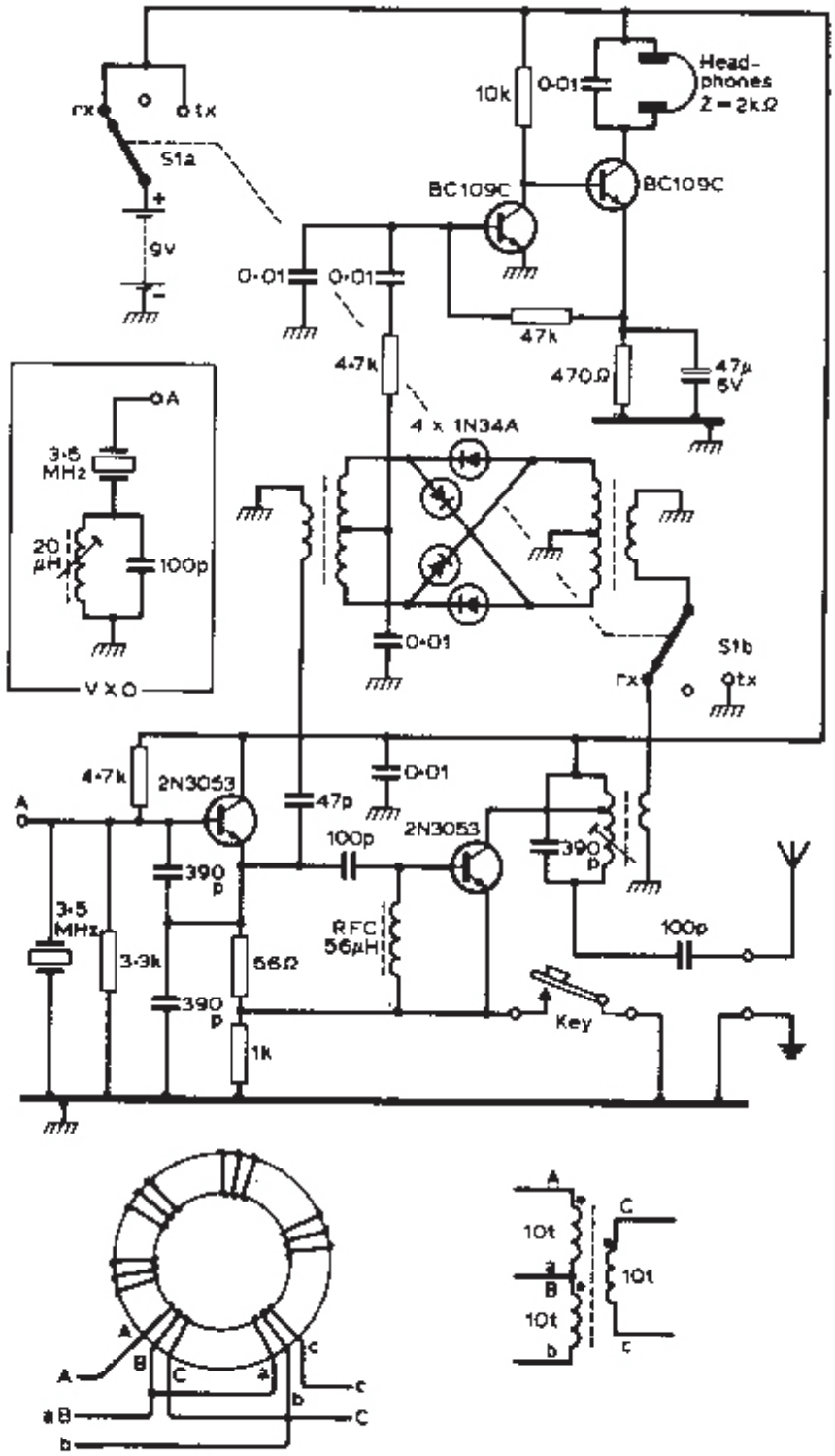

Fig 9. The SM6DWO four-transistor 3·5MHz transceiver. The pa tank coil is about 30t on 8mm diameter former and 20mm long, with collector tap at 5t with 4t link coupling coil

Build A 9 dB, 70cm, Collinear Antenna From Coax

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V = Velocity factory of Coax

300 / 444 / 2 * .66 = .2229 meters or 223 millimetres

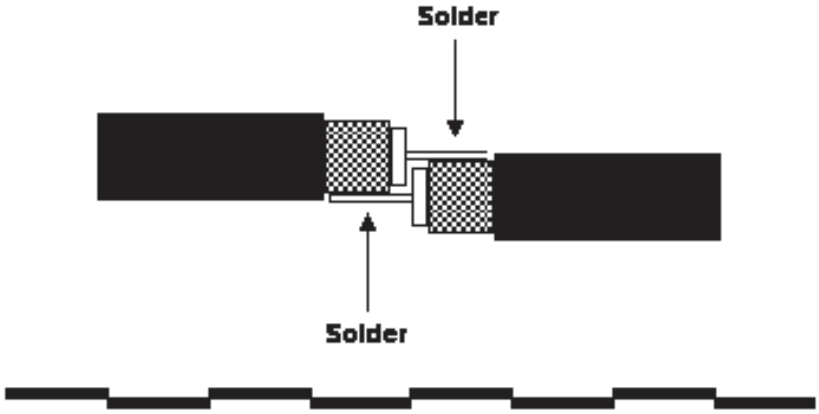

Figure 1

To allow for cutting the ends of our coax, we will need to add 8 millimetres to each ½ wave length for a total of 231 millimetres.

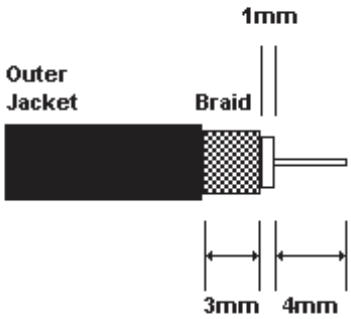

Figure 2

To get started, we will need 8 half wave lengths (231 millimetres) of RG58/U coaxial cable to be cut and connected in the manner shown in Figure 1. First cut back 4 millimetres of the outer jacket, braid and dielectric exposing the centre conductor as in Figure 2. Now cut back the outer jacket another 4 millimetres to expose the braid and push the braid back about a millimetre to prevent it from shorting with the centre conductor. It is best to lightly tin the braid with solder at this point. Now solder each half wavelength as shown in Figure 1. Attach a few feet of RG58/U to the bottom of the array as in Figure 1 for feeding the antenna.

Now its time to add the additional elements to the top and bottom of the collinear array. First add a ¼ wave element to the top of the antenna as shown in Figure 3. Use #16 solid wire or similar and solder it to the centre conductor only. The length of the ¼ wave element is calculated as follows:

1/4 wavelength radiator = 300 / F / 4
Where F = Frequency in Megahertz

300 / 444 / 4 = .1689 meters or 169 millimetres

At the bottom of the array we will slide a 5/16 inch aluminium tube over the coax and crimp it to the braid of the antenna feed point only. If copper is used, it is okay to solder. The length of the tube is calculated as follows:

¼ wavelength of tubing = 300 / F / 4 * V

Where F = Frequency in Megahertz

V = Velocity factory of Tubing. (Use .95 for 5/16" tubing)

300 / 444 / 4 * .95 = .1604 meters or 160 millimetres

Because a collinear antenna is hot with RF along the shield of the coax, it is necessary to prevent the RF from coming back through the coax. Slide three FT50-43 or almost any similar sized toroids over the bottom end of the coax as shown in Figure 3. The toroids should be placed about ½ wave length from the bottom of the array. Use the same formula for calculating a half wave length of coax. If you prefer, apply RF to the antenna at this point and

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Build A 9 dB, 70cm, Collinear Antenna From Coax

(Continued from page 4)
slide the toroids up and down until minimum SWR is found. Tape the toroids to the proper point on the coax using electrical tape or similar means.

using tie wraps about every 3 inches. It may not be possible to obtain a wooden dowel for the complete length so attach two dowels together by using a 1 inch sleeve of 5/16" tubing and crimping the tubing at

plete feed line. Use a low loss coax such as RG8/U for the main feed line to the transceiver. Don't forget to water proof all coax connectors.

If the eight ½ wave coaxial ele-

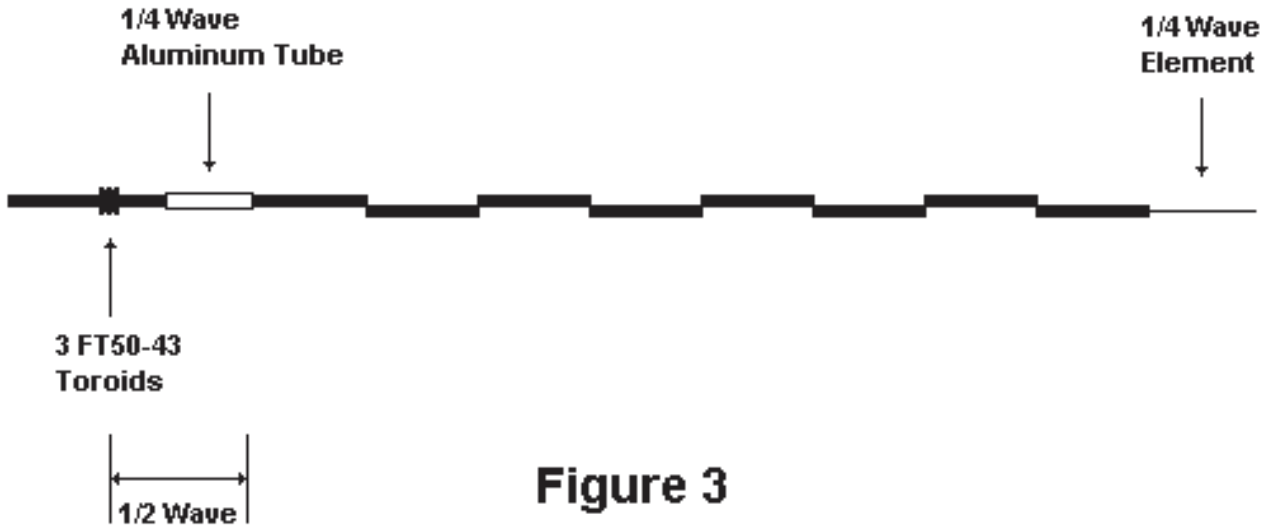

Figure 3

After completing the basic assembly of the collinear antenna, apply a small amount of RF with the antenna on the floor or ground. Relatively low SWR should be observed at this point. The SWR will be much lower once the antenna is mounted in the air. If the SWR is greater than 2 to 1 across the entire band, a connection may separated or a short occurred. It will be necessary to correct the problem before proceeding.

After good SWR is obtained, place heat shrink tubing along all connections or wrap tightly with electrical tape.

For final mounting, attach the antenna to a ¼" wooden dowel

each end. Check SWR again to insure that no connections have separated or shorted.

Carefully insert the coax and dowel assembly into several feet of ¾" PVC pipe for final mounting. Because of the tie wraps, it is not necessary to use spacers but may be necessary if larger size piping is used. Drill a hole for the coax at the bottom end cap and place an end cap on the top of the PVC. Do not cement end caps until the SWR has been doubled checked. Cement end caps and water proof coax opening on the bottom. Use whatever type of coaxial connector is desired on the bottom of the coax end but do not use RG58/U for your com-

ments result in an antenna too long for your liking (over seven feet), then it is okay to use four ½ wave coaxial elements but the SWR may be slightly higher (Attach four ¼ wave vertical ground radials at the antenna feed point to help lower SWR.). If 9 dB gain is still not enough for you then increase the number of coax elements from eight to sixteen. You will probably need to attach guy lines to the antenna. Although only a 70 CM antenna was described in this article, the formulas can be easily calculated for the 6 meter, 2 meter or 1¼ meter bands. Millimetres were used for many of the measurements but can be converted to inches by dividing millimetres

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Build A 9 dB, 70cm, Collinear Antenna From Coax

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by 25.4 for those who are not familiar with the metric system. After installing one of these antennas, be prepared to hear stations and repeaters that you never heard before.

DE N1HFX

To Projects Page!
http://www.rason.org/Projects/projects.htm

Circuits! Circuits!

For more information about using a "grid dip oscillator", see past issues of Anode.

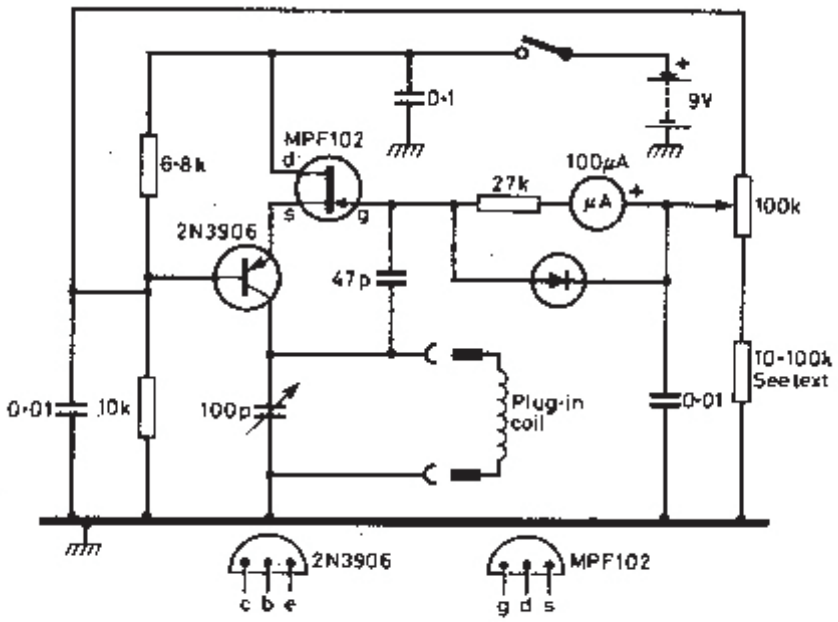


Fig 4. Solidstate "dipper" using single-gang variable capacitor and two-terminal coil

Circuits! Circuits!

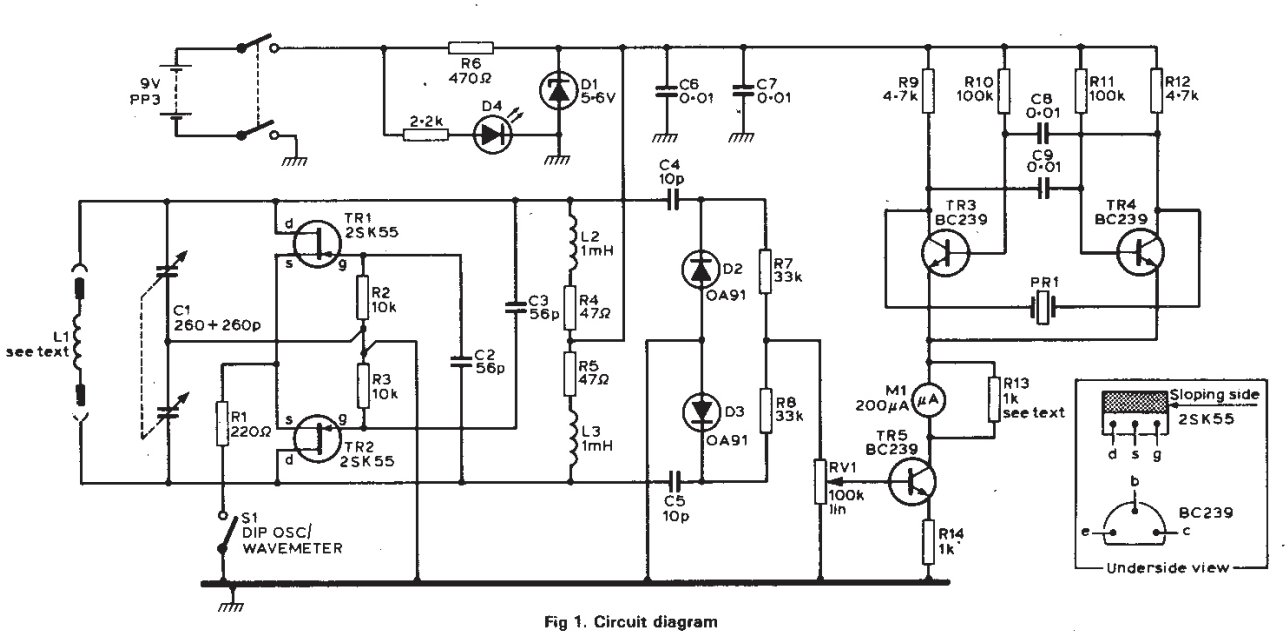
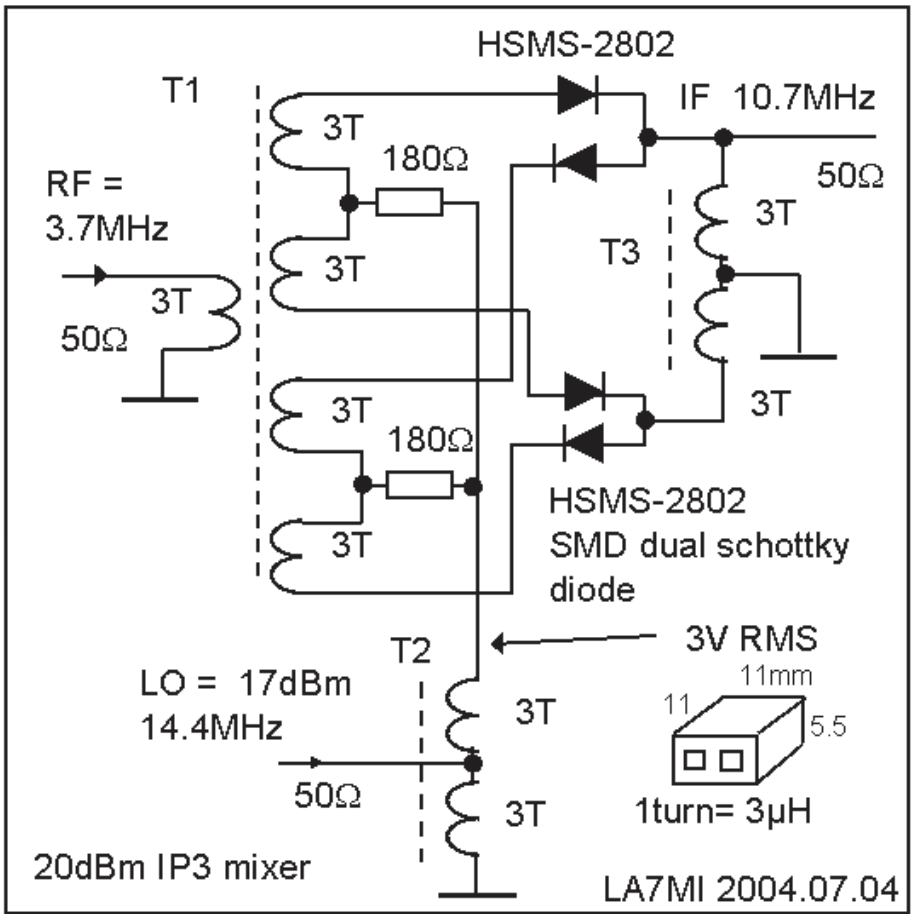


Fig 1. Circuit diagram

A balanced oscillator used as a f.e.t. "grid dip oscillator" with an audio tone generator for added sensitivity.

A Double Balanced Mixer for HF use. Using Schottky diodes and ferrite transformers for high intermodulation rejection.

Taken from LA7MI's web pages.



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[NEW EMAIL ADDRESS]

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

Frequencies
439.000MHz 7.6MHz split
(West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

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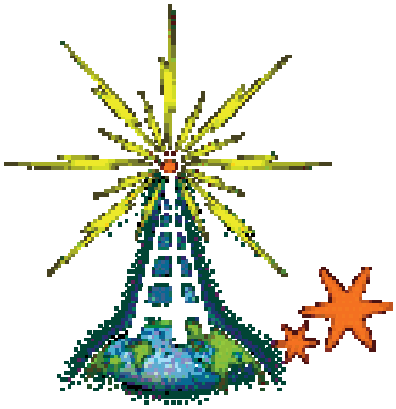
West Rand members - we need your input!

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.

In July 2003, we re-published an Anode Compendium on CD. It has the issues from July 2000 until June this year. This included the new Adobe reader. It has been updated, check with the chairman for details.



We need your input! Email us articles, comments and suggestions please.
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