THE WEST RAND AMATEUR RADIO CLUB

April 2007
Volume 7, Issue 8

ANODE

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Editor's Comments

Volume 7 Issue 8 - April 2007

Still using DOS programs?

Listening to the bulletin on Sunday (today), I heard OM Hennie (ZS6BSF) plea for a way to run his DOS program under Windows XP.

Most elderly DOS programs can be made to run under the "Command prompt" window . Its not a difficult process to set up manually. But does require some fortitude and luck.

A vast number of very good DOS games can be run under Windows XP using an open-source software tool. This tool is called "DosBox" and is available for free download from sourceforge.

`http://dosbox.sourceforge.net`

It also works well under linux using the X window system.

Where have all the 'young' radio amateurs gone? (Asks the SARL)

Where do you think? They got old, didn't they.

Radio Amateurs and Air Bags

(continued on page 7)

The "TTFD"

[TILTED TERMINATED FOLDED DIPOLE][Bob Innes ZS6RZ]

In mid-2005, my wife and I decided to move into a village complex, as we were approaching retirement, and were looking for a bit more security – as a result, I had to sell my tower and tri-bander beam antenna, together with an inverted "V", used for 80 and 40 metres. I had read good reports about the "TTFD" antenna and for a long time I wrestled with the idea of making up the "TTFD" but was put off because I thought it was a "pain-in-neck" to construct, but on the contrary, it proved to be quite easy, once I had gathered all the materials. Better still it is a reasonably small antenna, if designed around 40 metres. If I don't get permission to have it mounted on an external mast at our village, I will simply stick it in the ceiling of our cottage. No waterproofing needed!

I don't claim any fame to the design or modification of this antenna – what follows is purely my personal experiences in constructing the "TTFD", and experimenting with it.

Brief Description

The "TTFD" has been used commercially for many years, but there are very few amateurs that have attempted to construct the antenna. I have never seen any sales adverts for

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Special points of interest:

- Contact details on back page (updated)
- Next Ham-Comp is at 13:00 on the 21st April.

The "TTFD"

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the device either.

Just the name of this antenna conjures up ideas of a difficult construction project! The "TTFD" antenna is not very well known, but has been documented on the Internet from time to time. The antenna can be designed to operate from 160 metres right up to the 2-metre band.

The "TTFD" was originally designed by Captain G Countryman of the US Navy (W3HH). The US Navy has successfully used this design both at home and abroad. It is a compromise antenna; don't expect it to out do a "beam" or a "quad". The basic design is a "folded dipole" with a termination resistor sitting in the middle, which tends to "broadband it". The "TTFD" becomes reasonably "omni-directional" when sloped downward at an angle of between 20° and 40°, with 30° being optimum. The formula described by W3HH for calculating the lengths – seems a bit odd, and nobody seems to know how it was derived, but it seems to work OK! The "TTFD" has is a medium impedance device, meaning that that a balun transformer would be required to match to 50 or 75 Ohms. The lower end of the antenna can be mounted to a pole/mast of about 2 metres off the ground, running upwards to a mast of suitable height to give one the required 20° to 40° angle.

This is a "wire" antenna; made with a few pieces of PVC tubing to hold it together, a 50 watt resistor, a few nuts and eye bolts; with some solder lugs and a balun.

See Figure 2 & 3

Construction of the "TTFD"

The formula for the "TTFD" is as follows:
Length in metres = 100/frequency in Mhz

Spacing in metres = 3/frequency in Mhz

See Figure 2

There are numerous diagrams and pictures showing one how to assemble the "TTFD".

Each arm of the folded dipole needs to be supported along its length, to maintain the spacing, the easiest way is to use 16 mm or 20 mm pvc conduit piping – it's light and relatively cheap to buy.

The terminating resistor must be "non-inductive" of about 35 to 50 watts for a 100 watt transmitter. I use a single 500 Ohm, 50-watt wire wound ceramic resistor, which I put on an inductance bridge, and found the inductance was so low, I could not measure it! One can also build up a suitable resistive value using small "non-inductive" 2 watt carbon resistors in a series/parallel fashion, and then mount these on a suitable insulating board, don't use plastic or perspex, as the resistors can get hot!

The balun – this is a 9:1 ratio, this depends on the terminating resistor value that one uses. When using 300 Ohm twin feeder (if you can find some) the ideal resistor value is about 400 Ohms, with 450 Ohm open-wire feeder, a 500 Ohm resistor will suffice. In any event the resistor should be between 375 and 575 Ohms. The terminating resistor should be power rated at least 35% of your transmitter output, and 50% for CW or FM operation.

I am using a 9:1 balun, and a standard value 500 Ohm resistor; running a lightweight RG-59 coax cable, so as not to drag the antenna downwards, then suitably tuned with an antenna tuner, to iron out any impedance irregularities. If a 300 Ohm or a 450 Ohm twin feeder is used, run it right down to the antenna tuner. An "L" match tuner will address higher antenna impedances. Also ensure that your rig has a good earth, (not from electrical mains!!) this seems to cut down noise.

See diagrams and descriptions for making up the balun and resistive networks.

To make life easier, I have included a table below

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The "TTFD"

(Continued from page 2)

(Figure 1.) for various frequencies, giving dimensions of each arm of the cable and spacing of the wires.

Frequency Mhz	Length of AB & CD	Spacing
1.8	55.50 metres	1660 mm
3.6	27.77 metres	833 mm
7.0	14.28 metres	428 mm
10.1	9.90 metres	297 mm
14.2	7.04 metres	211 mm
21.2	4.70 metres	141 mm
28.5	3.50 metres	105 mm

Figure 1.

Please note: the length of AB & CD includes the spacing measurement!

Mechanical Considerations

1. Because of its span, very thin copper wire cannot be used, my suggestion is that one use a multi-strand plastic covered wire of at least a similar thickness to that of 14 to 16 S.W.G. gauge solid copper – and if possible go even thicker. Multi-strand to be used in preference to solid single strand, because of its flexibility.
2. The upper and lower wires of each arm must be uniformly spaced from one another, with an insulating material – I suggest 16 mm or 20 mm electrical conduit, or fibreglass fishing rod blanks as I have used. Something sturdy but lightweight
3. For spacing, I have the main tube housing

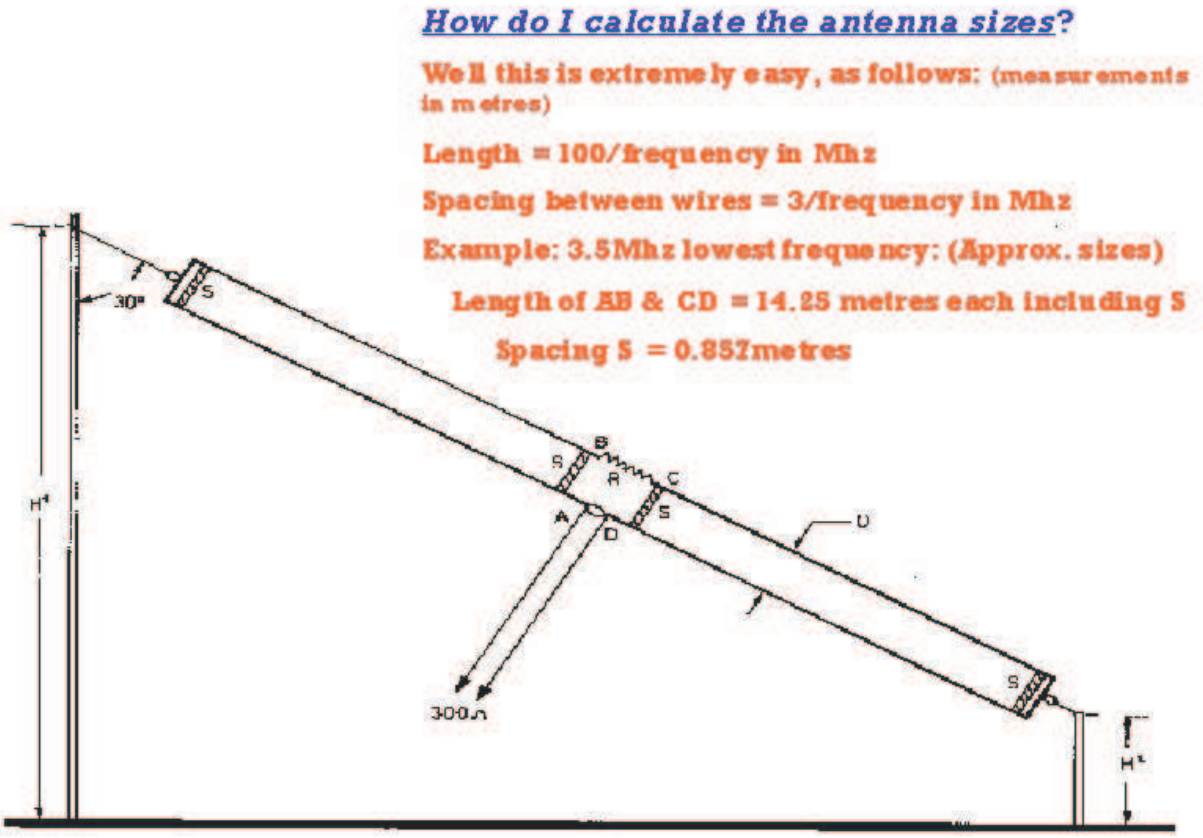


Figure 2.

(continued on page 4)

The "TTFD"

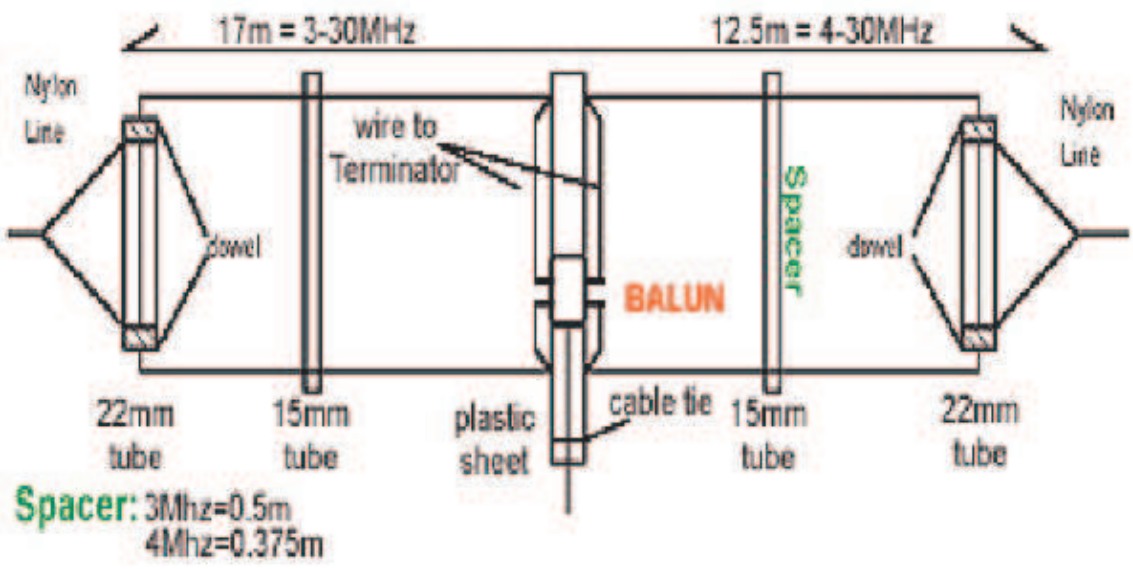
(continued from page 3)

the resistor and balun, a fibre-glass rod at the extreme ends, and another two halfway down the length – this seems to be more than adequate, for the 7 MHz version, if you construct the 3.5 MHz, you will need more, and the wire size may also have to increased to carry the weight over such a big span.

I have used 8 mm diameter "ski-rope", as it is rather robust, and is designed to be used outdoors under wet and hot conditions.

6. The centre pvc tubing piece that holds the balun and resistor must be water-proofed with a silicon filler, i.e. silicon bath sealer would do the job.
7. It would be ideal if your shack were as close to the centre of the antenna as possible – makes life easy.

An electrical layout of the entire concept of the TTFD antenna



4. The extreme end spacers can be made of aluminium tube or any extrusion, as it does not matter if they short circuit the wire at this particular position.
5. The "plane" of the antenna must be held vertically somehow or other,

Figure 3.

Making the Balun Transformer

There are two methods of approaching the construction of the balun:

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The "TTFD"

(Continued from page 4)

1. Using the Micrometals/Amidon toroid core type T-106-2 for a 100 watt power, or the T-200-2 for higher powers – these are a problem to procure in South Africa, but if one knows of someone in the States, that can assist you, this is the way to go.
2. Otherwise use some standard broadcast radio ferrite rods of about 10 mm diameter.
   Beg, borrow, buy or steal some of these.

Using the Amidon toroid, wind on 12 turns trifilar (three wires simultaneously) of 18 to 20 SWG gauge enamelled copper wire, and connect as per diagram for 9:1 balun.

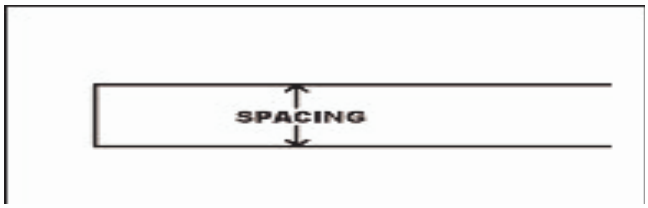

Figure 4

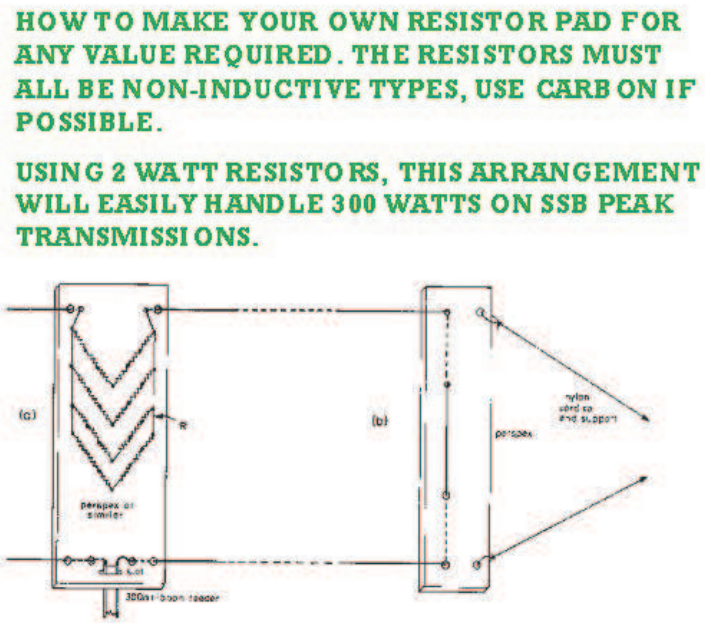

Figure 5

Using ferrite rods, strap together three pieces of about 100 mm long, and bind together with insulation tape – once again wind as above, and connect as per toroid specification. *See Figure 4*

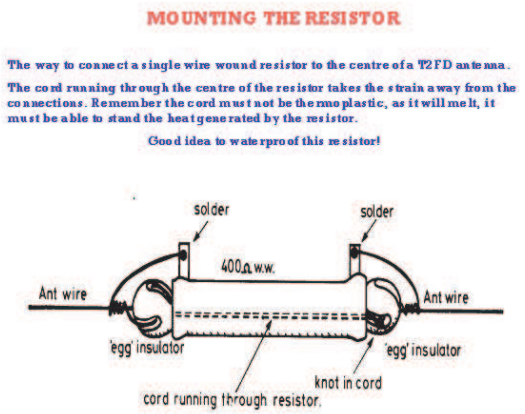

Figure 6.

Making up the terminating resistor

One will need a single high wattage resistor, or, 20 X 270 Ohm and 8 X 330 Ohm, 2 Watt resistors to make up a suitable resistance pad. This will work ideally with a 9:1 balun, and brings the resistance down to about 57 Ohms, which can be ironed out with an antenna tuner to match your transceiver's 50 Ohm requirement.

The resistor arms consist of 5 X 270 Ohms and 2 X 330 Ohms in a series configuration = 2010 Ohms, with 4 of these arms in parallel, the final value will be 502.5 Ohms – an ideal value for a 9:1 balun!

This configuration will handle well over 100 watts with ease. *See figure 5 & 6*

Parts List

Following is a listing of bits and pieces I purchased for construction – all the tubing

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The "TTFD"

(continued from page 5)

and solder lugs came from a plumber and electrical supplier, the eye-bolts, nuts and washers from your local hardware store. I spent R75.00 odd on these, excluding the wire, which I had donated; one can obtain the wire from a reputable electrical supplier.

The wire could also be the typical multi-strand non-insulated copper type used for earthing house electrical systems.

Quantity	Description
1	50mm PVC waste pipe – 500mm long
2	50mm PVC Sleeves
2	50mm PVC End Caps
8	Crimp solder lugs with 4mm holes
8	Threaded 4mm Eye-bolts, with nuts & washers
2	Metres 20mm PVC electrical pipe
1	Terminating resistor of your choice
1	9:1 Balun
1	SO239 coaxial socket
20	Metres of nylon "ski-rope"
	Assorted "coarse-threaded" self-tap screws

Figure 7.

I have some very good results with the "TTFD", as far a field as India, Madagascar, Tanzania, Namibia Indonesia, and lots of locals. However as conditions are currently diabolical to say the least, be patient, and when these improve, you will be pleased with the "TTFD"

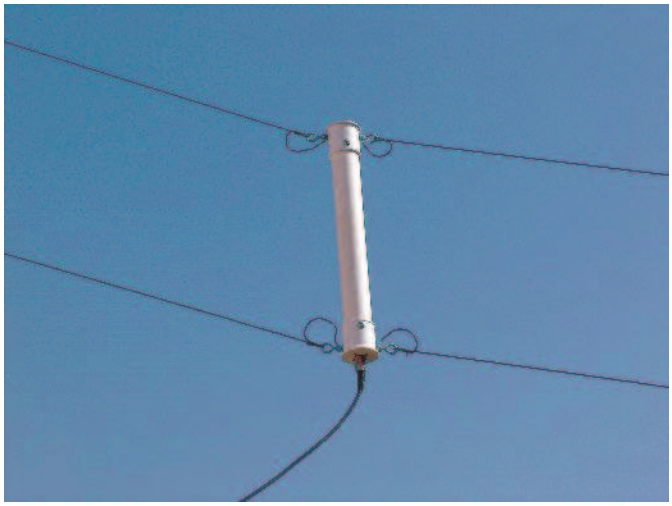
Good luck with building the "TTFD" - should you have any questions, please contact me:

Bob Innes – ZS6RZ

Mobile phone: 083 675 3951
(During the day, please!)

References and credits:

1. Practical Wire Antennas – John D Heys G3BDQ
2. Arnie Coro – Dxers Unlimited, Radio Havana; Cuba
3. More about baluns – Dr Jerry Sevick, Ph.D (Find this on the web)



TTFD (centre piece)

Ham-Comp revised aims - January 2007

Aims - To provide 'the club' with computers for Radio Amateur use.

Applications

1. Packet Radio using sound card
2. Morse reception and transmission using sound card
3. Radio Teletype (RTTY) using sound card
4. PSK31 using sound card
5. Slow Scan TV (SSTV) using sound card

Antenna rotator control - using the parallel port. Methods and how to achieve.
Logging (Automatic) - manual type / serial input.

Also desired

Test equipment - sound card and dedicated input.
In circuit and workbench software.
Printed circuit board / CAD - layout and design programs / software.
Development software.

Procedure

1. Setup 10pc's individually using boot-rom technology.
2. Install software applications.
3. Distribute to club members - the member undertakes to test, evaluated and report on software and hardware etc.
4. Logbook for each pc. (Suggested by Ron BHH)

The next Ham-Comp meeting will be on April 21st at 13:00 at the Club house.

Editor's Comments

(Continued from page 1)

I have now a Wagon R car. It has two front air bags. Are they likely to be set off by ten watts at 145MHz. Is it safe to have mobile amateur radio and air bags?

73 de Pete g4egq
pj.pennington@ntlworld.com

Hi Pete.

I have used various handies up to 10w output on 2 metres and my IC2800 puts out 50ish on 2 (ant mounted on the roof about 6 cm from one of the bags explosives!) and my Toyota Yaris has had no problems with any of its 9 airbags (10 if you count the missus!) so I would say go ahead!

73 Brian MW0GKX

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

Frequencies
439.000MHz 7.6MHz split
Input: 431.4MHz (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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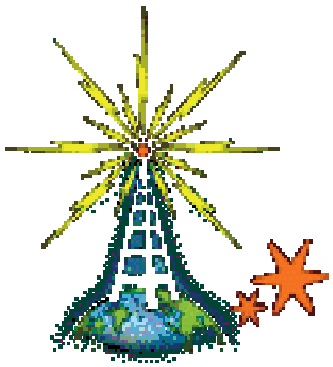
West Rand members - we need your input!

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 2005. 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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