

Random Wire Antenna calculator version 1.0

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A simple manual for the use of the random wire antenna calculator tool. This manual shows how to setup, compile and use the tool in a Linux or Linux-like environment.

It should work equally well in a BSD environment pretty much out of the box, in MacOS X there would be some work to install a suitable environment using 3rd part software such as brew".

In windows it compiles and runs under a Cygwin environmen so that is recommended if you need to run it in Windows. This manual details how to set it up properly.

1 Acquiring the software

Software is distributed as a source package. The repository for the software is currently with *GitHub* which makes it simple to download and use. Once in a shell environment suitable for building the software you can issue the following command:

```
$ git clone https://github.com/sikvall/rwa rwa
```

This will create a folder called *rwa*, download the necessary files to this folder and prepare you for making the files.

2 Compiling the software

To perform this you require to have a toolchain that can compile the c code. I recommend using the GNU Compiler Collection which should be easy to install in most environment by installing the *build essential* target.

It does not need any certain libraries or other supporting software.

Compiling is done by simply typing *make*

```
$ cd rwa      # change to rwa folder
$ make        # compile the software
```

Once the software is built error free you should have a binary file called *rwa* in the same folder. This is the software needed.

3 Using the software

Using the software is quite simple, the general use takes the form of the following command:

```
$ ./rwa [options] -b <band 1> ... <band n> > plot.dat
```

The *-b* option is used for selecting the bands you want to plot for. The bands possible to select are 6, 10, 12, 15, 17, 20, 30, 40, 60, 80, 160 meters.

The output directs to a file using *> plot.dat* which is then later used by *gnuplot*.

4 Options

There are a bunch of other options that also can be used with the software to control various aspects of it.

<code>-h, --help</code>	Prints a help text and then exits the software. The help text is an abbreviated help text based on this manual.
<code>-v, --velocity <%></code>	This set the velocity factor of the cable. Most straight lines would do well with about 98% of the light speed in free space. This is also the default value when the option is not used. For very thick wires you might want to try <code>--velocity 96</code> or there about. For plastic cladded wires you may also need to lower the velocity a little bit. The number is percentage of light speed in vaccum.
<code>-r, --region <reg></code>	Sets the region to either region 1 (Europe, Africa, Russia, Middle East and so on), to region 2 (The Americas, Greenland and so on) or to region 3 which is unfortunately not yet implemented. This control the actual bands as the HAM radio assignments in some bands differ between the Americas and Europe etc.
<code>-f, --feet</code>	Sets calculation presentation to feet instead of meters. Chances are that if you are using <code>-r 2</code> flag you might want this also.
<code>-m, --meters</code>	Makes sure output is in metric and not in feet or other imperial measures. This is also the default so the flag actually does not really do anything.
<code>-o, --output <file></code>	Output the data to a file. Same as redirecting stdout using the <code>> plot.dat</code> idea. Takes one argument which should be a valid file name.
<code>-b, --band <arg></code>	Band flag is required and used to tell the calculator which bands you want to include. This should be the bands you intent to use the wire on. Allowed bands include 6, 10, 12, 15, 17, 20, 30, 40, 60, 80 and 160 meter. Use the region switch <code>-r, --region</code> to set the region so you get the band edges correctly for your region.

5 Examples

```
./rwa -r2 -v96 -b 80 40 20 17 10 > plot.dat
```

Produces output for region 2 (Europe etc) with velocity factor 0,96 for the wire using the bands 80, 40, 20, 17 and 10 meters to a file called *plot.dat*.

6 Making the plot

Save the output from rwa into a file called plot.dat and then run gnuplot using the following command:

```
$ gnuplot rwa.gnu
```

If everything goes well you should have a png picture file in the same folder with the plot on it. Now you can experiment with various bands etc and see which frequencies you should avoid to make it tunable.

Good luck!

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