



# GENERATE RANDOM PWL FILE

|   |                        |
|---|------------------------|
| <input type="text" value="audio1k"/>              | Enter a Name           |
| <input type="text" value="5.656854249492381e-7"/> | Enter RMS Magnitude_V  |
| <input type="text" value="20"/>                   | Enter Min Frequency_Hz |
| <input type="text" value="20000"/>                | Enter Max Frequency_Hz |

```
Vpwaudio1k audio1k 0 PWL(
+ 0.000000000000 5.112535727314647e-7
+ 0.000025000000 -4.5107601958274405e-7
+ 0.000050000000 1.007782428756313e-7
+ 0.000075000000 2.4446815073157053e-7
+ 0.000100000000 -3.259420013292084e-7
+ 0.000125000000 2.3185687984099876e-7
+ 0.000150000000 1.6480905090530845e-8
+ 0.000175000000 -7.710943933063126e-7
+ 0.000200000000 7.441617918791331e-7
+ 0.000225000000 1.0801899966845153e-7
+ 0.000250000000 6.373041775973575e-7
+ 0.000275000000 9.882207958226114e-7
+ 0.000300000000 4.943555182199806e-7
+ 0.000325000000 5.638313819880847e-7
+ 0.000350000000 3.5000863352125985e-7
+ 0.000375000000 5.665843466320042e-7
+ 0.000400000000 3.7111507192998105e-7
+ 0.000425000000 2.664020420827657e-7
+ 0.000450000000 -3.732647113521845e-7
```

|                                       |                            |
|---------------------------------------|----------------------------|
| <input type="text" value="0.05"/>     | Total Period is Now_sec    |
| <input type="text" value="0.000025"/> | Sampling Period is Now_sec |
| <input type="text" value="2000"/>     | Number Points is Now       |

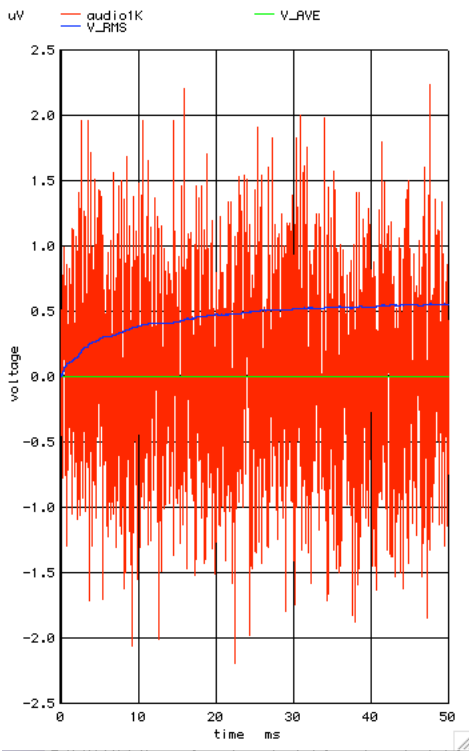
CUT and Paste into a PWL file and Use as Such..

```
*      OUT      Rload
*      /VpwlT\
*      Gnd
*      www.idea2ic.com
*      4/23/08

Rload      OUT      0      1k
.include   PWL_test.txt
```

The SUBCKT "M\_RMS" is for sanity checking.  
The V\_RMS port attempts to plot the rms value.

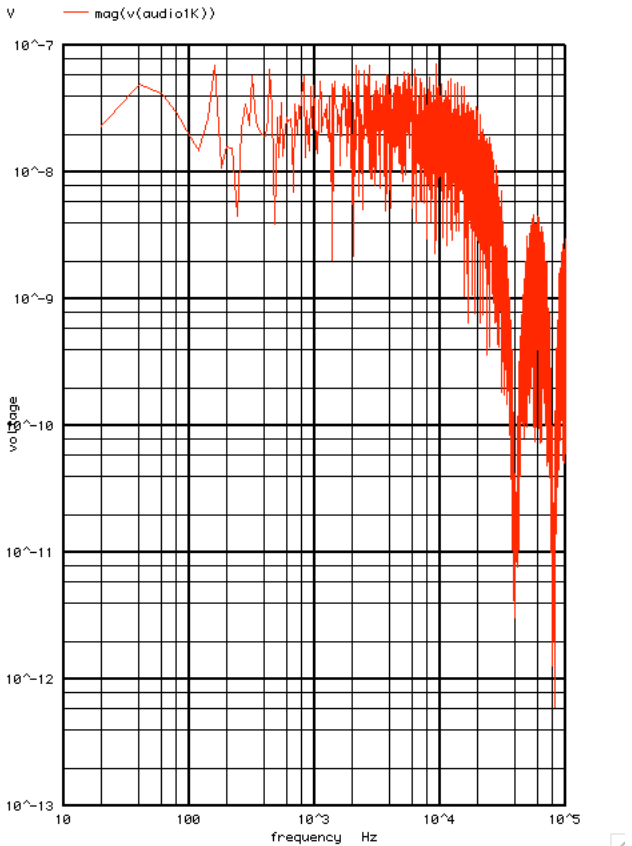
Graph 10 - tran11: PWL\_Noise\_1K\_@\_1K



The rms value should come close to **0.565uV**.  
The voltage\_ppk should be within **+/-1.7uV**  
for 99% of the time.

The spectrum should have a 20KHz Bandwidth.  
Since the frequency bins are each 20Hz wide,  
the expected level is  $4nV * \sqrt{20} = 17.9nV\_rms$   
In peak value terms that should be **25.3nV\_pk**.

Graph 11 - spect13: PWL\_Noise\_1K\_@\_1K



The "linearize" statement interpolates the waveform.  
Ideally a **sinc function** should be used.  
As a result, the 20KHz limited Noise waveform  
should be expected to have harmonics.