NetCalc2 - an RF Impedance Calculator for Macintosh and PC

The page below is reprinted from Harry Whitfield's website and is included here on SSS Online with his kind permission. If you have any questions about the operation of this program, please contact Harry at

Credits

This program, NetCalc, is broadly based on NETCALC - an RF Impedance Calculator by Ian White, G3SEK ()

The concepts and command names follow those in NETCALC, but the coding and design of this program are entirely new.

This program can also display impedances on a diagram similar to the well-known Smith Chart.

The L-section code is based on a PERL program by Claude Frantz ().

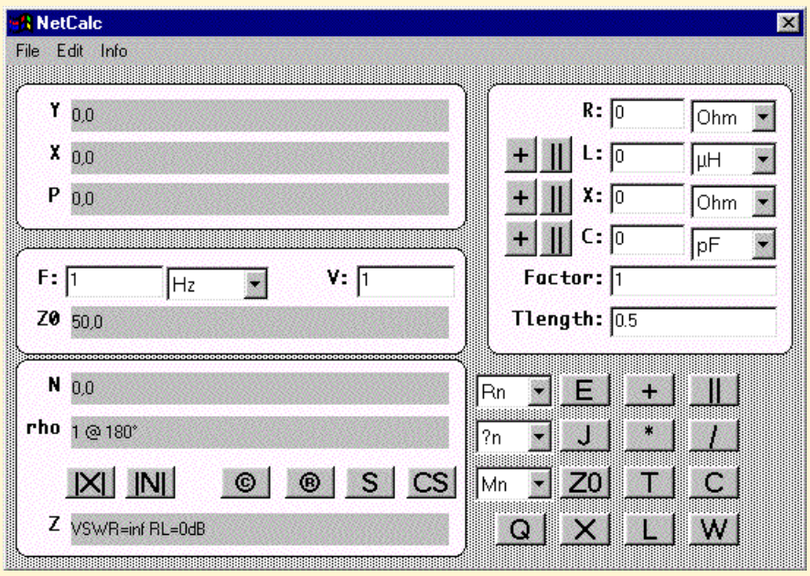
Background

NETCALC is available from the above link and can be executed on an IBM PC under various versions of the Microsoft Windows Operating System. Indeed, I have also used it under SoftWindows on an Apple iMac.

However, I wanted a version that would run native on a Macintosh as well as on a PC and thought that writing and testing such a program would teach me a lot about network analysis and Smith Charts.

Using NetCalc

Here is a view of the program when it first opens.



Data is entered via the panel at the top right and transfered to the X register by use of the + and || buttons.

Operations on the X (and Y) register(s) are performed using the buttons at the bottom right. The command names are the same as those in NETCALC, so you should read the NETCALC instructions before attempting to use the program.

The X and Y registers appear in the panel at the top left. The X register is also shown in parallel form in the P register.

The environment parameters are entered in the middle left panel, apart from Z0 which must first be entered via the data panel and transferred from X to Z0 using the Z0 button. Complex characteristic impedances can be entered if desired.

Many of the circuit parameters are recomputed at every operation. Others are computed as required.

The panel at the bottom left displays the normalised value of X in the N register and the reflection coefficient (in polar form) in the rho register. The VSWR is displayed in the Z register, which is also used as a general display register.

There are buttons to compute the modulus of X and of N, and four buttons to produce a rudimentary display similar to that on a Smith Chart.

Buttons and Operations

Data input (top right)

```
R +  L  X -> Y, R +  L -> X
R || L  X -> Y, R || L -> X

R +  x  X -> Y, R +  x -> X
R || x  X -> Y, R || x -> X

R +  C  X -> Y, R +  C -> X
R || C  X -> Y, R || C -> X
```

Calculation (bottom right)

```
Rn      X -> Y, Rn -> X
E       X <=> Y
+       X +  Y -> X, 0 -> Y
||      X || Y -> X, 0 -> Y

?n      Rn -> Z
J       X* -> X
*       X * Factor -> X
/       X / Factor -> X

Mn      X -> Mn
Z0      X -> Z0
T       X + T(Z0, F, V, length) -> X
C       Y -> X, 0 -> Y

Q       x/r -> Z, where X = r + jx
X       if x >= 0, L = x/(2¾F)   -> Z, where X = r + jx
        if x <  0, C =  (-2¾F)*x -> Z, where X = r + jx
L       L(X, Z0, F, V) -> Z
W       (1 +|rho|)/(1 - |rho|) -> Z,
        where rho = ((X/Z0) - 1)/((X/Z0) + 1)
LS      Displays L-sections matching the load X to the real part of Z0
```

Calculation (bottom left)

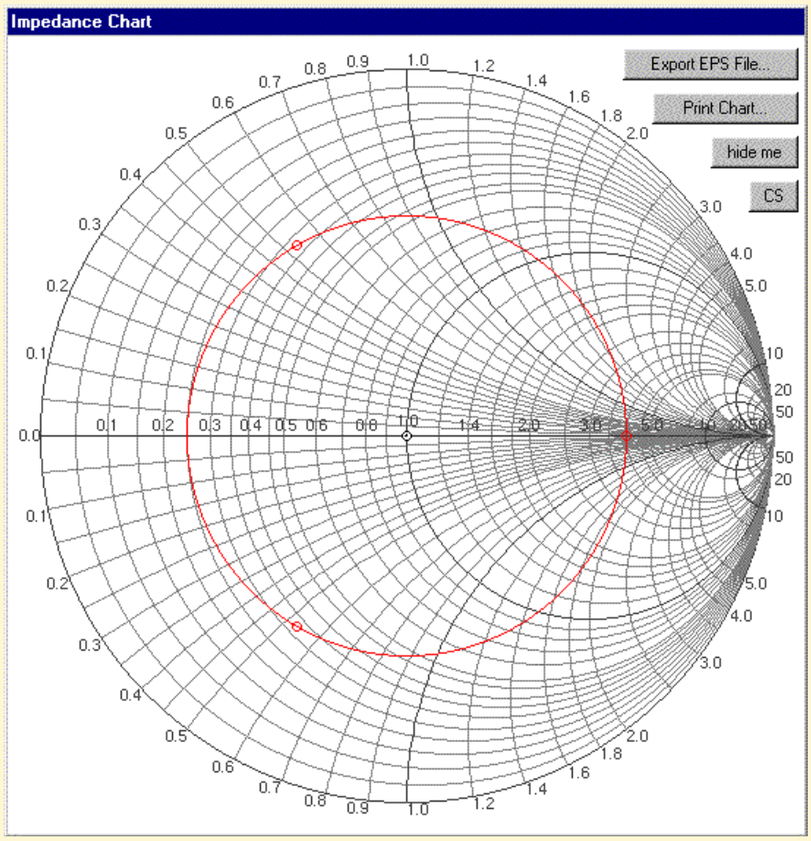
```
|X|     |X| -> Z
|N|     |X/Z0| -> Z
```

Chart Drawing (bottom left)

The C, R, S and CS buttons are used as follows:

- C draws the VSWR circle on the chart.
- R places the current N (ie rho) value on the chart.
- S displays the chart.
- CS clears the chart.

Here is a view of a chart:



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Download the Software

Download NetCalc - Macintosh (Carbon) Version. (505KB)
Made for Mac OS 8.6 with CarbonLib, but does not work correctly on Mac OS X.

Download NetCalc - Macintosh (Classic) Version. (414KB)
Can also be run in Classic Mode on Mac OS X.

Download NetCalc - PC Version. (343KB)

Download NetCalc - Macintosh HyperCard Stack. (125KB)
Requires HyperCard or HyperCard Player, both of which can also be run in Classic Mode on Mac OS X.

Download NetCalc - Macintosh (HC) Application (Classic). (876KB)

Can also be run in Classic Mode on Mac OS X.

Download NetCalc Widget (285KB)
Requires Konfabulator and runs correctly on Mac OS X.

If you would like to check the engineering formulae, the mathematics or the programming, you can download the HyperTalk and REALbasic scripts.

Download HyperTalk script from the HyperCard Version of NetCalc (38K).

Download REALbasic script from the REALbasic Versions of NetCalc (24K).

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