

# TX Line Calculator

Version 1.0 22 November 2007

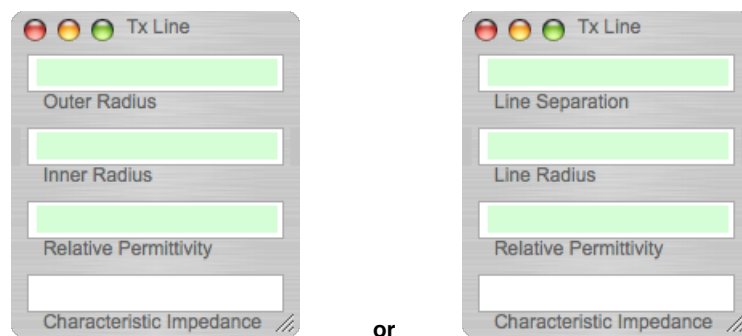
## Summary

This is a special purpose calculator which performs simple transmission line calculations. Given three line parameters, the Widget calculates the value of a fourth.

Two formulae are used, one for coaxial cable, the other for parallel line.

## Instructions

When the Widget is started, it displays a window with four fields.



Enter data into the three green fields, then press the RETURN or ENTER key. The Widget computes a fourth value and displays it in the fourth field.

Which of the four values is to be computed can be set in the Widget's preferences or by alt-clicking the amber button, which reveals a menu from which the output mode (output field) can be chosen.

## Coaxial Cable and Parallel Line

The Widget uses two formulae, one for **coaxial cable**, the other for **parallel line**. The formula to be used can be chosen in the Widget's preferences or by alt-clicking the green button, which reveals a menu from which the input mode (**Coaxial Cable** or **Parallel Line**) can be chosen.

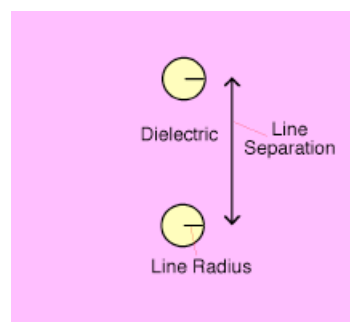
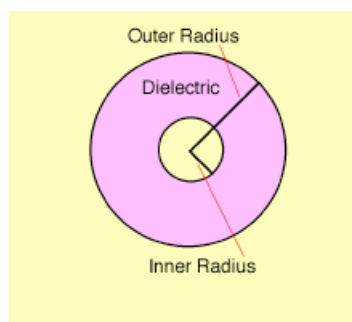
For coaxial cable, the formula used is:  $Z_0 = Z_v * \ln(o / i) / (2 * \pi * \text{sqrt}(e))$ ,

where  $Z_v$  is the characteristic impedance of a vacuum,  $o$  and  $i$  are the outer and inner cable radii,  $e$  is the relative permittivity of the dielectric, and  $Z_0$  is characteristic impedance of the transmission line.

For parallel line, the formula used is:  $Z_0 = Z_v * \ln(s/r) / (\pi * \text{sqrt}(e))$ .

where  $Z_v$  is the characteristic impedance of a vacuum,  $s$  and  $r$  are the line separation and line radius,  $e$  is the relative permittivity of the dielectric, and  $Z_0$  is characteristic impedance of the transmission line.

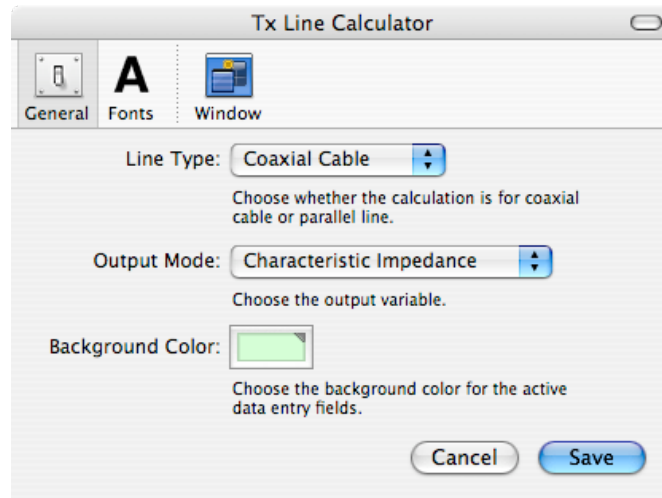
The value of  $Z_v$  is taken to be **376.73031346177066** ohms.



## Units of Measurement

Because the measurements of length only appear in the ratios ( $o / i$ ) and ( $s / r$ ), they can be in any units desired, **provided the same units are used for both.**

## Preferences



## Dock

The dock shows the **Coaxial Cable** or **Parallel Line** mode currently in force.

## License

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## Widget Concept, Coding and Documentation

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