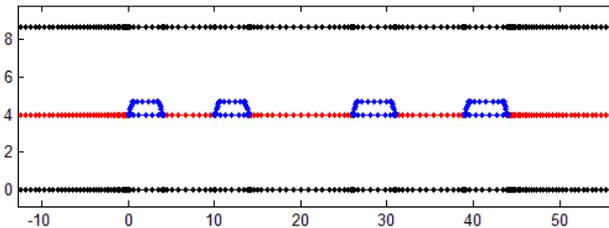


# Free 2D field solver

AtaiTec Corporation  
*info@ataitec.com*

# Features

- Compute impedance and create W-element RLGC models for microstrip or striplines with trapezoidal cross section and mixed width/spacing.



Frequency = 3.000000e+09 Hz

Lossy Characteristic Impedance Matrix [ZC] (Ohm)

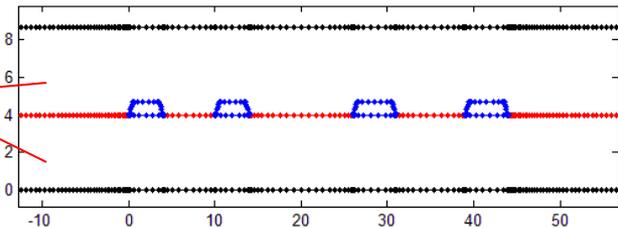
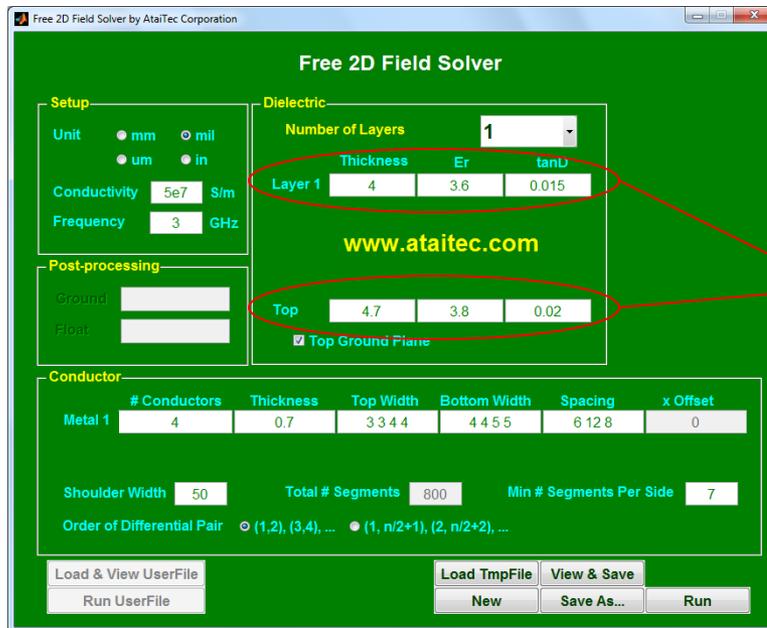
```
4.854347e+01+i* 4.192044e-01 2.138467e+00+i* 1.784579e-02
2.138467e+00+i* 1.784579e-02 4.854259e+01+i* 4.192210e-01
31e-03
35e-05
```

```
* Lo
3.118439e-07
1.368082e-08 3.118400e-07
6.395089e-11 1.394415e-09 2.771430e-07
1.247383e-12 2.719850e-11 5.283962e-09 2.771455e-07

* Co
1.325639e-10
-5.863922e-12 1.325701e-10
-1.343702e-15 -6.741986e-13 1.488909e-10
-5.916489e-19 -2.965864e-16 -2.866957e-12 1.488847e-10
```

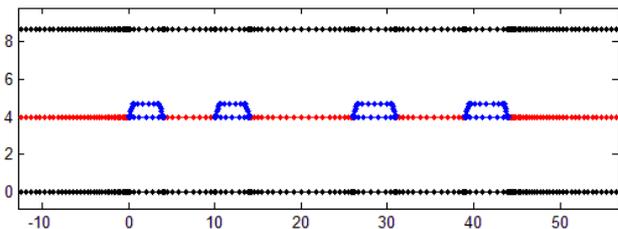
# Dielectric layers

- Bottom ground plane is assumed to be present. Air is assumed for the background dielectric.
- The user specifies the dielectric stack (the bottom and top layers) by entering thickness, dielectric constant ( $\epsilon_r$ ) and loss tangent ( $\tan\delta$ ).



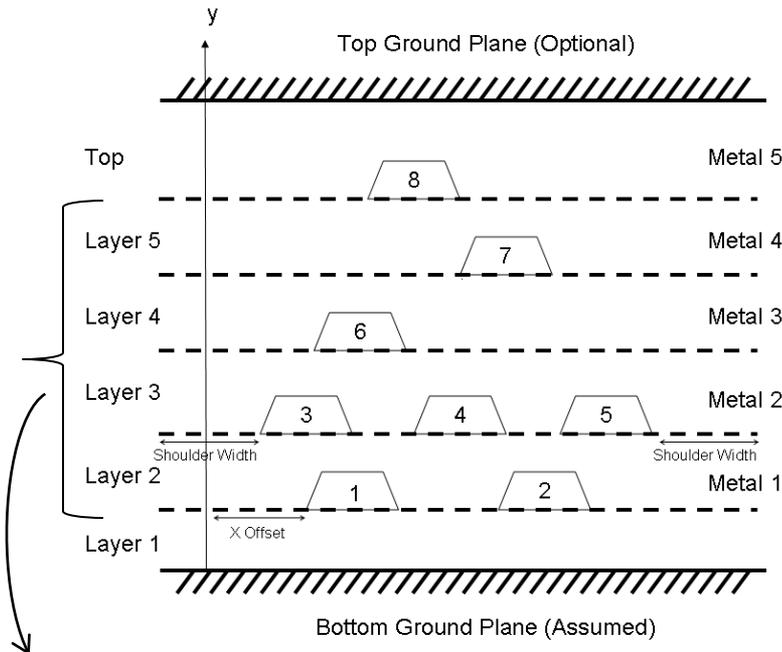
# Conductor width and spacing

- Conductors sit on the top of bottom dielectric layer. All thickness, top width, bottom width and spacing can be entered in scalar or vector. Each conductor can be assigned different thickness, width and spacing through vectored inputs.



# Conductor's numbering sequence

- Conductors are numbered from left to right and from bottom to top.

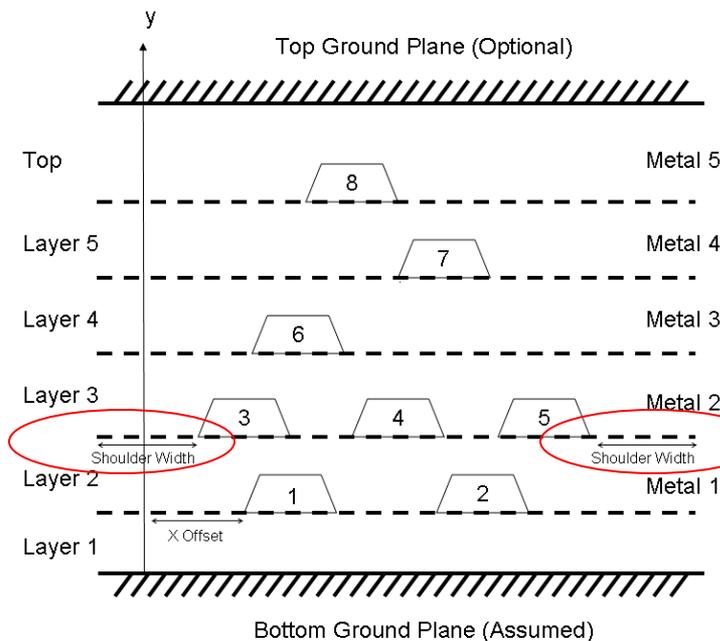


Layers 2 to 5 are available only through ADK.



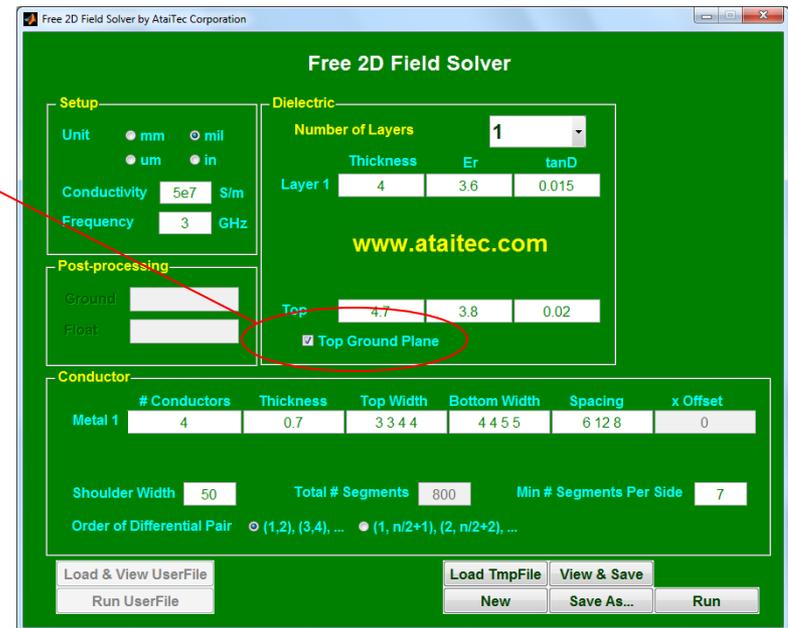
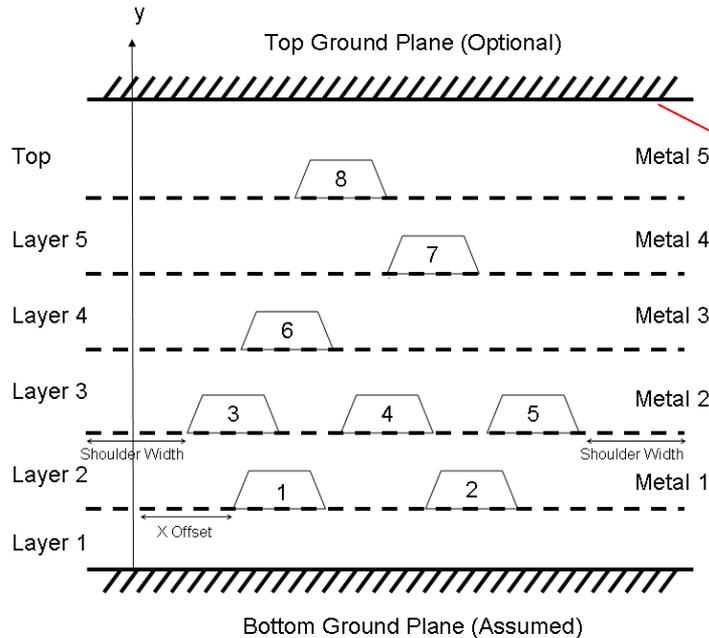
# Shoulder width

- Dielectric interface is extended up to the shoulder width from the leftmost and rightmost conductors. To mimic infinite dielectric interface, 5x or more vertical + horizontal dimension can be used for shoulder width.



# Top ground plane

- Top ground plane can be turned on/off to simulate stipline or microtrip.



# Advanced features

- ADK is required to simulate coplanar waveguide, floating conductors, multiple dielectrics or arbitrary cross section.

The screenshot shows the 'Free 2D Field Solver' interface with several key features highlighted by red circles and blue callouts:

- More dielectric layers:** A red circle highlights the 'Number of Layers' dropdown menu, which is currently set to '1'.
- Ground or float conductors:** A red circle highlights the 'Post-processing' section, specifically the 'Ground' and 'Float' checkboxes.
- More meshes:** A red circle highlights the 'Conductor' section, specifically the 'Total # Segments' field, which is set to '800'.
- Use-defined file for arbitrary structures:** A red circle highlights the 'Load & View UserFile' and 'Run UserFile' buttons.

The interface includes the following sections and data:

- Setup:** Unit (mm, mil, um, in), Conductivity (5e7 S/m), Frequency (3 GHz).
- Dielectric:** Number of Layers (1), Layer 1 (Thickness: 4, Er: 3.6, tanD: 0.015), Top (4.7, 3.8, 0.02), Top Ground Plane (checked).
- Conductor:** Metal 1 (# Conductors: 4, Thickness: 0.7, Top Width: 3344, Bottom Width: 4455, Spacing: 6128, x Offset: 0). Shoulder Width: 50, Total # Segments: 800, Min # Segments Per Side: 7.
- Order of Differential Pair:** (1,2), (3,4), ... (1, n/2-1), (2, n/2), ...
- Buttons:** Load & View UserFile, Run UserFile, Load TmpFile, View & Save, New, Save As..., Run.