

RF PCB Toolbox™ Release Notes



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RF PCB Toolbox™ Release Notes

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R2022a

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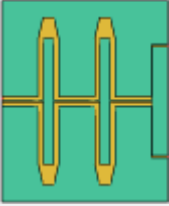
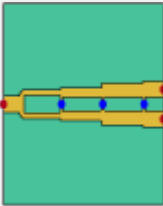
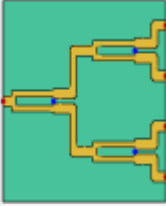
R2022a

Version: 1.1

New Features

Wideband Wilkinson Power Divider or Combiner, Corporate Power Divider, and Coupled Line Balun: Design, visualize, and analyze three new PCB components using parameterized geometry

Create and analyze the structure of 3 PCB components using the objects in PCB Components Catalog. Use the show function to view the structure of the PCB components.

<p>balunCoupledLine</p>  <p>Create a multisection coupled-line balun on the X-Y plane.</p>	<p>wilkinsonSplitterWideband</p>  <p>Create a wideband Wilkinson power divider.</p>	<p>powerDividerCorporate</p>  <p>Create a corporate power divider.</p>
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Tapered Trace Shapes: Create tapered trace shapes to use as an RF PCB interconnect

Use the traceStep and traceTapered objects to create tapered trace shapes used in RF PCB interconnect. This trace creates different PCB components in tapered form to create the required electrical connection.

MirrorX and MirrorY Functions: Create symmetrical structures for resonators, couplers, and filters

Use the mirrorX and mirrorY functions to create symmetrical structures like resonators, couplers, and filters. The mirrorX and mirrorY functions mirror an RF PCB shape along the X and Y axis, respectively.

Coupling, Directivity, and Isolation: Understand and compare the behaviors of couplers

- Use the coupling function to calculate and plot the coupling factor of a coupler.
- Use the directivity function to calculate and plot the directivity of a coupler over a specified frequency.
- Use the isolation function to calculate and plot the isolation of a coupler over a specified frequency.

R2021b

Version: 1.0

New Features

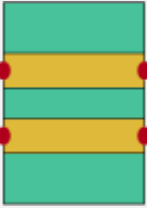
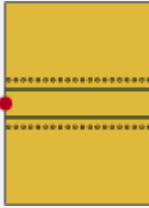
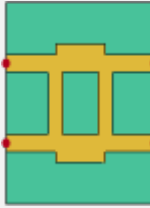
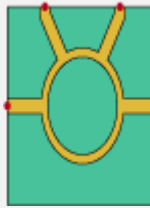

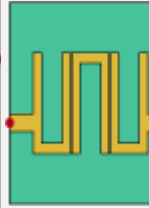
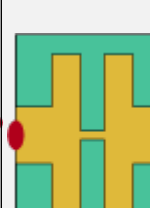
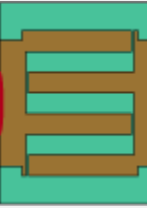
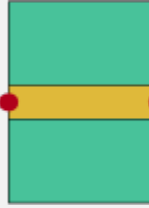


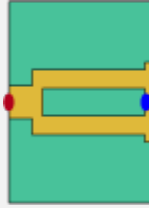
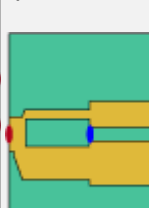
New RF PCB Toolbox

The new RF PCB Toolbox™ features a comprehensive set of objects, functions, and solvers for designing, analyzing, and prototyping printed circuit boards (PCBs) operating at high frequencies.

Transmission lines, Couplers, Splitters, Filters, and More: PCB component library for rapid design and visualization of PCBs using parameterized geometry

Create and analyze the structure of 13 PCB components using the objects in PCB Components Catalog. Use the show function to view the structure of the PCB components.

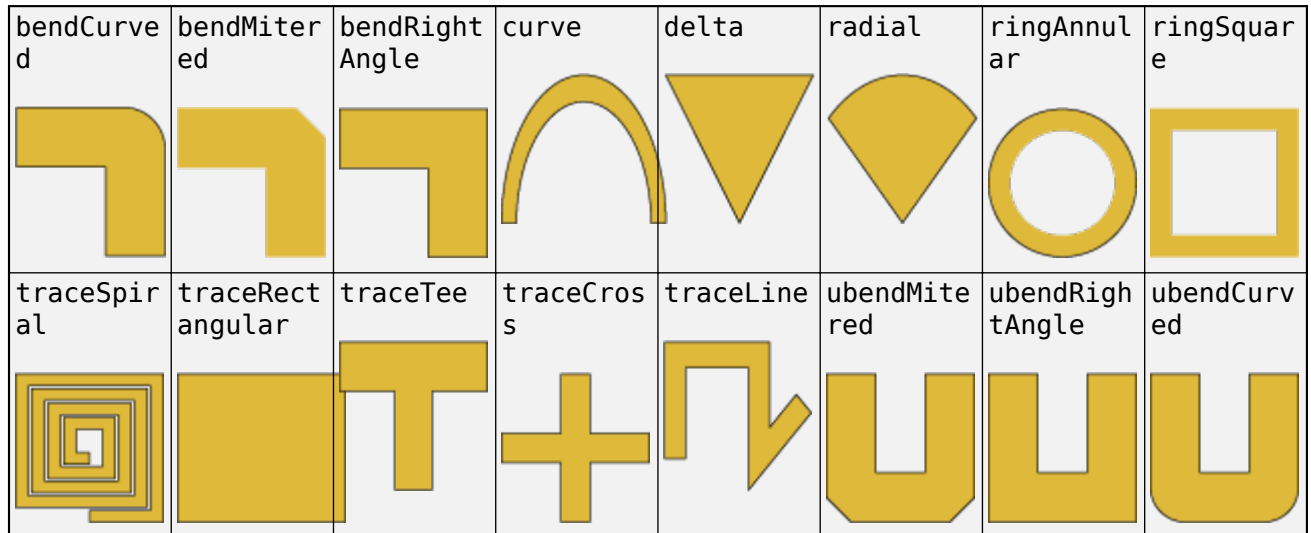
The following PCB components are available in this release:

<p>coupledMicrostripLine</p>  <p>Creates a coupled transmission line in the microstrip form.</p>	<p>coplanarWaveguide</p>  <p>Creates a coplanar waveguide transmission line.</p>	<p>couplerBranchline</p>  <p>Creates an equal branchline coupler or a quadrature hybrid.</p>	<p>couplerRatRace</p>  <p>Creates an equal-split rat-race coupler or a 180-degree ring hybrid.</p>	<p>filterCoupledLine</p>  <p>Creates a coupled line filter in the microstrip form.</p>	<p>filterHairpin</p>  <p>Creates a hairpin filter in the microstrip form.</p>	<p>filterStepImpedanceLowPass</p>  <p>Creates a stepped-impedance lowpass filter in the microstrip form.</p>
<p>interdigitalCapacitor</p>  <p>Creates a basic interdigital capacitor.</p>	<p>microstripLine</p>  <p>Creates a microstrip transmission line.</p>	<p>spiralInductor</p>  <p>Creates a spiral inductor in four different shapes.</p>	<p>stubRadialShunt</p>  <p>Creates a single and double radial shunt.</p>	<p>wilkinsonSplitter</p>  <p>Creates a Wilkinson splitter in the microstrip form.</p>	<p>wilkinsonSplitterUnequal</p>  <p>Creates an unequal Wilkinson splitter.</p>	

Bends, Traces, Rings and More: Create and visualize 17 PCB shapes used in custom PCB geometry

Create different layouts by using interconnects such as traces, bends, curves, and mitered edges from Custom Geometry and PCB Fabrication. Combine parameterized shapes using Boolean operations to create new planar geometry for PCB design. Use the show function to view the shapes.

The following shape objects are available in this release:



PCB Design Function: Design PCB components with appropriate parameters around specified frequency

Use the design function on the objects in PCB Components Catalog to create PCB components that operate around a specified frequency.

Custom PCB Component: Design custom PCB components with arbitrary metal and dielectric layers, solid feed or via models, and advanced meshing control

Use the pcbComponent object to build custom multilayer metal-dielectric PCB components.

PCB Component Subsystem: Cascade PCB components to create RF subsystems

Use the pcbcascade function cascade one or two of PCB components or a PCB component object and an Antenna Toolbox™ pcbStack object across edge-based ports.

PCB Component Circuit Element: Convert PCB components to circuit elements

Use the `pcbElement` function to convert a PCB component into circuit elements. You can use these circuit elements in the `circuit` object from RF Toolbox™.

PCB Component Analysis: Perform various EM analyses of PCB components and visualize the results

Use the functions in Analysis and Verification to analyze:

- All the components in PCB Components Catalog
- PCB components designed using the `design` function
- Custom PCB components created using functions and objects in Custom Geometry and PCB Fabrication

Behavioral Analysis: Perform behavioral analysis of noncritical components on a PCB Board

Use the following objects and functions to compute the behavioral model for PCB components to:

- Calculate the S-parameters of the component using the `Behavioral` property in the `sparameters` function
- Convert the PCB component into a PCB element object using the `pcbElement` object with the object `Behavioral` property to 1.

For more information on behavioral analysis, see Behavioral Models.

Gerber File Generation: Prototype and implement antennas using customizable library of RF connectors and PCB manufacturing services

Use the `PCBWriter` object or the `gerberWrite` function with the `pcbComponent` object to generate Gerber files. You can share these files with manufacturers for PCB fabrication. Optionally, you can choose the RF connectors for the PCB board using `PCBConnectors` or manufacturing services using `PCBServices`.

Dielectric Catalog and Visualization: Choose, customize, and visualize metal using DielectricCatalog function

Use the `DielectricCatalog` function to:

- Select dielectric substrates for PCB components from the dielectric catalog
- Use a custom dielectric and add it to the dielectric catalog
- Visualize PCB components created using substrates from the dielectric catalog

Metal Catalog and Visualization: Choose, customize, and visualize metal using MetalCatalog function

Use the MetalCatalog function to:

- Select metal for PCB components from the metal catalog
- Use a custom metal and add it to the metal catalog
- Visualize PCB components created using different metals from the metal catalog

Application-Based Examples

RF Filter Modeling

- Bandstop and Bandpass Filters with Open Microstrip Line Stubs using Behavioral and EM Simulation
- Stepped Impedance Maximally Flat Low-Pass Filter for Microwave Applications
- Design and Analysis of Hairpin Micro-Strip Line Bandpass Filter
- Design and Analyze Compact UWB Low Pass Filter Using pcbComponent
- Design and Analyze Band Stop Filter using pcbComponent
- Design and Analyze High Pass Filter using pcbComponent

RF Matching

- Design Two-Stage Low Noise Amplifier Using Microstrip Transmission Line Matching Network
- Design of Quarter-Wave Transformer for Impedance Matching Applications

Signal Integrity

- Analyzing High Frequency Currents and Techniques for Routing PCB Traces
- Analyzing Crosstalk Between PCB Traces
- Create and Analyze PCB Interconnects using Custom Traces

Antenna and RFIC

- Design of Dual-Fed Square Microstrip Patch Antenna for Bluetooth Low Energy Applications
- Characterization and Modeling of On-Chip Square Spiral Inductor for Si RFIC Application

