

## Field Theoretic CAD of Open or Aperture Matched T-Junction Coupled Rectangular Waveguide Structures

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The rigorous computer-aided design of rectangular waveguide structures is described which are coupled by open or rectangular iris loaded E- or H-plane T-junctions. The design theory is based on the full wave mode-matching method for the key-building block T-junction element associated with the generalized S-matrix technique for composite structures. The waveguide structures may be arbitrarily composed of the T-junction and already known key-building block elements (such as the double step and the septum discontinuity) combined with homogeneous waveguide sections between them. The E- or H-plane T-junction effect, large apertures, finite iris or septum thicknesses and higher order mode interactions at all step discontinuities are rigorously taken into account. Typical design examples, like rectangular iris coupled T-junctions, narrow-stopband waveguide filters, high return loss E-plane T-junction diplexers, an elliptic function E-plane integrated metal insert filter and a simple orthomode transducer demonstrate the efficiency of the method. The theory is verified by measurements.

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