Abstracts

An Automated Technique for Post Production Tuning of Microwave Circuits

Tuning, in the form of physical adjustments to microstrip matching networks, is needed for most microwave circuits to meet today's state of the art performance requirements. This is because there is only so much that can be done in the design phase to account for the effects of tolerance variations and parasitics in the components that make up the circuit, and manufacturing variations in assembly and etching of the circuiy itself. Presently circuit adjustments are performed manually by highly skilled technicians who must probe the circuit, measure its resulting response and determine how to modify the circuit elements for best overall performance. This iterative process is empirical in nature and consequently highly dependent on the experience level of the technician and his learning skills. It is for most circuits a very time-consuming and therefore costly part of the production cycle.The tuning technique presented in this paper removes the empirical element from the production cycle and, through automation, expedites and standardizes the circuit alteration process. It therefore provides for reduced tuning time and improved repeatability and producibility of microwave circuits. This technique can be used in a semi-automated mode, with a computer instructing the technician on how to modify the circuit for optimum performance, or as a fully automated workstation with a laser and a robot working per instructions from the said computer. A description of the technique as well as application data are included in this paper. Data is provided for a single stage L band power amplifier tuned in the automated workstation and for a four stage X band amplifier tuned using the computer-aided approach.

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