Abstracts

A Miniaturized C-Band Digital Latching Phase Shifter (Dec. 1966 [T-MTT])

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This paper describes a digital-latching phase shifter which combines the electrical advantages of waveguide design with the compactness of a strip transmission-line structure. Two multibit, nonreciprocal, C-band models are described, which combine the electronic drivers and the microwave structure in an 0.8 by 0.8 inch cross section designed specifically for half-wavelength stacking in an antenna array. A new technique of antisymmetric dielectric loading to convert microwave energy from a TEM mode in stripline transmission to a TE-type mode propagating in a dielectrically loaded rectangular waveguide is presented. Data for a one-bit model are presented along with an investigation into an optimum material choice. Temperature stability and peak power capability are also discussed. The performance of two multibit models are presented, including VSWR, insertion loss, and average power characteristics of the final microwave structures. Temperature variation of phase shift and peak power performance of these devices are also presented. Particular attention is given the electronic drivers for the multibit models which must latch the toroids into their remanent states. The driver circuit is designed to permit switching of each bit between states with a single wire trigger. Finally, the advantages of this design over previous miniaturized models are summarized, and further investigations into other features for greater optimization are suggested.

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