Abstracts

Sampling for Oscilloscopes and other RF Systems: Dc Through X-Band (Dec. 1966 [T-MTT])

W.M. Grove. "Sampling for Oscilloscopes and other RF Systems: Dc Through X-Band (Dec. 1966 [T-MTT])." 1966 Transactions on Microwave Theory and Techniques 14.12 (Dec. 1966 [T-MTT]): 629-635.

Sampling techniques as used in wideband oscilloscopes have, in the past, yielded bandwidths up to 4000 MHz. This approach has now been employed to achieve bandwidths in excess of 15 GHz. The design requirements necessary for this extended bandwidth are presented along with a detailed description of one solution to the design problem. The device is basically a two-diode sampler located at the center of a dielectric filled, biconical cavity containing the RF transmission line. The RF line is perpendicular to the axis of the biconical cavity. The sampling pulse is introduced into the cavity by applying it directly between the centers of the opposite faces of the cavity. This establishes a potential difference between two points on the ground conductor of the RF transmission line being sampled. This technique is basic to the operation of the device and plays a key role in the reduction of sampling loop inductance, which would limit the bandwidth. The equivalent circuits are presented along with the appropriate defining equations. The relationship between bandwidth, input VSWR, and step response overshoot, are presented, along with the typical measured results.

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