Abstracts

Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator

M.W. Casseday, N.J. Berg, I.J. Abramovitz and J.N. Lee. "Wide-Band Signal Processing Using the Two-Beam Surface Acoustic Wave Acoustooptic Time Integrating Correlator." 1981 Transactions on Microwave Theory and Techniques 29.5 (May 1981 [T-MTT] (Joint Special Issue on Surface-Acoustic-Wave Device Applications)): 483-490.

A new acoustooptic architecture for performing real-time correlation of high-frequency wide-band signals has been developed. It uses a surface-acoustic-wave (SAW) delay line, and features the optical interference of two coherent light beams which have been Bragg-diffracted by SAW's propagating in the line. The signal multiplication, and subsequent time integration of the product formed, is performed by a photodiode array which detects the diffracted light. This architecture has achieved time-bandwidths products exceeding 10/sup 6/ (34 MHz X 30 ms), and has several attributes which make it particularly well suited for use as a spread-spectrum signal processor. These include linearity of operation, large dynamic range, a large time aperture over which the correlation can be observed, and the ability to determine the center frequency and bandwidth of the signals. A correlator with this architecture has been used to detect a number of wide-band spread-spectrum signals. Its suitability for use as a signal processor in several spread-spectrum systems is considered.

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