Abstracts

Design and Implementation of a Direct Digitization GPS Receiver Front End

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A direct digitization approach greatly reduces the hardware requirements in traditional front end design. Further, the hardware that has been eliminated is typically the source of a number of potential difficulties including age-based, temperature-based, and/or nonlinear performance. This paper presents a case study on the design and implementation of direct digitization Global Positioning System (GPS) receiver front end. First, sensitivity and dynamic range issues for a generic front end are discussed with particular attention given to the unique requirements in the direct digitization approach. Second, two GPS front end implementations are compared. The first is the direct digitization of the input signal at radio frequency (RF) as is the case in the true digital receiver or software radio. The second uses a more standard approach of downconverting the input signal to an intermediate frequency (IF) for further processing or digitization. Experimental data is presented which characterizes the relative signal-to-noise ratio for both implementations as well as the results of initial acquisition processing of true GPS data.

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