

Abstract: Design of Cost and Performance Efficient Fast Fourier Transform Processors with Various Number Systems

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Abstract

In this paper, we design fast Fourier transform (FFT) processors and discuss the influence which the type of number system and the word length of the FFT have on the performance and cost of FFT processors. The type of number system and the word length of the FFT are important factors in FFT processors. Thus, these factors should be determined with careful consideration in the design of FFT processors. In this paper, we design 64, 256 and 1024-length radix-4 FFT processors based on various number systems, including fixed-point, block floating-point and floating-point number systems, with a 0.18- μm complementary metal–oxide–semiconductor, (CMOS) technology. Then, we discuss the cost and performance of FFT processors that vary depending on the type of number system and the word length used. Finally, from the practical analysis of the experiment results, we propose a cost and performance effective word length for floating-point FFT processors.

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