

**ENCODERS DESIGN FOR 4-BIT FLASH ADC USING 0.18 μ m
CMOS TECHNOLOGY**

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ABSTRACT

This paper describes design and performance of encoder for 4-bit flash Analog to Digital Converter (ADC). Encoder for flash ADC is known for its high speed operation. In this paper, three of encoder designs are use to do the comparisons between power and propagations delay, it is implemented in $0.18\mu\text{m}$ CMOS technology. Generally, the Silvaco Electronic Design Automation (EDA) Tools that used for drawing the schematics and do the simulations of the 4-bit encoder. The digital encoder can operate more efficient in terms of power dissipation only 6.48mW at 1.8V supply voltage. Meanwhile the lowest propagation delay time goes to 2-stage pipelining encoder with the result value 0.9385ns fastest. In addition the preferred design of encoder is determine according to simulation among 3 design values of speed and its overall performance in encoder.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The natural state of audio and video signals is analog. When digital technology was not yet around, they are recorded or played back in analog devices like vinyl discs and cassette tapes. Direct-conversion ADC which is also called flash conversion ADC is a process that extremely fast with a sampling rate of up to 1 GHz. The resolution is however, limited because of the large number of comparators and reference voltages required. The input signal is fed simultaneously to all comparators. A priority encoder then generates a digital output that corresponds with the highest activated comparator.

In the reality is life basically in analog. The temperature, light, pressure and sound are exist as analog signal in the real life. In order to connect these elements to the digital system, analog to digital converter (ADC) is used as the interfacing device. The usage of ADC is becoming significant in applications such as satellite communication system, image sensing and optical communication system. Even in the medical field, ADC has been used in the ultrasonic medical imaging and MRI scanner. Today, the industry has demand for higher frequency, lower power consumption and higher speed ADC.