

Design of 3bit Flash Type ADC

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Abstract—This paper proposes a 3-bit flash type adc for low power integrated circuits and system application which will be implemented using ngspice and verilog simulation. The circuit design,implementation analysis will be done by using FOSSEE's esim software. The 3 bit flash type ADC can be designed by using comparators and priority encoder for the conversion of analog to digital signals. This flash type ADC is used in the design of large integrated circuits which has many digital decoding functions.Using reference circuits and waveforms, we can verify the circuit design.

Keywords—Comparators,Encoder,Flash type ADC

REFERENCE CIRCUIT DETAILS

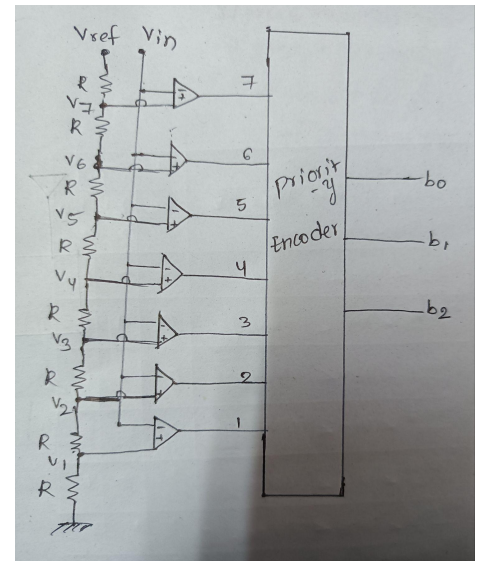
Among all ADC's flash type ADC is more fast because it takes less time and conversion of flash type Tclock. Flash ADC Is also called parallel ADC or simultaneous ADC.It consists of Resistor ladder , comparator and encoder.

The Flash ADC is type of analog to digital converter.For 3-bit Flash type ADC there are 7 comparators , for dividing Voltage With respect to reference voltage 8 resistors are required.

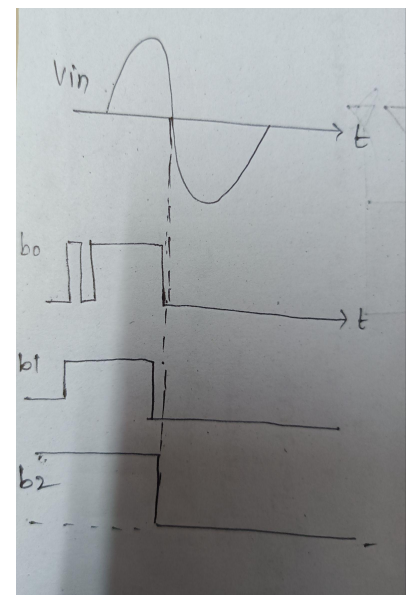
Actual purpose of comparators is compares in this circuit .Vin[input voltage] is comparing with Verf[reference voltage]
If $V_{in} > V_{ref}$; output is logic 1
If $V_{in} < V_{ref}$; output is logic 0

Encoder is type of combinational circuit which performs the encoding 2^n inputs to N outputs. This basic encoder has a Problem when its comes to multiple input being high at same Time. In order to rectify this problem , priority encoder is used Priority Encoder gives us the output based on highest priority Input. In this circuit we are going to use an 8x3 priority encoder encoding circuit. We will implement 3-bit Flash type ADC circuit design using ngspice and verilog software and also Verification of obtained output waveforms as an output

References:- [1] S.Franco,Design with operational amplifiers and analog integrated circuits. New york McGraw-Hill Education,2015



Reference Circuit design



Reference output waveforms