



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECB202 – LINEAR INTEGRATED CIRCUITS

II YEAR/ III SEMESTER
1

UNIT 4 – ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTER

TOPIC 4.3 – Flash Type & Successive Approximation Type ADC





Flash Type - ADC

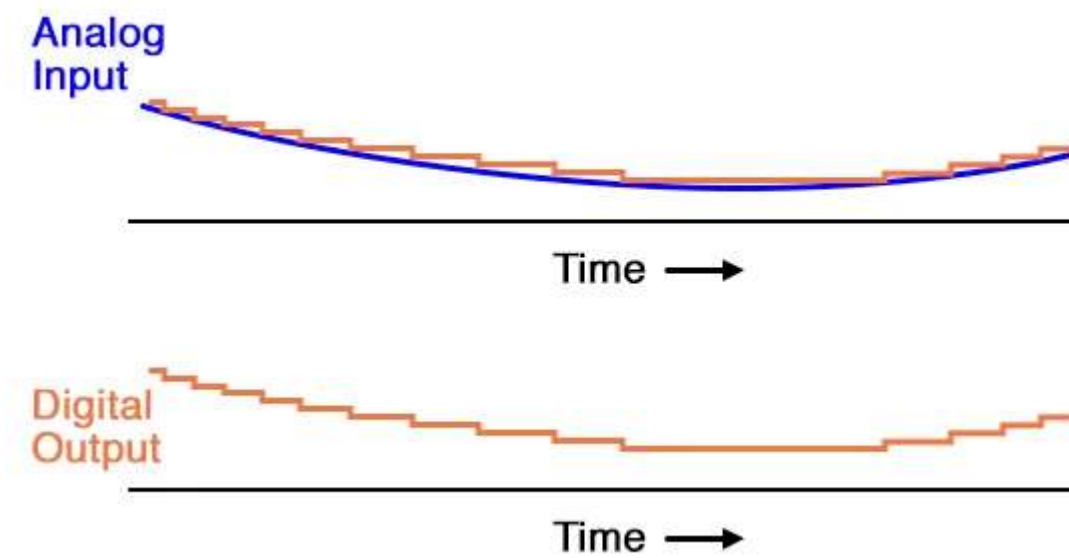
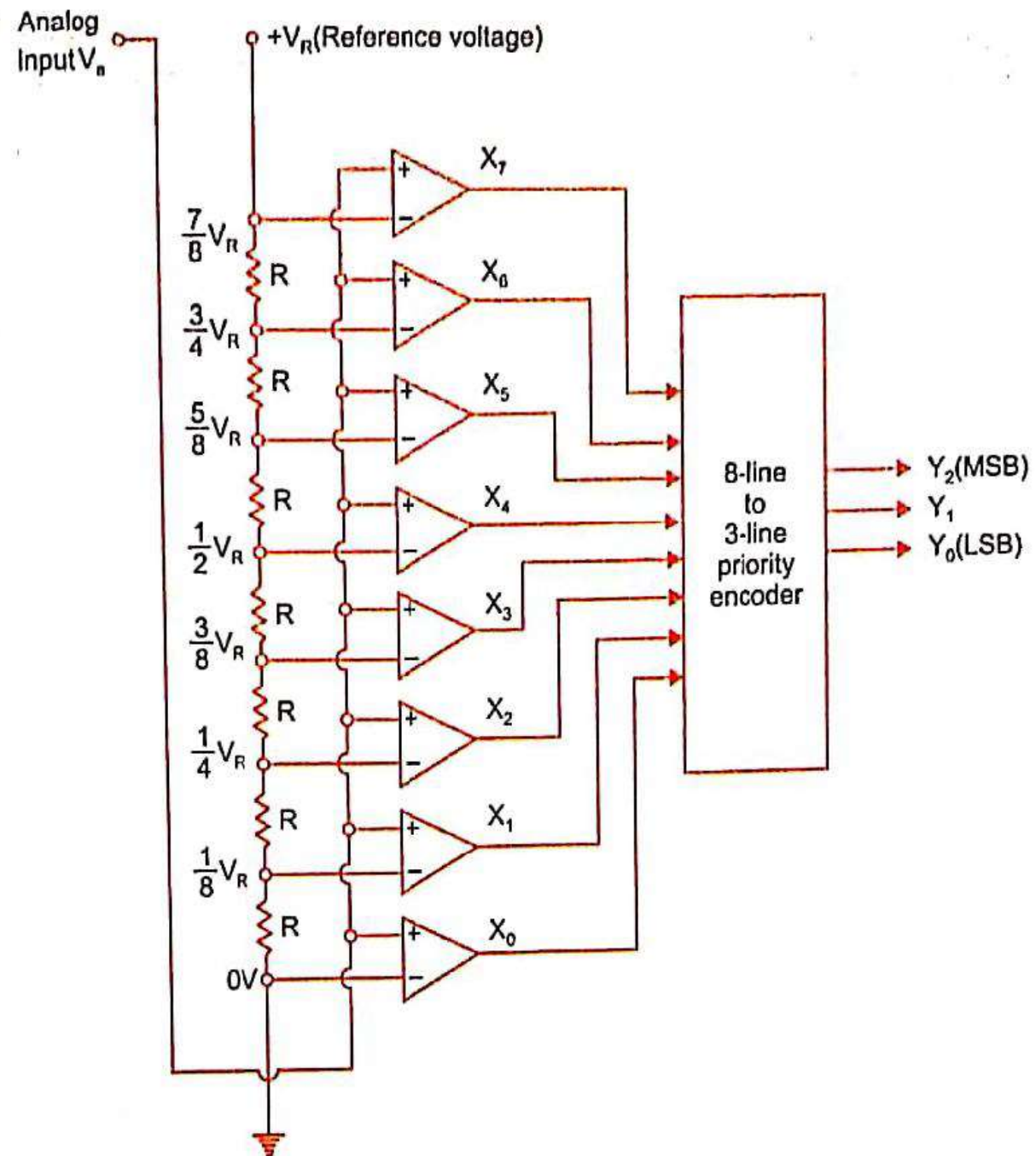


- Flash ADCs are frequently used when speed is critical and latency must be kept to a minimum
- The basic idea behind a Flash ADC is simple: it compares the input analog value to numerous reference voltages and provides a digital output in a single step
- $V_a > V_d$ - Output is "1"
- $V_a < V_d$ - Output is "0"





Flash Type - ADC





Flash Type - ADC



- Also called the *parallel* A/D converter, this circuit is the simplest to understand
- It is formed of a series of comparators, each one comparing the input signal to a unique reference voltage.
- The comparator outputs connect to the inputs of a priority encoder circuit, which then produces a binary output.
- V_{ref} is a stable reference voltage provided by a precision voltage regulator as part of the converter circuit, not shown in the schematic
- As the analog input voltage exceeds the reference voltage at each comparator the comparator outputs will sequentially saturate to a high state
- The priority encoder generates a binary number based on the highest-order active input, ignoring all other active inputs





Successive Approximation Type ADC



- This ADC technique most frequently includes general applications
- The ADC comprises a comparator, a digital-to-analog converter, a register, and a control circuit
- To grasp the concept, consider a 4-bit ADC with a sampling rate of 11.2 volts.
- We take the comparator reference voltage as 16 volts
- Whenever the new transformation begins, the successive approximation register sets the most significant bit to 1 and all others to zero
- As the register is followed by the DAC, the input to the DAC is 1000

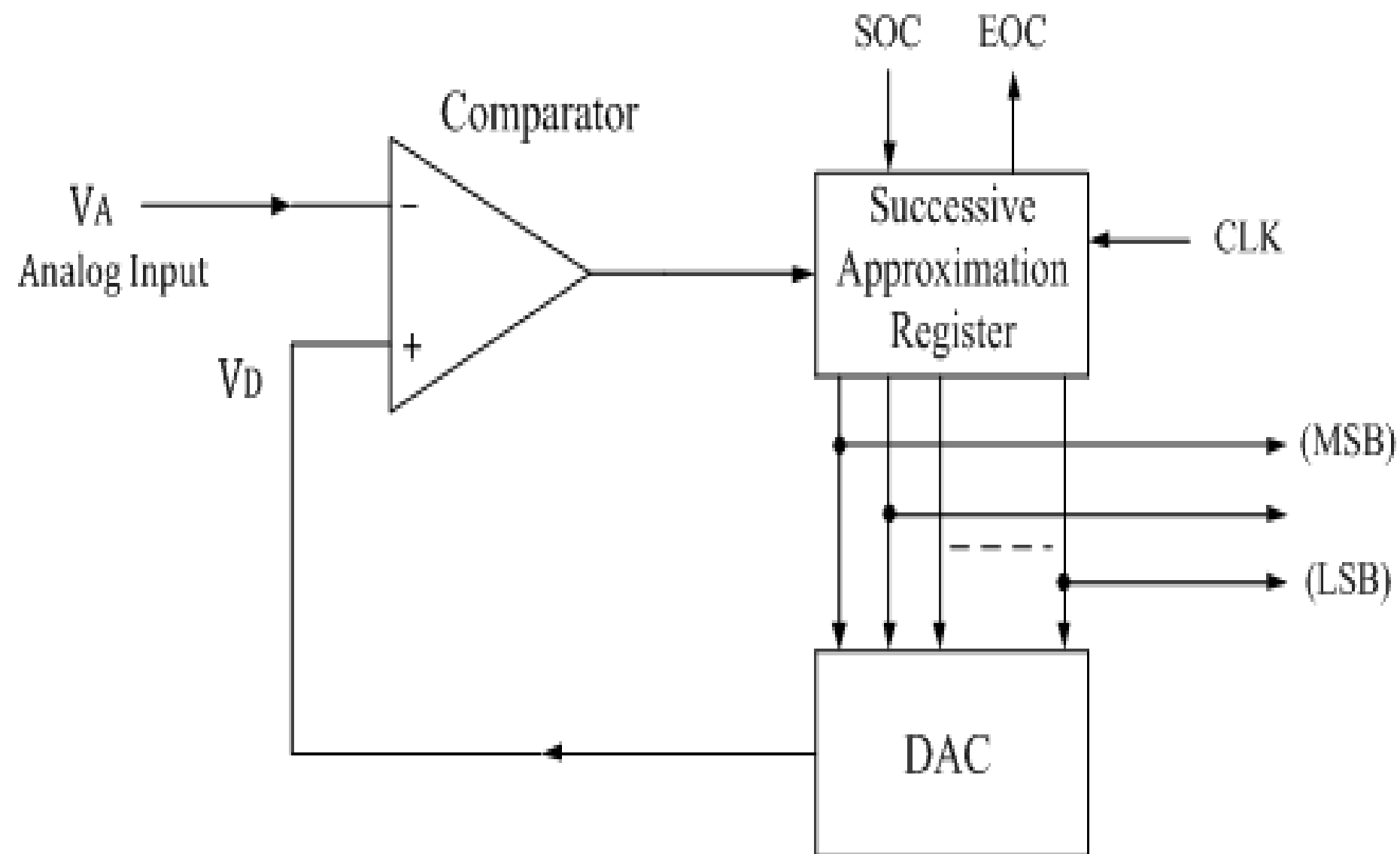




Successive Approximation Type ADC



- **Successive Approximation** is one of the most widely used methods of digitizing an analog signal





Successive Approximation Type ADC

Correct Digital Representation (Va)	SAR o/p Vd at different stages in correction	Comparator o/p
11010100	10000000	1
	11000000	1
	11010000	0
	11011000	1
	11010100	0
	11010110	1
	11010101	0
	11010100	0





THANK YOU