



FACULTY OF ENGINEERING & TECHNOLOGY

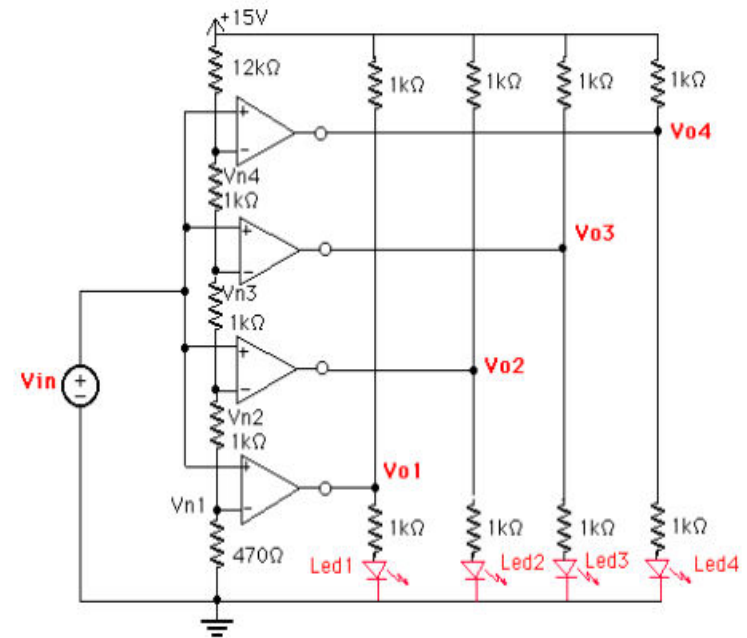
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A/D & D/A CONVERTERS

Flash Converter

- The circuit consists of 4 comparators whose inverting inputs are connected to a voltage divider.
- A comparator is basically an operational amplifier used without feedback.
- The outputs of the comparators correspond to a digital word.
- When the input rises above V_{n1} , the first comparator will switch to a high output voltage causing the LED to light up, indicating a (0001).
- For larger input voltages the output of other comparators will switch high as well. For large input voltages (above V_{n3}) all comparators will be high corresponding to (1111) digital output.



A/D & D/A CONVERTERS

Successive Approximation A/D Converter Circuit

- The SAR (successive approximation register) begins by turning on the MSB Bit7.
- V_o of the D/A converter is compared with the analog input voltage V_{in} in the comparator.
- If analog voltage is less than the digital voltage, Bit7 is turned off and Bit6 is turned on.
- If analog voltage is greater than the digital voltage, Bit7 is kept on and Bit6 is turned on.
- The process of turning bit on/off is continued until Bit0.
- Now the 8-bit input to the D/A converter represents the digital equivalent of the analog signal V_{in} .

Bit 7 is set: $b_7=1$
If $V_a < V_d \rightarrow b_7=0; b_6=1$
If $V_a > V_d \rightarrow b_7=1; b_6=1$
.....
If $V_a < V_d \rightarrow b_7=0; \dots b_0=1$
If $V_a > V_d \rightarrow b_7=1; \dots b_0=1$
Done

