**Digital-to-Analog Converter DAC0800**

Digital-to-analog converters (DACs) translate digital information into equivalent analog voltage or current.


**Fig :3-bit DAC**

There are two types of DAC:

1. R-2-R ladder network and
2. weighted resistor network.

**1. R-2-R ladder network DAC:**

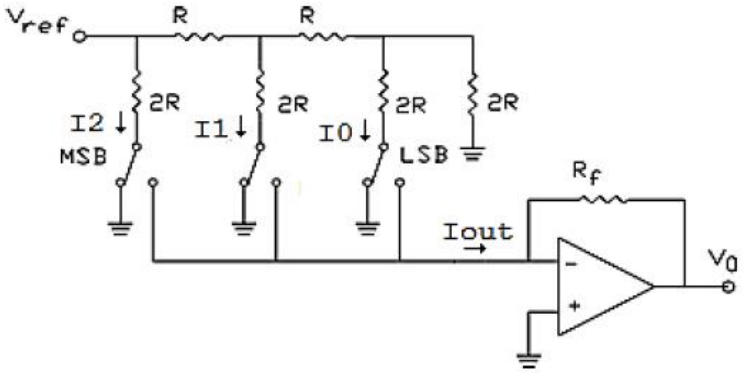
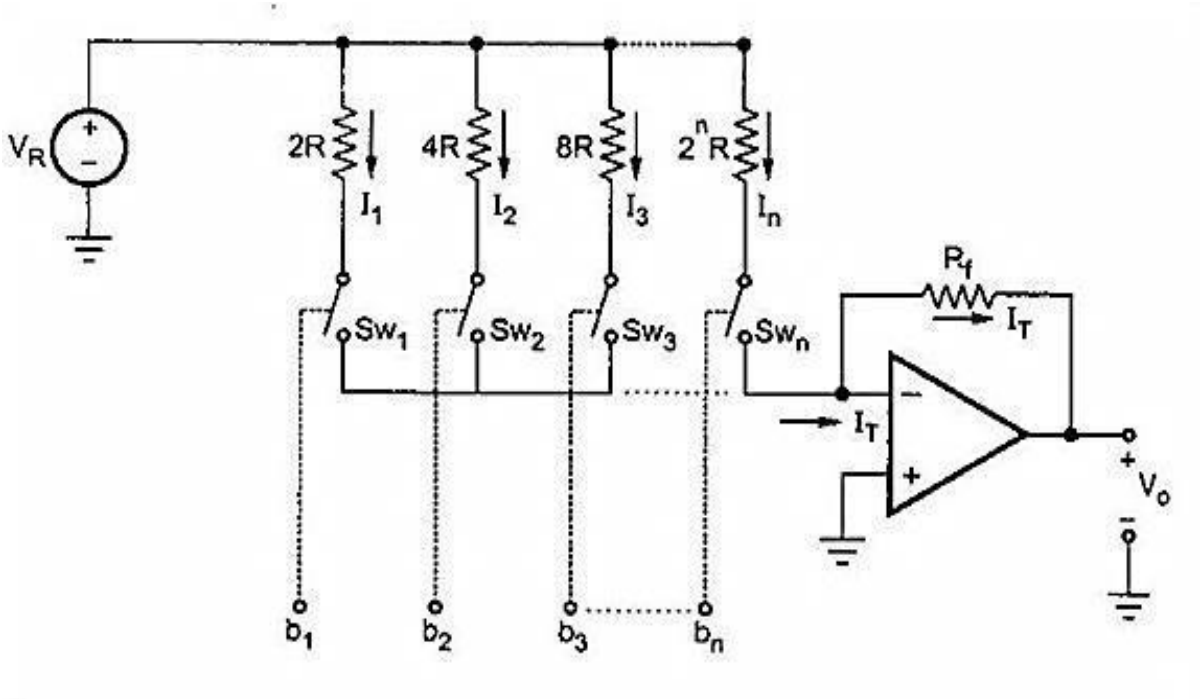



**Fig: R-2-R ladder network DAC**

It uses only two values of resistor R and 2R. One of the switch positions is connected to the reference voltage and other switch position is connected to the ground. The switches in the circuit can be transistors which connect the resistance either to the ground or Vref. The resistors are connected in such a way that for any possible binary input , the total current IT is proportional to the binary input. The op amp converts the current IT to a voltage signal V0.

**2. Weighted resistor DAC:**

The weighted resistor DAC uses an op-amp to sum n - binary weighted currents derived from a reference voltage VR via current scaling resistors 2R , 4R, 8R…..2nR.




The switch positions are controlled by the digital input. When the digit input is 1, it connects the corresponding resistance to the reference voltage VR,- otherwise it leaves the resistor open. Hence for the ON switch I=VR/R and for the OFF switch I=0.

The op amp acts as a summing amplifier. The summing current flows through Rf. Hence , the total current through Rf is given as If = I1+ I2+ I3+…….+ In. The output voltage across Rf is given as : V0 = - IRf

**Interfacing DAC:**

**Features:**

i. DAC0800 is a monolithic 8-bit DAC manufactured by National semiconductor.

ii. It has settling time around 100ms

iii. It can operate on a range of power supply voltage i.e. from 4.5V to +18V. Usually the supply V+ is 5V or +12V. The V-pin can be kept at a minimum of -12V.

iv. Resolution of the DAC is 39.06Mv