**BANNARI AMMAN INSTITUTE OF TECHNOLOGY-SATHYAMANGALAM ERODE**

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# 2-BIT DAC USING ESIM

**ABSTRACT:**

A digital-to-analog converter (DAC, D/A, D2A, or D-to-A) in electronics is a device that transforms digital signals into analogue signals. To accomplish the opposite, an analog-to-digital converter (ADC) is used. There are various DAC architectures, and a DAC's usefulness for a given application is determined by factors like resolution, maximum sampling frequency, and others. A DAC that has negligible faults for the application should be used because digital-to-analog conversion might damage a signal. There are 2 types of DAC Weighted Resistor DAC, R-2R Ladder DAC.

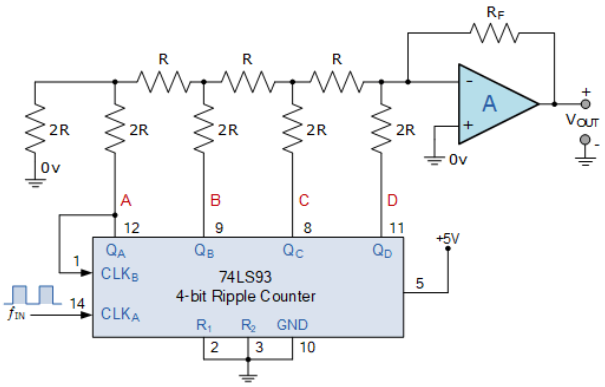
**DESCRIPTION:**

Music players frequently employ DACs to transform digital data streams into analogue audio signals. They also transform digital video data into analogue video signals for usage in televisions and mobile phones. At opposing ends of the frequency/resolution trade-off, these two applications employ DACs. While the video DAC is a high-frequency, low- to medium-resolution kind, the audio DAC is a low-frequency, high-resolution type. All but the most specialized DACs are implemented as integrated circuits due to the complexity and requirement for perfectly matched components (ICs). These often come in the form of mixed-signal MOS integrated circuit chips, which combine analogue and digital circuitry.

Discrete DACs, which are employed in military radar systems and are circuits built from several discrete electronic components rather than a packaged IC, are often of the highly high-speed, low-resolution, power-hungry variety. Discrete DACs may also be used in extremely fast test equipment, specifically sampling oscilloscopes.

**EXPLANATION:**

Data converters known as binary weighted digital-to-analogue converters translate digital binary numbers into analogue output signals that are proportional to the digital number's value. There are not just two different voltages but four volts as well, depending on the states of the two bits. This is produced by the binary output values 00, 01, 10, and 11. Here, an R, which is equal to half of the resistance of the 2R, connects the higher bit to the "2R" on the output in the lower section and the "2R" to ground. R/2R network is the result, therefore the name

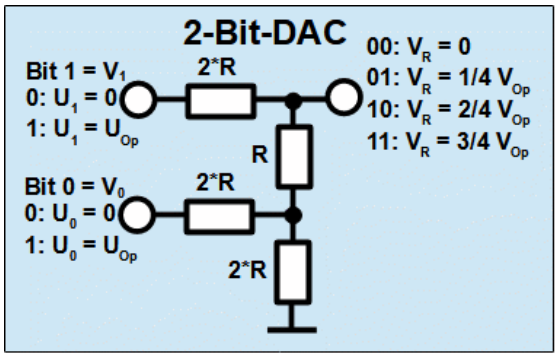


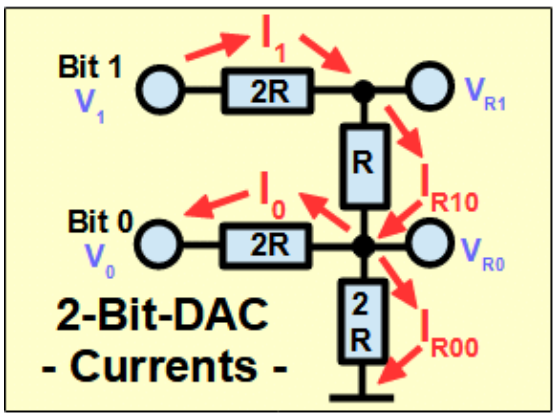

**REFERENCES:**

https://en.wikipedia.org/wiki/Digital-to-analog_converter

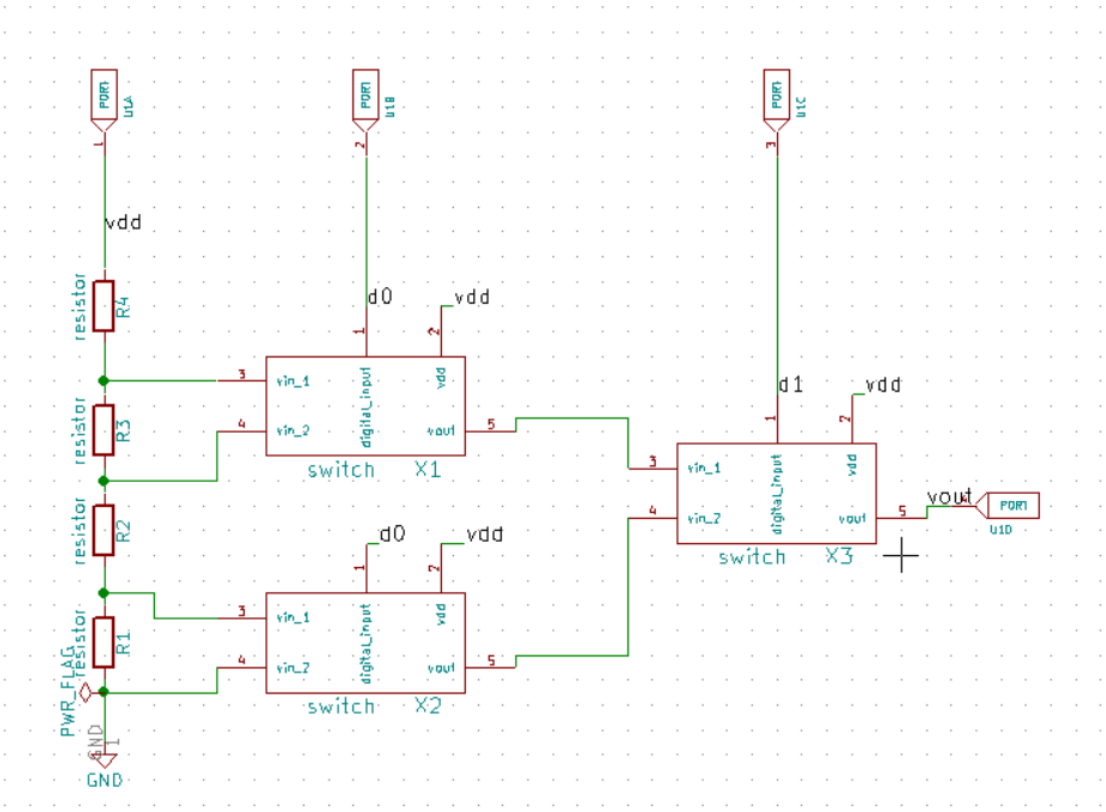
https://www.multisim.com/content/wuWs5gvKLmNNbEj7APg4Fo/2-bit-r-2r-dac/

**DIAGRAM:**



## CIRCUIT:




## OUTPUT WAVEFORM: