# RESISTANCE -TO- DIGITAL CONVERTER

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## ABSTRACT:

In this development of resistance-to-digital (R2D) Converter circuit is presented. This circuit is designed to determines the value of an external resistor in order to configure various settings within the Integrated Circuits. The R2D circuit provides several advantages for power supplies, such as the elimination of leakage current, smaller solution size, lower design cost, tighter output voltage accuracy and greater design flexibility. We use TDC in our work, TDC (Time to Digital Converter) is used to measure the fractional part of oscillation period, which realize a high resolution and conversion rate with moderate oscillation frequency.

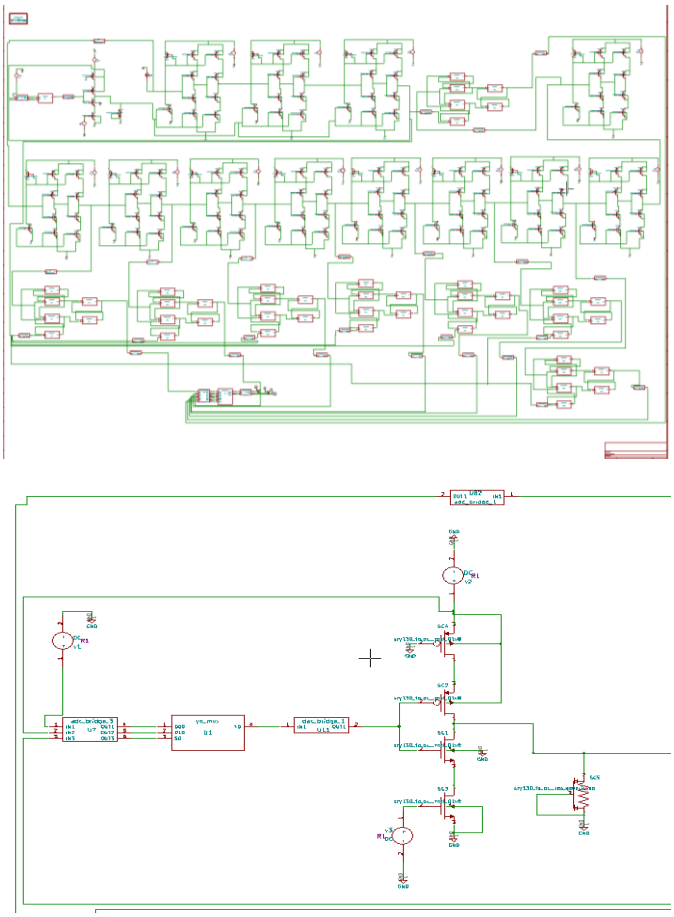
## 1. CIRCUIT DETAILS:

As shown in the figure we have analog circuit and digital circuit in which altogether formed a mixed circuit signal A charge pumping circuit is generally uses capacitors as the energy storage element.

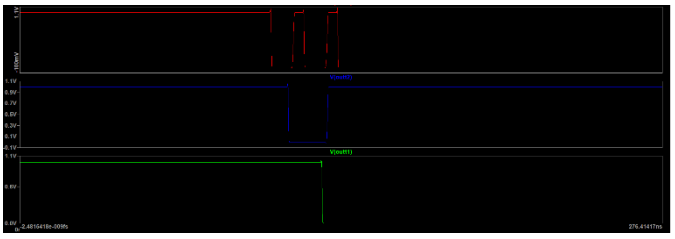
This (R2D) circuit consists of cmos, mux, flipflop, priority encoder, charge pump circuit, resistor. The analog part consists of a resistor that is grounded. Digital circuit consists of priority encoder, mux, flipflop. For these digital blocks that is module is created in Ngveri then the module is used in the circuit. Here we are using VTC (Voltage to Time Converter) that is a delay in our circuit we use it for three time to increase the delay if we use it for one time the delay will be less. And then we have a TDC (Time to Digital Converter) block in which the output of one TDC is given as the input of other then the output is connected to the flip flop and then all these are connected to the priority encoder that is based the priority, we will get the output. It consists of analog and digital which is altogether a mixed signal circuit is formed.

The purpose of this project is to determine the value of resistors using end-to- end open-source EDA tools.

## 2. IMPLEMENTED CIRCUIT



## 3. EXPECTED OUTPUT WAVEFORM:



## 4. REFERENCES:

S. Nakagawa, K. Horikoshi and H. Ishikuro, "A High-Resolution Time-Based Resistance-to-Digital Converter with TDC and Counter," 2018 IEEE 61st International Midwest Symposium on Circuits and Systems (MWSCAS), 2018