

Circuit Simulation Project

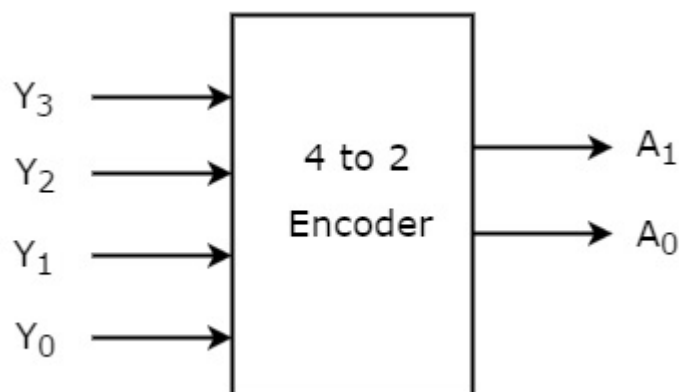
<https://esim.fossee.in/circuit-simulation-project>

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Title of the circuit: Encoder Circuit (4x2 encoder)

Theory/Description: An Encoder is a combinational circuit that performs the reverse operation of Decoder. It has maximum of 2^n input lines and 'n' output lines, hence it encodes the information from 2^n inputs into an n-bit code. It will produce a binary code equivalent to the input, which is active High. Therefore, the encoder encodes 2^n input lines with 'n' bits. Here we have a 4:2 Encoder that converts $2^2(=4)$ inputs into 2-bit code.

4 to 2 Encoder has four inputs Y_3, Y_2, Y_1 & Y_0 and two outputs A_1 & A_0 . The block diagram of 4 to 2 Encoder is shown in the following figure.



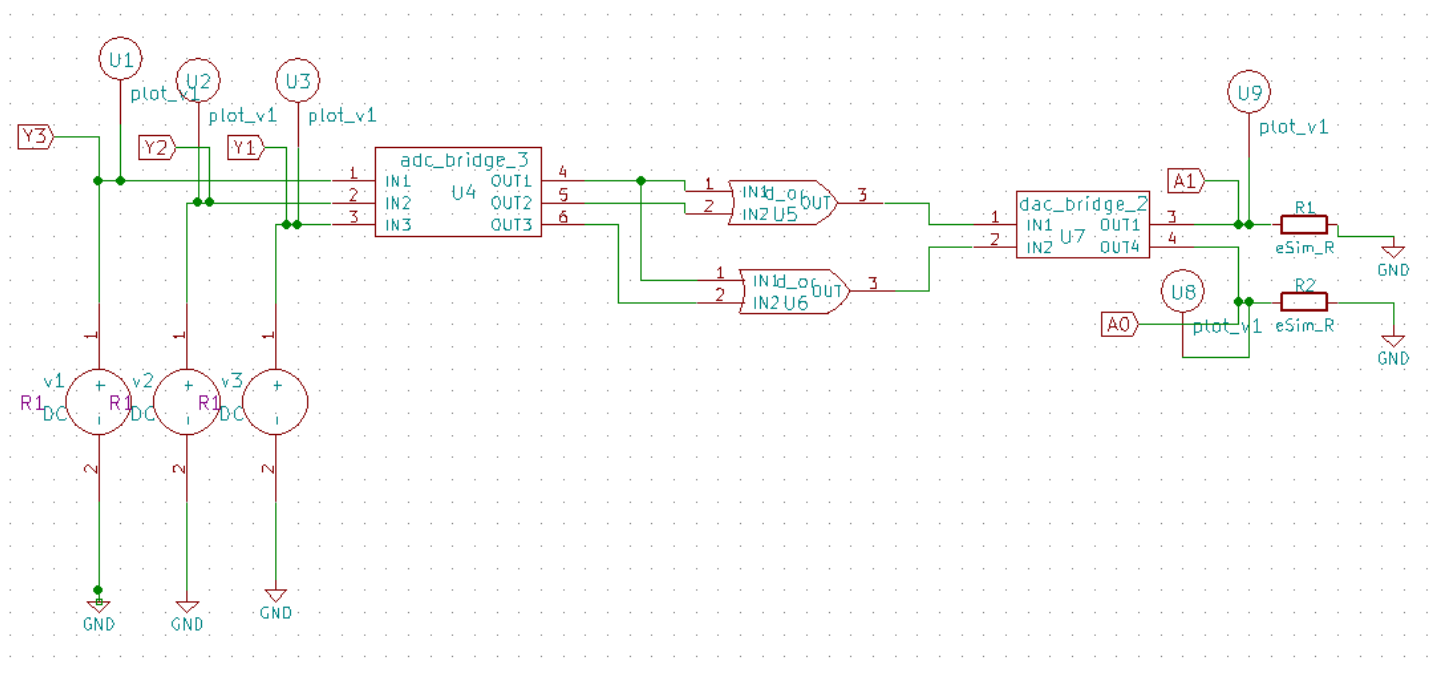
At any time, only one of these 4 inputs can be '1' in order to get the respective binary code at the output. The Truth table of 4 to 2 encoder is shown below.

Inputs				Outputs	
Y ₃	Y ₂	Y ₁	Y ₀	A ₁	A ₀
0	0	0	1	0	0
0	0	1	0	0	1
0	1	0	0	1	0
1	0	0	0	1	1

Here in the highlighted case is simulated whose plots and multi-meter values are shown in the below diagrams.

5V represents high logic level and 0V represents low logic level in the multi-meter diagrams.

Circuit Diagram(s):

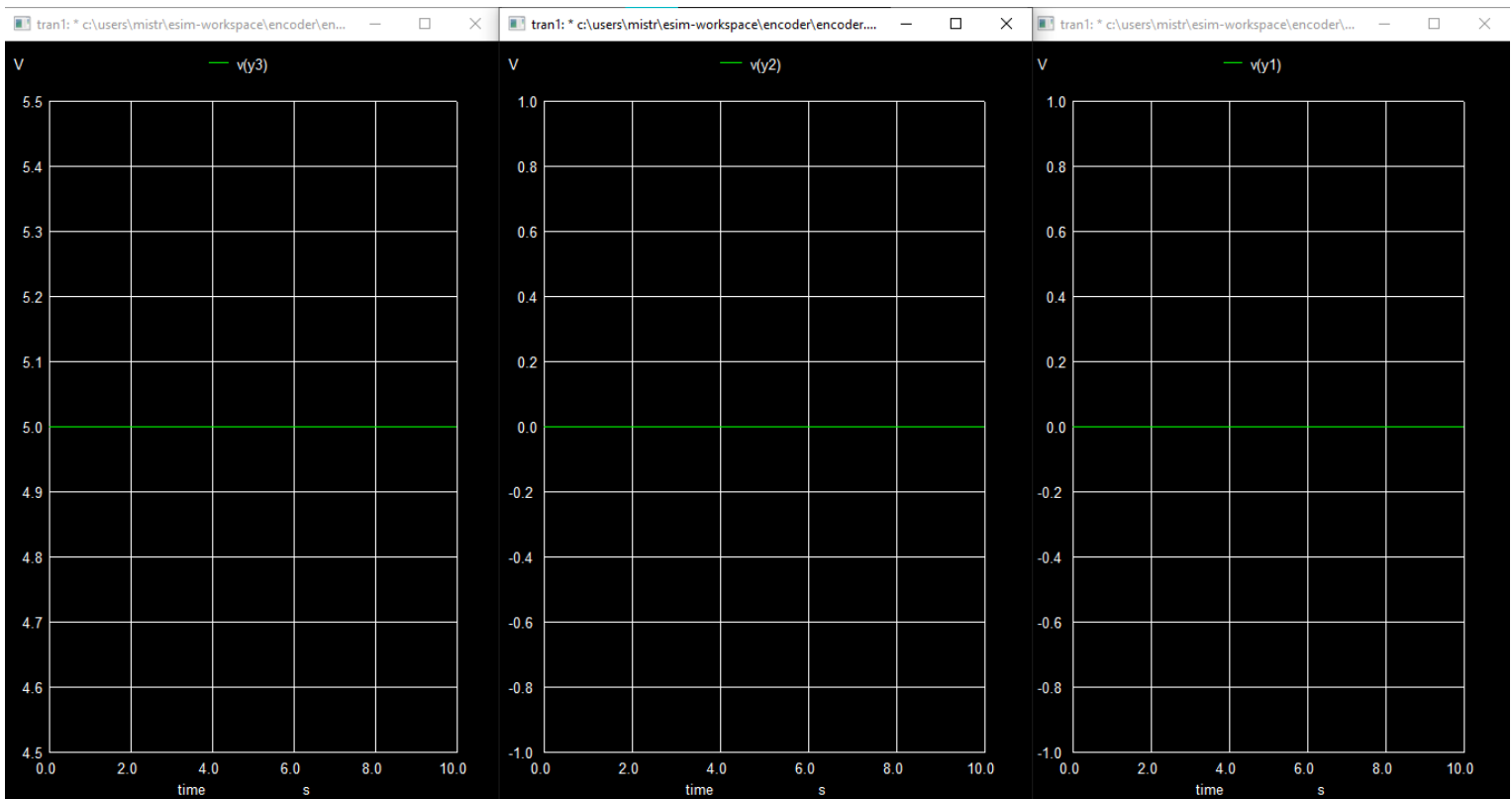
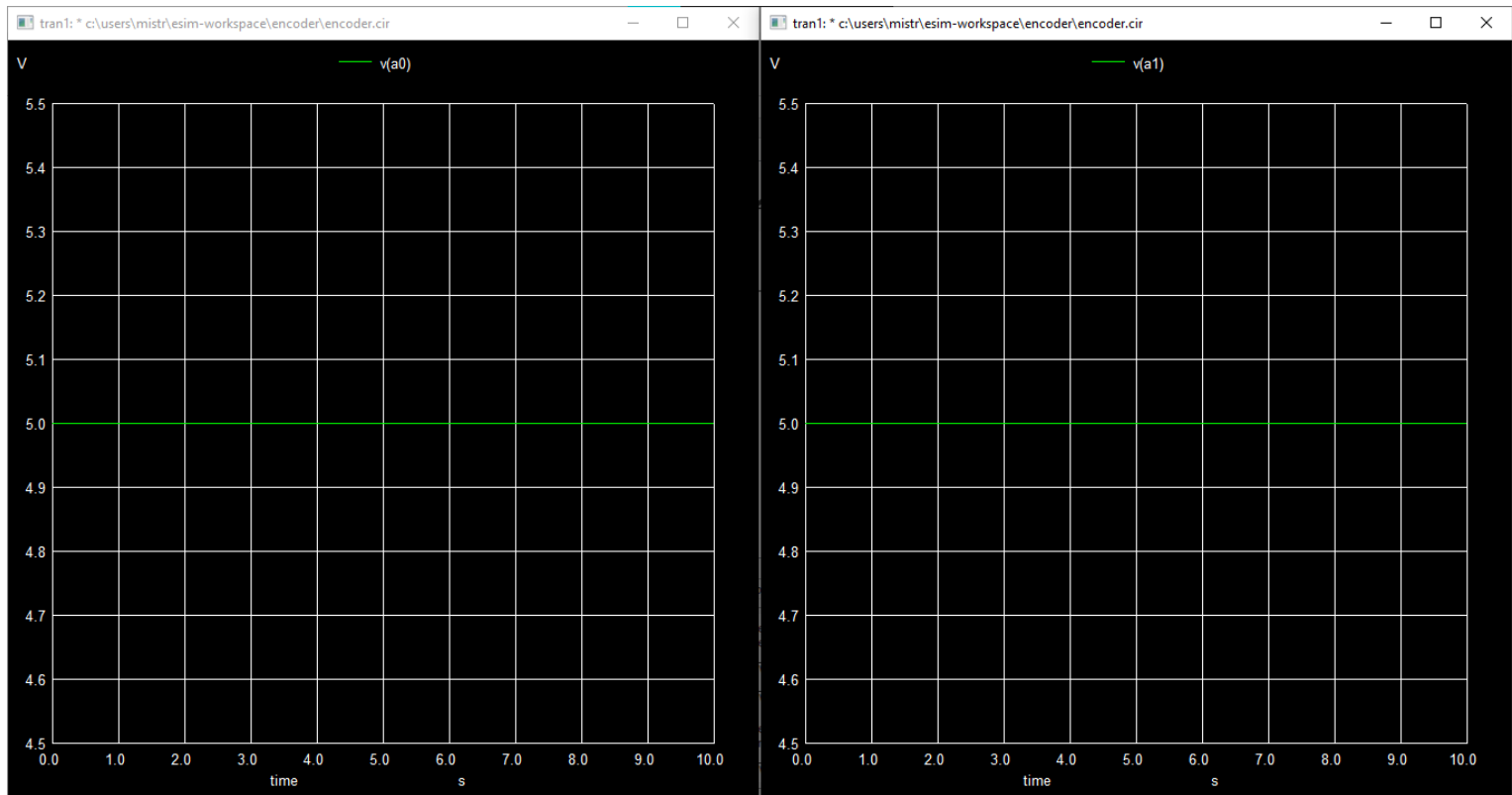


Outputs:

Multimeter:

<div>MultiMeter</div> <div>Node RMS Value</div> <div>a0 5.0 Volts</div>	<div>MultiMeter</div> <div>Branch RMS Value</div> <div>a3#branch_1_0 5.0E+3 Amp</div>
<div>MultiMeter</div> <div>Node RMS Value</div> <div>a1 5.0 Volts</div>	<div>MultiMeter</div> <div>Branch RMS Value</div> <div>a3#branch_1_1 5.0E+3 Amp</div>
<div>MultiMeter</div> <div>Node RMS Value</div> <div>y1 0.000000 Volts</div>	<div>MultiMeter</div> <div>Branch RMS Value</div> <div>v1#branch 0.000000 Amp</div>
<div>MultiMeter</div> <div>Node RMS Value</div> <div>y2 0.000000 Volts</div>	<div>MultiMeter</div> <div>Branch RMS Value</div> <div>v2#branch 0.000000 Amp</div>
<div>MultiMeter</div> <div>Node RMS Value</div> <div>y3 5.0 Volts</div>	<div>MultiMeter</div> <div>Branch RMS Value</div> <div>v3#branch 0.000000 Amp</div>

Plots:



References:

https://www.tutorialspoint.com/digital_circuits/digital_circuits_encoders.htm