# NON RETURN TO ZERO MARK PROJECT

In NRZ-M, the output signal level remains unchanged during the bit duration if the input is zero, while it toggles or changes its level if the input is one.

When the input bit is zero, the NRZ-M encoding maintains a steady output signal level. This means that the output voltage or current remains at a constant level for the entire duration of the bit. This allows for easy differentiation between consecutive zeros.

On the other hand, if the input bit is one, the NRZ-M encoding introduces a transition in the output signal. The output signal toggles or changes its level from high to low (or vice versa) to indicate the presence of a one bit. This transition helps distinguish consecutive ones and provides a means of synchronization and identification.

Simulation scheme
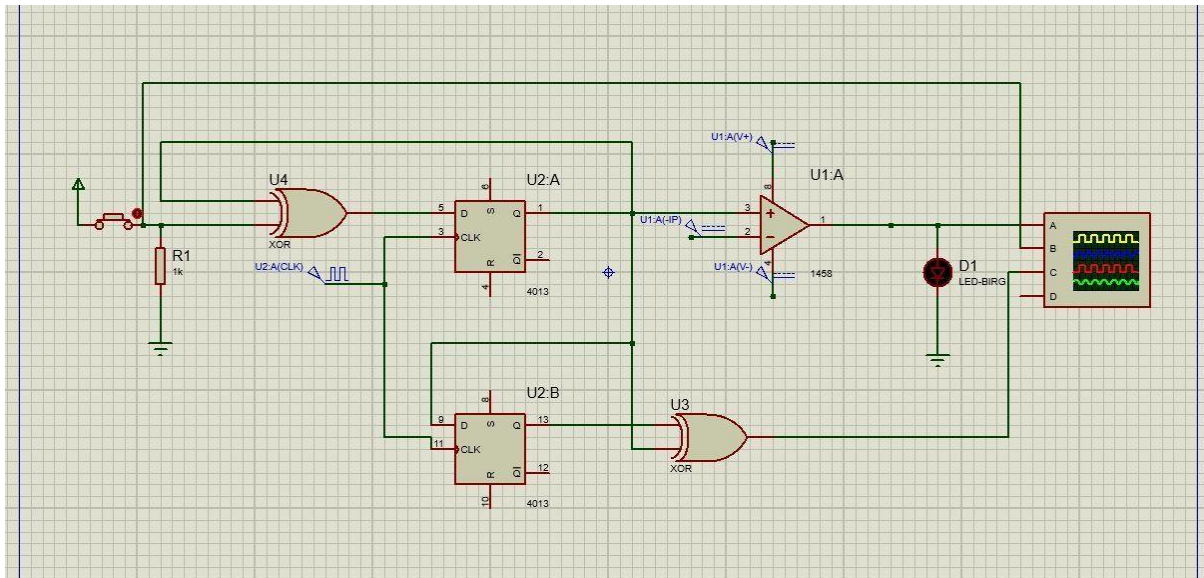
Firstly there is a button when pressed mas a high logic to the xor the a xor , xor also is connected to the flip flop output , if the button is pressed , the flip flop output toggles and its unchanged otherwise , the a comparator is used to convert the output to polar instead of unipolar , comparator input(3) is compared with a 2.5 volt id greater the output is 5 volt if smaller the output is -5 volt(polar) , lastly the led will shine red when output is the same and green when output toggles.

Decoding: the unipolar output is delayed one bit using the d flip flop and xored with the currend encoded bit , output is the original input stream(unipolar).
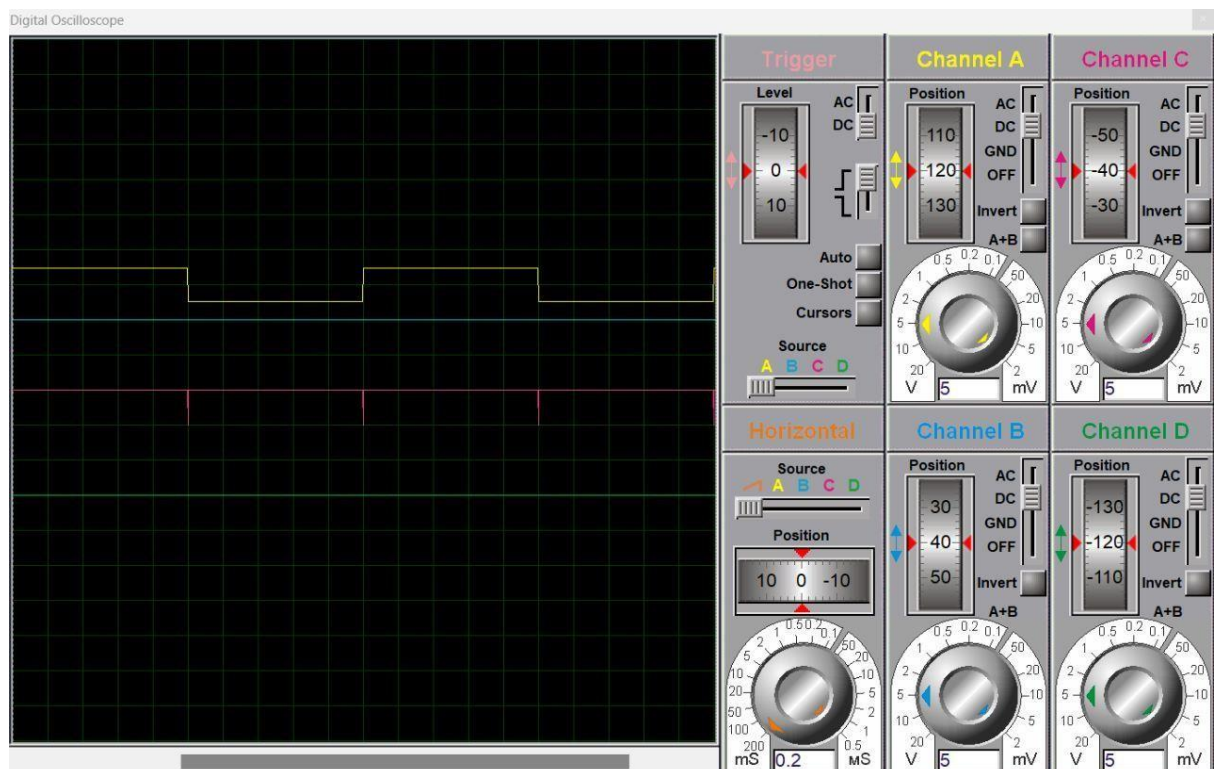
Oscilloscope output

Button is clicked

Yellow graph : encoded signal

Blue graph: original input signal

red: decoded signal

MATLAB PLOT