Crack Sensing Circuit

Krunal Badlani

Indian Institute of Technology, Hyderabad
Telangana, India

Abstract—**This report explains the design of a mixed signal SoC to detect cracks using the strain gauges. Strain gauge is a type of sensor which changes its resistance on application of strain on its surface. For the sake of this design, the voltage across a strain gauge has been mapped to a voltage source of 3.70 V. This is then connected to a 3-bit flash type analog to digital converter. The priority encoder of this ADC is fed to a PIPO which in turn gives data corresponding to the voltage across the strain gauge.This data is then fed to the LCD interfacing circuit to display on the LCD letting us know about the crack.**

I. Circuit Details and Results

The schematic of the circuit can be seen in Fig 1. The circuit has 5 stages: voltage divider, 3 bit Flash ADC, 8x3 priority encoder,PIPO register and a LCD interfacing circuit. For the sake of this simulation we have taken the 4 stages, Flash ADC followed by a 8x3 priority encoder, a PIPO register and the LCD interfacing circuit. The output of a simple voltage divider/Wheatstone bridge (strain gauge is assumed to be a part of these) is assumed and directly taken as 3.70V. This 3.70V produces the output 101 at the output of the PIPO which then is fed to the LCD which shows the output (vout2) on every RS(vout) (Register select mode) cycle. The results from the LCD is shown in the Fig 2, where it can be see that the output is high low high or 101 for every RS cycle. This is also verified by the results from the Makerchip simulation(Fig. 3)
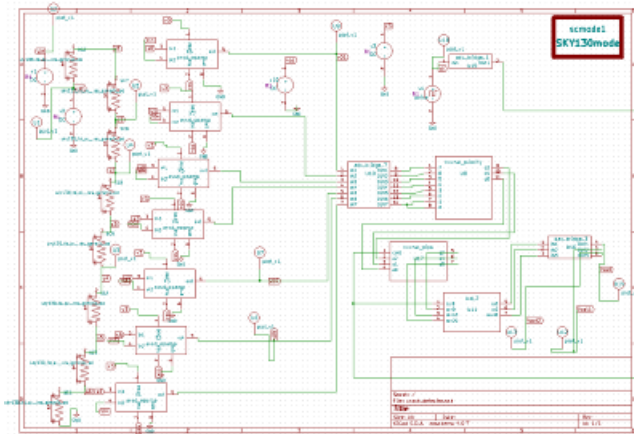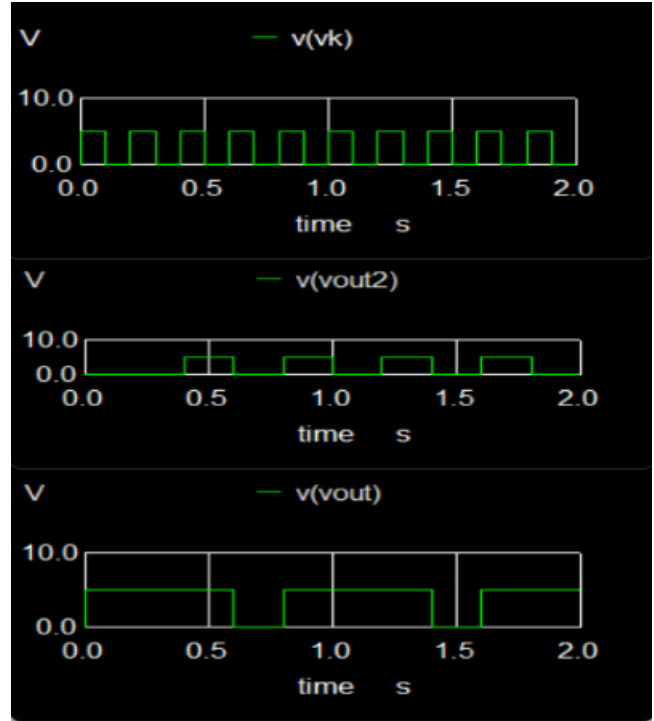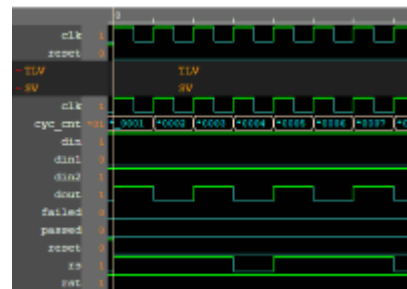

Fig. 2. LCD output

Fig. 1. Schematic

Fig. 3. Makerchip simulation of the LCD interfacing circuit