DE2116D

Experiment 10

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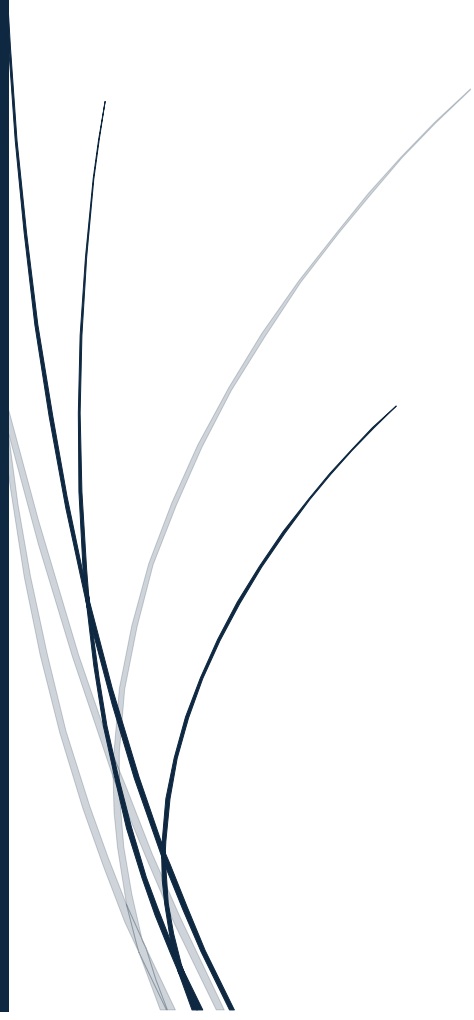

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1. Objective/Aim

The aim of this experiment is to investigate the functioning of an ADC circuit that converts analogue input signals to digital binary output values.

2. Materials used

- 1xADC0804
- 8x330Ω resistor
- 1x10 kΩ resistor
- 1x10 kΩ potentiometer
- 8xLED
- C1 = 10µF-POL
- C2 = 100pF
- 9V battery
- Breadboard

3. Procedure

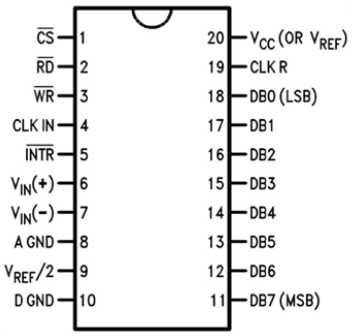

Figure 3.1 ADC0804 pin diagram

1. Connect pin 1 (CS'), pin 2(RD'), pin 7 (Vin(-)), pin 8 (A GND) and pin 10 (D GND) to ground.
2. Connect pin 20 (Vcc).
3. Connect pin 3 (WR') to pin 5 (INTR').
4. Connect pin 19 (CLK R) to a 10kΩ resistor connect the other end of the resistor to pin 4 (CLK IN).
5. Connect 100pF ceramic capacitor to pin 4 (CLK IN) and the 10kΩ resistor, connect the other end of the capacitor to ground.
6. Connect pin 6 (Vin(+)) to the 2nd pin of the 10kΩ potentiometer, connect pin 1 to Vcc and pin 3 to ground.
7. Connect pin 20(Vcc) to Vcc and connect the 10 µF polarised capacitor from pin 20 to ground.
8. Connect pin 11-18 to 330Ω resistors then to LEDs which are connected to ground.

4. Circuit Diagram (Proteus)

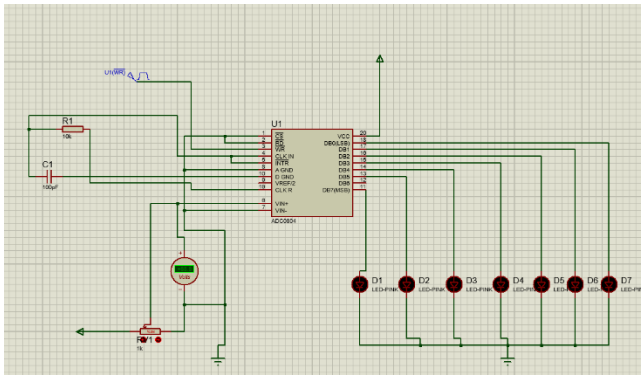

Figure 4.1Proteus Circuit

5. Practical Layout

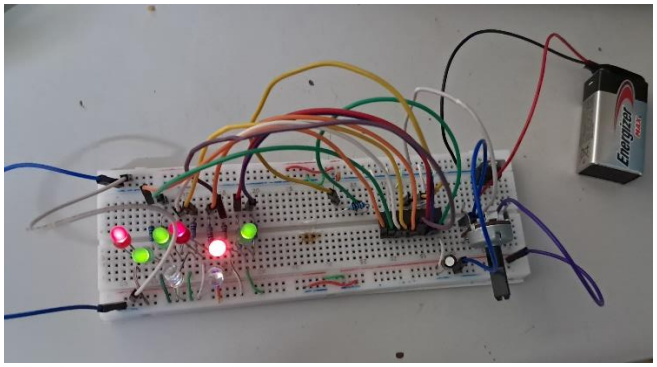

Figure 5.1 Physical Circuit

6. Data and Observations

Vin Measured	Binary Output X7 → X0	Vin Calculated
0	00000000	0.00
0.2	00000101	0.20
0.8	00100001	0.80
1.0	00110011	1.00
1.3	01000010	1.29
1.5	01001100	1.49
1.8	01011100	1.80
2.0	01100110	2.00
2.2	01110000	2.20
2.5	10000000	2.51
2.7	10001010	2.71
3.0	10011001	3.00
3.2	10100011	3.20
3.5	10110010	3.49
3.8	11000010	3.80
4.0	11001100	4.00
4.2	11010110	4.20
4.5	11100110	4.50

4.8	11110101	4.80
5.0	11111111	5.00

Table 6.1

The hardwired circuit is more susceptible to electrical noise, interference from nearby components, and imperfections in power supplies. Due to temperature changes, resistance fluctuations, or component imperfections (like capacitor leakage) may have affected the circuit's behaviour. Thus, for some outputs they varied compared to the expected proteus ones. The similarities between the physical circuit and the simulation are that some of the LED out puts are directly related to that of the expected.

7. Conclusion

It thus can be concluded that the adc0804 will have inconsistencies as compared to the simulated circuit., due to noise and other real-life interferences. In this experiment an adc0804 successfully implemented an ADC circuit using the ADC0804 integrated circuit in both theoretical simulations (Proteus) and a physical hardwired setup. The ADC circuit functioned as expected in both cases, converting analogue input voltages into corresponding 8-bit binary digital outputs although they were not as accurate.