**Assignment No.:109**

**TITLE – 8051 & DAC Interfacing**

**AIM:**

Write 8051 ALP to interface DAC and generate following waveforms on Oscilloscope.

1. Square wave variable frequency.
2. Ramp wave – variable direction.
3. Trapezoidal wave
4. Triangular wave.

**OBJECTIVE -** To study 8051& DAC interfacing.

**APPARATUS:-** 8051 Kit, DAC card, CRO, 14 pin FRC, Logic Probe, CRO probe.

**THEORY : -**

* Digital to Analog interface is implemented using 8-bit R-2R DAC 0808.
* DAC 0808 is as 8-bit monolithic high speed current o/p digital to analog converter
* The 8-bit data i/p for DAC 0808 is written in port 1of 8051 CPU.

**DAC 0808 General Description: -**

* The DAC0808 is an 8-bit monolithic digital-to-analog converter (DAC) featuring a full scale output current settling time of 150 ns while dissipating only 33 mW with ±5V supplies.
* No reference current (IREF) trimming is required for most applications since the full scale output current is typically ±1 LSB of 255 IREF/256. Relative accuracies of better than ±0.19% assure 8-bit monotonicity and linearity while zero level output current of less than 4 μA provides 8-bit zero accuracy for IREF³2 mA. The power supply currents of the DAC0808 is independent of bit codes, and exhibits essentially constant device characteristics over the entire supply voltage range.
* The DAC0808 will interface directly with popular TTL, DTL or CMOS logic levels, and is a direct replacement for the MC1508/MC1408.

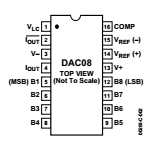
**Features**

* Reference Input Differential Voltage (V14 to V15) - ±18 V
* Reference Input Current – 5 mA
* Operating Temperature – 0 to 70 Degree Celsius
* Analog Current Outputs (at VS− = 15 V) - 4.25 mA
* V+ Supply to V− Supply - 36 V
* Wide power supply range: ±4.5 V to ±18 V
* Low power consumption: 33 mW @ ±5 V

**Key Specifications**

* Resolution - 8 bits
* Reference Input Slew Rate – 8 mA/ us
* Settling Time – 85 ns
* Conversion time – 35 ns

**DAC 0808 Pin Diagram: -**

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**Interfacing Diagram: -**

8051

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Iout

DAC

0808

Analog

Output

Voltage

I to V Converter

LM324

P1.7

D0

D7

P1.0

-vcc

+vcc

A1

A8

**PROCEDURE: -**

1. Connect supply power to 8051 kit & DAC card.
2. Connect the DAC card to 8051 by 14 pin FRC.
3. Do not connect or remove the DAC 0808 card to from 8051 kit while power is on.
4. Connect the analog output of DACcard toCRO input using probe.
5. Download &Execute the program.
6. Observe the waveform on CRO.
7. Draw the waveform observed on CRO, measure voltage& time period (frequency) of the waveform and note it.

Jumper Settings Details

|  |  |
| --- | --- |
| **Jumper Settings for DAC** | **(Closing Positions)** |
| **J1** | **2-3** |
| **J2** | **1-2** |
| **J3** | **1-2** |
| **J4** | **1-2** |
| **J5** | **1-2** |
| **J6** | **2-3** |

**ALGORITHM FOR SQUARE WAVE**

1. Load accumulator with ‘00’ and transfer it in port P1.
2. call delay procedure.
3. Load accumulator with ‘FF’ and transfer it in port P1.
4. call delay procedure.
5. Jump to step 1.

**ALGORITHM TO GENERATE POSITIVE GOING RAMP WAVE.**

1. Load accumulator with ‘00’
2. Transfer to port P1.
3. Increment accumulator.
4. Compare accumulator with ‘FF’, If accumulator not equal to FF, go to step 2.
5. Go to step 1

**ALGORITHM TO GENERATE NEGATIVE GOING RAMP WAVE.**

1. Load accumulator with ‘FF’
2. Transfer to port P1.
3. Decrement accumulator.
4. Compare accumulator with ‘00’, If accumulator not equal to 00, go to step 2.
5. Go to step 1

**ALGORITHM TO GENERATE A TRAPEZOIDAL WAVEFORM**

1. Load accumulator with ‘00’
2. Transfer to port P1.
3. Increment accumulator.
4. Compare accumulator with ‘FF’, If accumulator not equal to FF, go to step 2.
5. Transfer to port P1
6. Call delay.
7. Transfer to port P1.
8. Decrement accumulator.
9. Compare accumulator with ‘00’, If accumulator not equal to 00, go to step 7.
10. Go to step 2

**Conclusion:**