Interfacing a D/A converter with 8051 microcontroller and display signals on a Cathode Ray Oscilloscope (CRO)

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Aim: Interface the D/A convertor with the microcontroller and hence implement and design programming model for display of staircase signal on CRO

Theory of DAC:

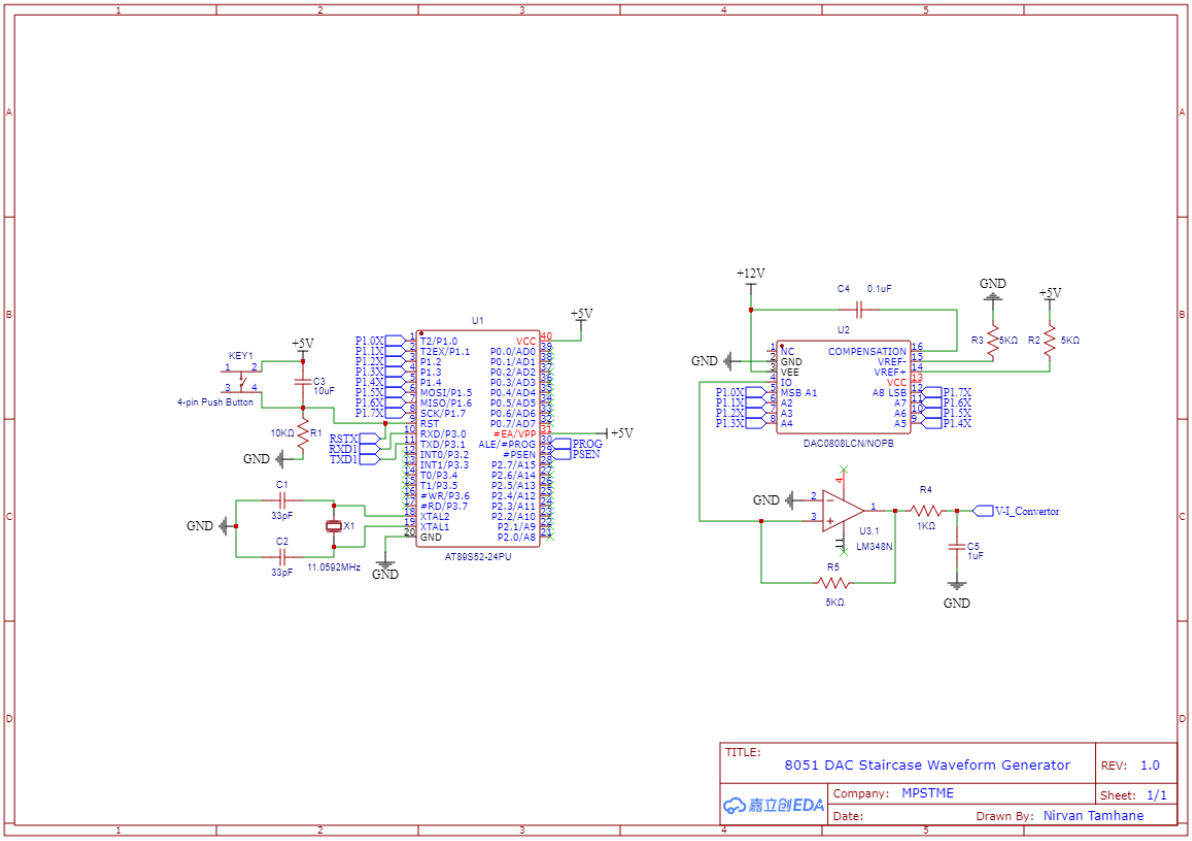
- DAC 0808 is an 8 bit Digital to Analog Converter. It can convert an 8-bit digital data input into an analog voltage output.
- Reference voltage for conversion is provided using +VREF and –VREF. The output can be amplified (optional) using an op-amp.
- DACs are used in various applications such as Waveform generation, PWM, Motor control Applications, DSP etc. Here we connect the output to a display device like a CRO.

Features of IC DAC0808:

The features of IC DAC0808 include the following.

- Relative exactness at ±0.19% highest error
- The range of voltage power supply will be ±4.5V to ±18VN
- Noninverting digital inputs are compatible with CMOS & TTL
- The settling time is very fast 150 ns
- The digital data input is 8-bit parallel

Interfacing/Schematic:



Assembly code:

```
ORG 0000H
MOV P1,         #00H
REPEAT:ACALL STAIR_CASE_WAVE
SJMP    REPEAT
STAIR_CASE_WAVE:MOV A,          #00H
MOV P1,         A
ACALL DELAY
BACK:ADD A,#51H
MOV P1,         A
ACALL DELAY
CJNE A,         #0FFH, BACK
SJMP    STAIR_CASE_WAVE
DELAY:MOV R0,       #20
UP2:MOV R1,  #250
```

```
UP2: MOV R2, #250
HERE:DJNZ R2,        HERE
DJNZ R1,UP1
DJNZ R0,UP2
RET
END
```

Conclusion – I learned the interfacing of a DAC with 8051 microcontroller. I also learned that the DAC needs a specific process of initialization and the conversion of digital to analog signal will further be given to V to I convertor.