SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC-UGC with 'A' Grade

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UNIT 2
A/D and D/A Interfacing

Interfacing Analog to Digital Data Converters

The analog to digital converters is treaded as an input device by the microprocessor, that sends an initialising signal to the ADC to start the analogy to digital data conversation process. The start of conversation signal is a pulse of a specific duration.

General algorithm for ADC interfacing contains the following steps:

Ensure the stability of analog input, applied to the ADC.

Issue start of conversion pulse to ADC

Read end of conversion signal to mark the end of conversion processes.

Read digital data output of the ADC as equivalent digital output.

ADC 0808/0809

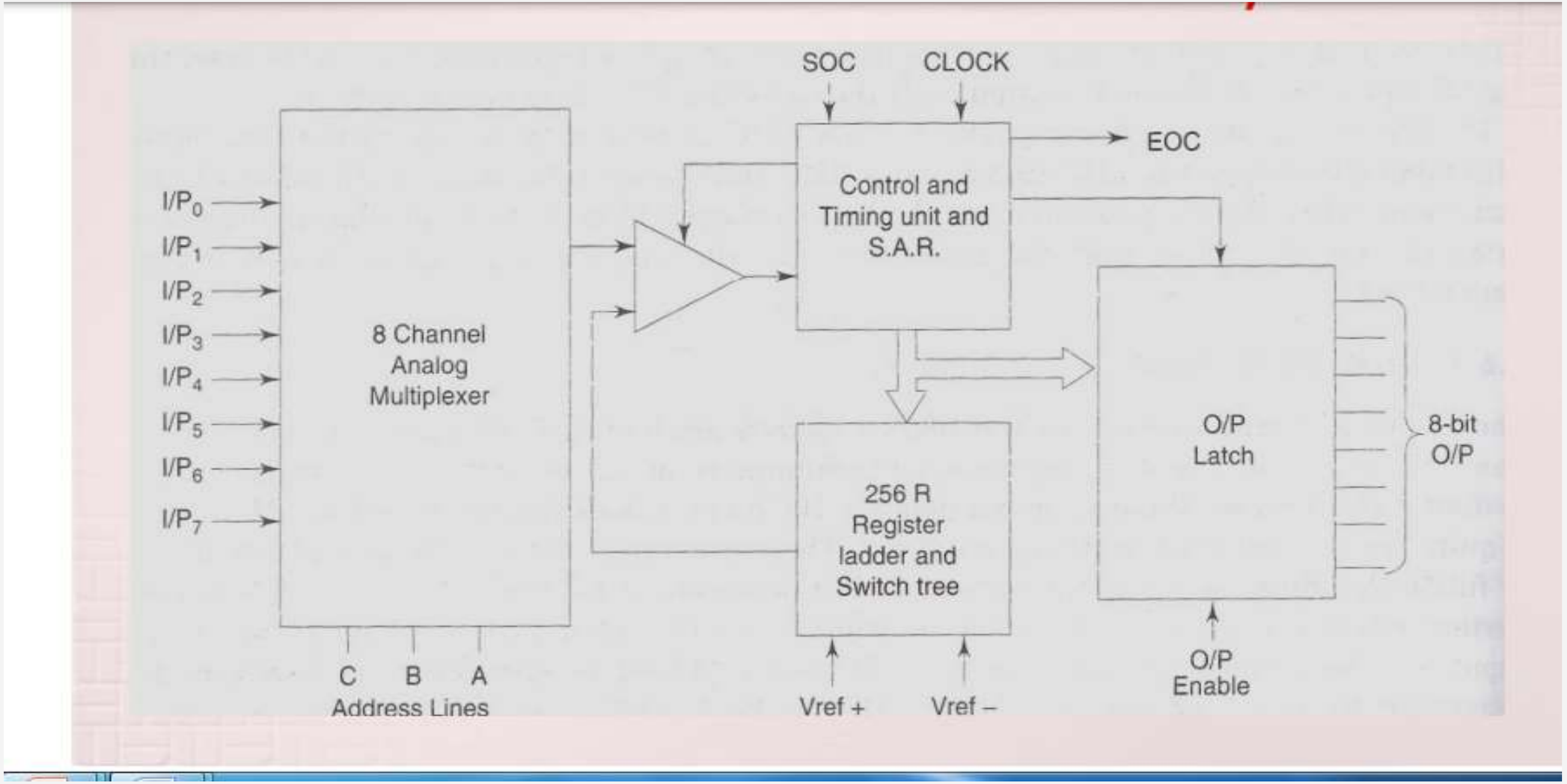
8- bit CMOS successive approximation converters.

fast techniques for analog to digital conversion. Tconversion delay is 100µs at a clock frequency of 640 KHz

These converters do not need any external zero or full scale adjustments as they are already taken care of by internal circuits.

internally have a 3:8 analog multiplexer so that at a time eight different analog conversion by using address lines ADD A, ADD B, ADD C

Block Diagram-ADC 0808/0809



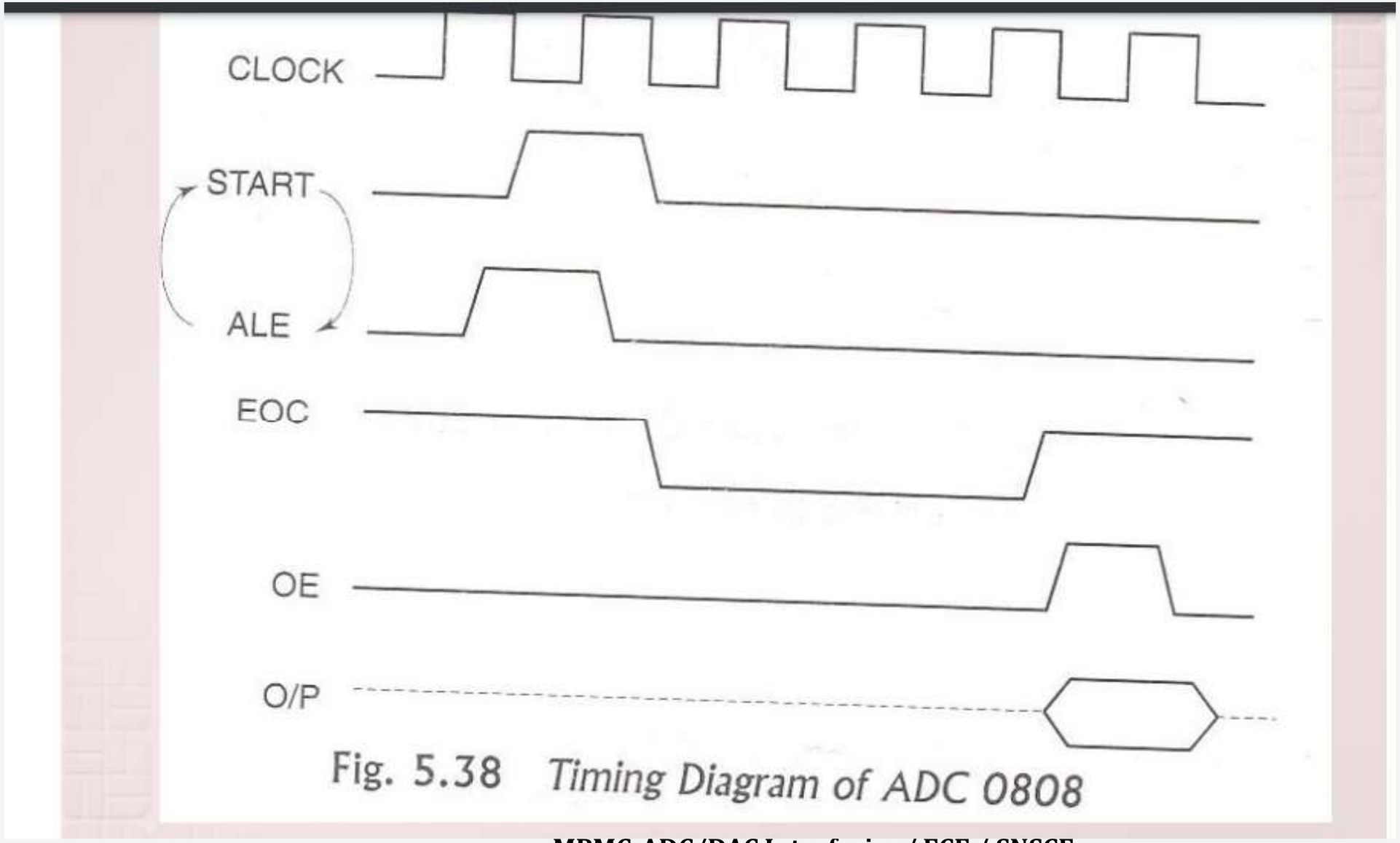
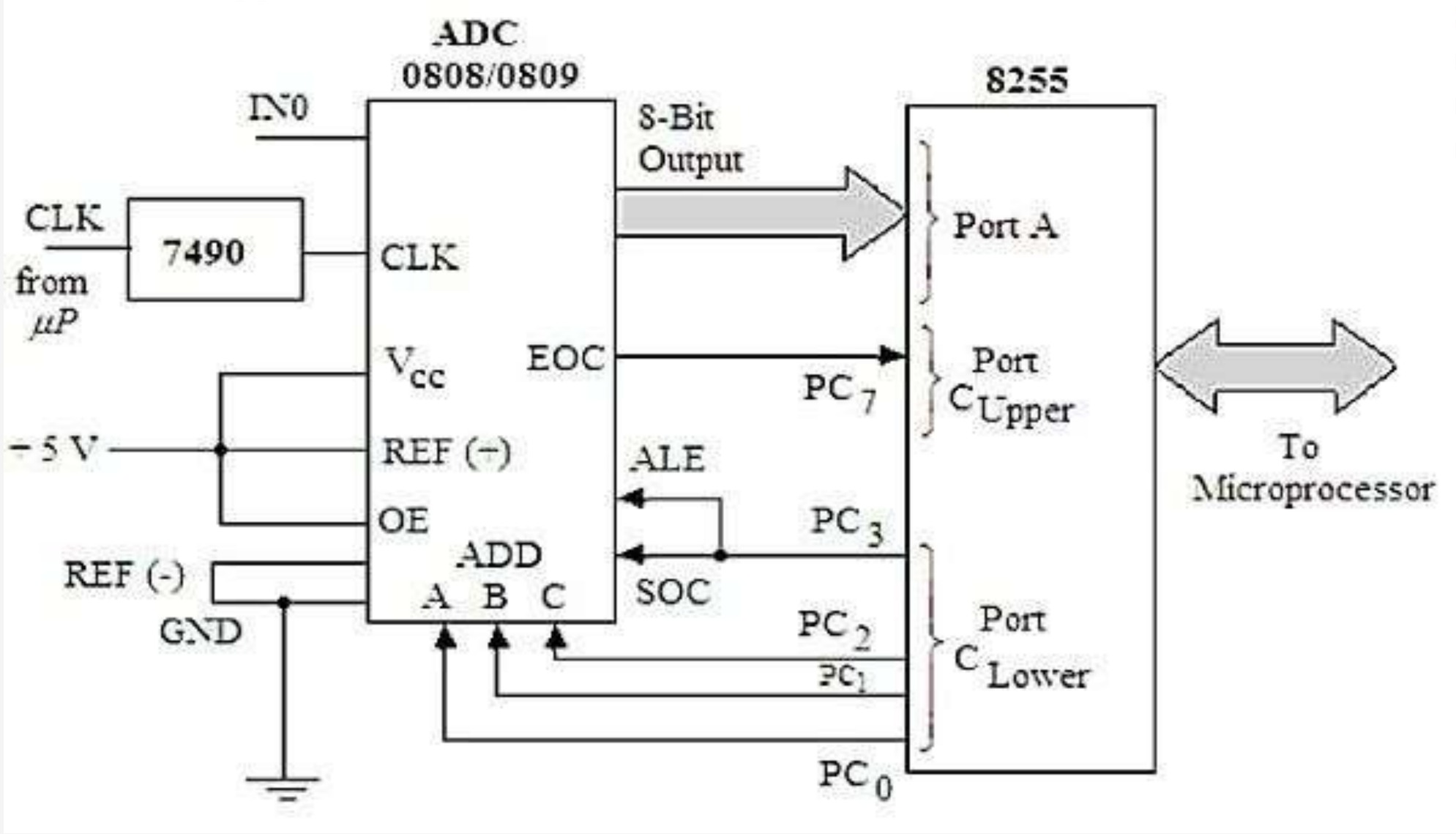


Fig. 5.38 *Timing Diagram of ADC 0808*

Interfacing ADC 0808 with 8085



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MVI A, 98H ; Set Port A and Cupper as input, CLower as output OUT 03H ;
Write control word 8255-I to control Wordregister
XRA A ; Clear the accumulator
OUT 02H ; Send the content of Acc to Port Clower to select
IN0
MVI A, 08H ; Load the accumulator with 08H
OUT 02H ; ALE and SOC will be 0
XRA A ; Clear the accumulator
OUT 02H ; ALE and SOC will be low.
READ: IN 02H ; Read from EOC (PC7)
RAL ; Rotate left to check C7 is 1.
JNC READ ; If C7 is not 1, go to READ
 IN 00H ; Read digital output of ADC
STA 8000H ; Save result at 8000H
HLT ; Stop the program
```

Interfacing Digital To Analog Converters

The digital to analog converters convert binary numbers into their analog equivalent voltages or currents.

Techniques are employed for digital to analogconversion.

- i. Weighted resistor network
- ii. R-2R ladder network
- iii. Current output D/A converter

The DAC find applications in areas like digitally controlled gains, motor speed control, programmable gain amplifiers, digital voltmeters, panel meters, etc.

 In a compact disk audio player for example a 14 or16-bit D/A converter is used to convert the binary data read off the disk by a laser to an analog audio signal.

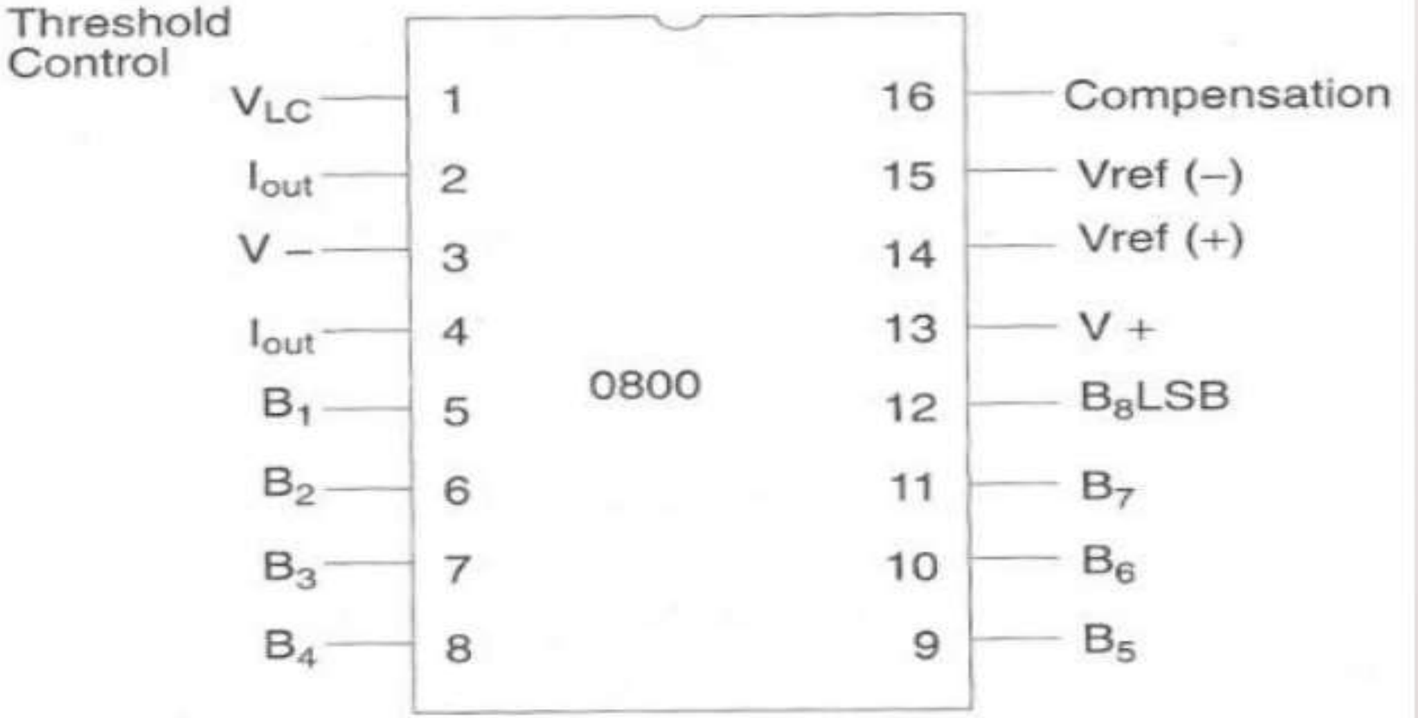
Characteristics : 1. Resolution: It is a change in analog output for one LSB change in digital input. It is given by(1/2^n)*Vref. If n=8 (i.e.8-bit DAC) 1/256*5V=39.06mV

2. Settling time: It is the time required for the DAC to settle for a full scale code change.

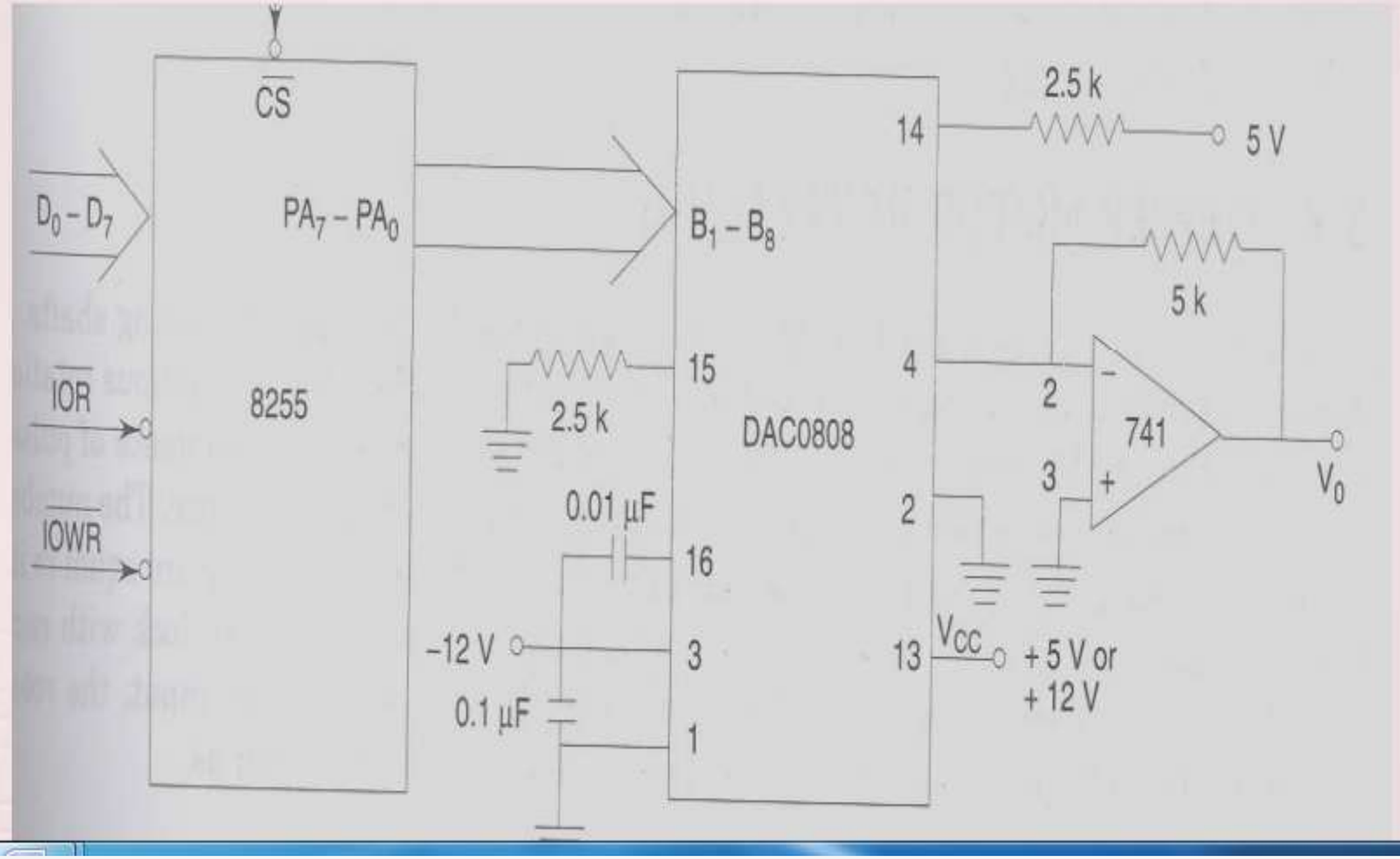
DAC 0800 8-bit Digital to Analog converter

Features:

i. DAC0800 is a monolithic 8-bit DAC manufactured by National semiconductor.
ii. It has settling time around 100ms
iii. It can operate on a range of power supply voltage i.e. from 4.5V to +18V. Usually the supply V+ is 5V or +12V.
The V- pin can be kept at a minimum of -12V.
iv. Resolution of the DAC is 39.06mV


Threshold Control
V_{LC}
I_{out}
V –
I_{out}
B_1
B_2
B_3
B_4
1
2
3
4
5
6
7
8
0800
16
15
14
13
12
11
10
9
Compensation
Vref (–)
Vref (+)
V +
B_8LSB
B_7
B_6
B_5

Interfacing of DAC0800 with 8086



THANK YOU