

**Lab
02**

Analog to Digital Conversion using ADC0804

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Lab Location

Sensor & Instrumentations Lab

Lab Outcomes:

By the end of this lab, students should be able to:

1. Experimental setup for free running ADC with LED
2. Interfacing ADC with PC parallel port

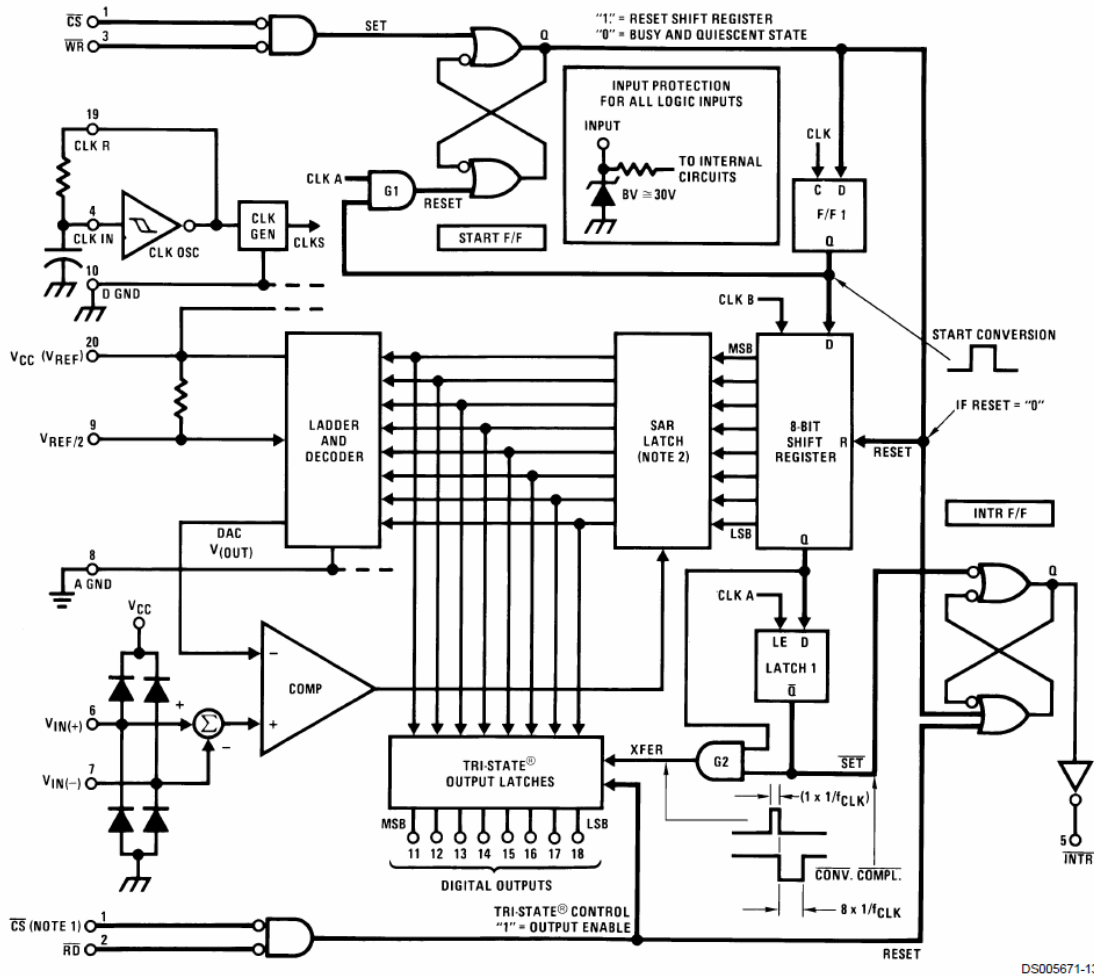
1.0 ADC Theoretical Background

ADC is a device that converts an analog signal to digital number. ADC is stand for **analog to digital converter**.

The processes of converting signals from analog form to digital form involve two operations:

1. Sample the signal
2. Quantize the signal to the resolution the A/D can represent with n -bits

Block diagram of ADC0804 are shown in Figure 1.



Note 13: \overline{CS} shown twice for clarity.
 Note 14: SAR = Successive Approximation Register.

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Figure 1: Block Diagram

2.0 ADC0804 Description

Details parametric of the ADC0804 are shown on the table below.

Parameters / Values	ADC0804
Resolution	8 bits
Input Channels	1
Interface Type	Parallel
Differential Input	Yes
Max Sample Rate	10 ksps
Min Supply Voltage	4.5 Volt
Max Supply Voltage	6.3 Volt

Reference Source	External
Temperature Min	-40 deg C
Temperature Max	85 deg C
Power Down	No
Input Sample/Hold	No
Special Features	Total unadjusted error is +/-1LSB
Data Converter Type	ADC
Max Sample Rate	0.01 MSPS

Pin diagram of ADC0804 are shown in Figure 2.

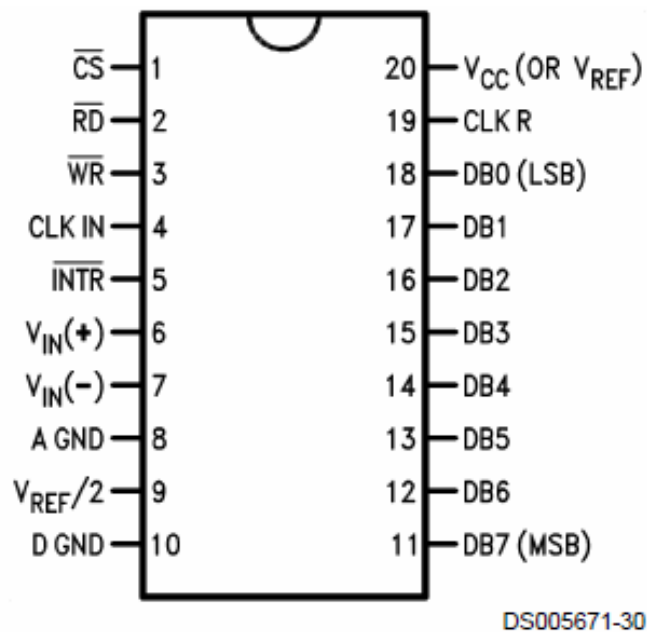


Figure 2: Pin diagram

3.0 Experimental setup

This lab will be conducted for 2 weeks. Your task for this lab is to configure ADC0804 in free running mode with LED. After successfully done that, you will continue the experiment by interfacing with PC parallel port. Your previous knowledge on input-output programming will be useful in interfacing the ADC with PC parallel port. Detail of the circuit diagram will be discussed during the lab. Happy experimenting!!

4.0 Lab Activities

1. Configure ADC0804 in **free running mode** with LED (Brightness of LED can be adjust).
2. Interfacing previous circuit with PC parallel port.
 - a. Turn ON LED **2** and **3** and state the digital value.
 - b. Turn ON LED **1, 5** and **8** and state the digital value.
 - c. Turn ON any LED and state the digital value.

References

1. <http://www.national.com/mpf/DC/ADC0804.html#Parametrics>
2. <http://www.dspguide.com/ch3.htm>
3. National Semiconductor ADC0804 datasheet