8086 Microprocessor interfacing with ADC

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•AIM: 1. To write a program for conversion of analog data to digital output.

•APPARATUS: 1. 8086 Trainer. 2. Power supply for trainer and interface module. 3. A/D, D/A interface module. 4. Power mate connector. 5. FRC connector. 6. Cathode ray oscilloscope.

Interfacing Analog to Digital Data Converters

- 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.

•Analog input voltage must be constant at the input of the ADC right from the start of conversion till the end of the conversion to get correct results. This may be ensured by a sample and hold circuit which samples the analog signal and holds it constant for specific time duration. The microprocessor may issue a hold signal to the sample and hold circuit.

•If the applied input changes before the complete conversion process is over, the digital equivalent of the analog input calculated by the ADC may not be correct.

Interfacing Analog to Digital Data Converters

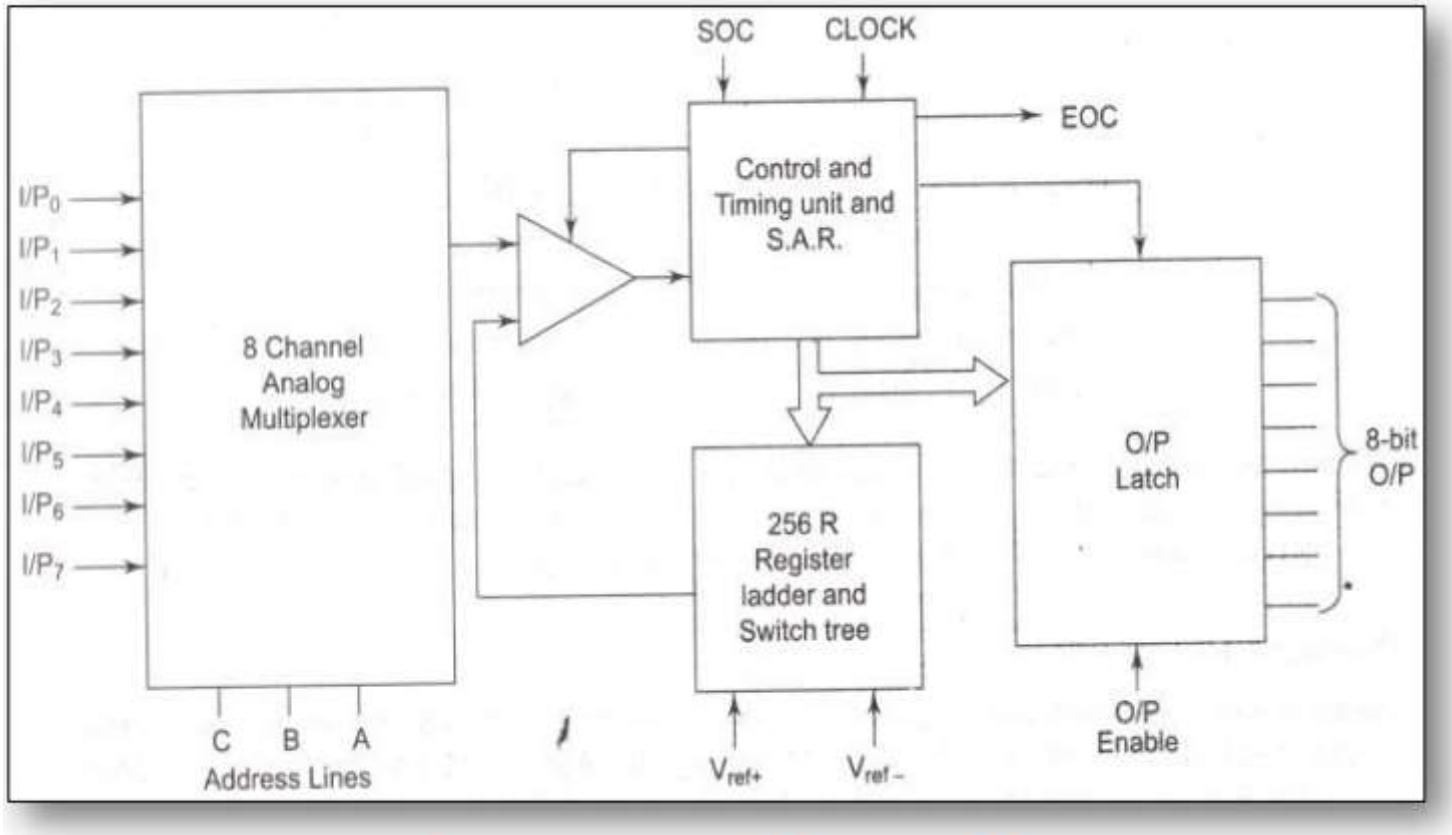
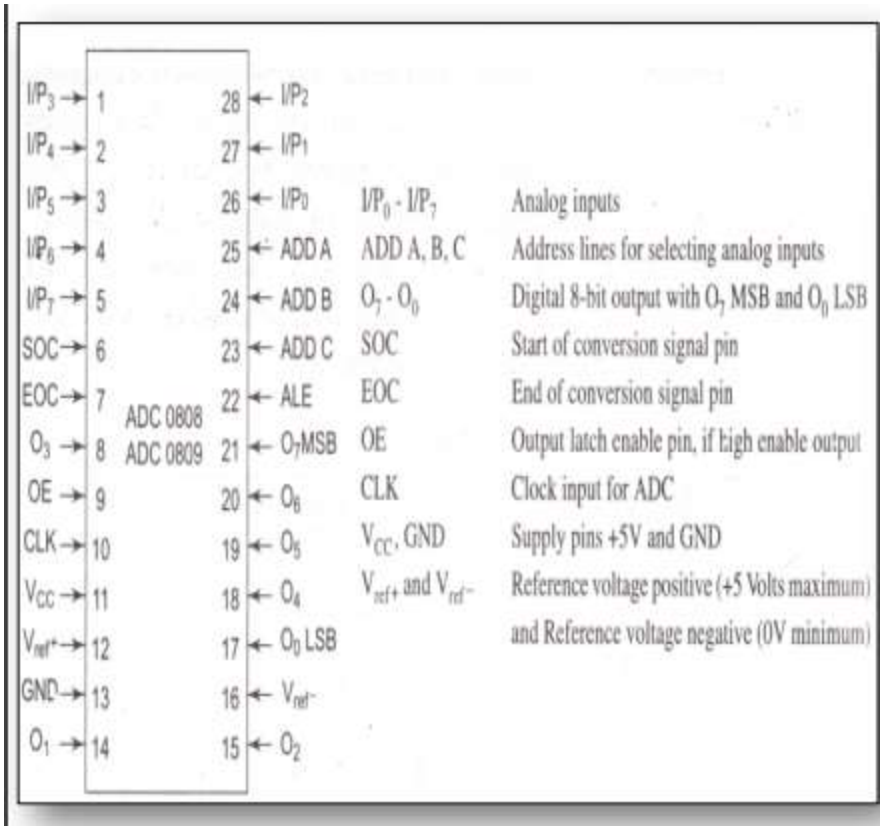


Fig.1 Block Diagram of ADC 0808/0809

Interfacing to analog to digtial converter(pin diagram)



There is a huge deferent between these signals :

	Analog	Digital
Signal	Analog signal is a continuous signal which represents physical measurements.	Digital signals are discrete time signals
Waves	Denoted by sine waves	Denoted by square waves
Representation	Uses continuous range of values to represent information	Uses discrete or discontinuous values to represent information
Data transmissions	Subjected to deterioration by noise during transmission and write/read cycle.	Can be noise-immune without deterioration during transmission and write/read cycle

Memory	Stored in the form of wave signal	Stored in the form of binary bit
Response to Noise	More likely to get affected reducing accuracy	Less affected since noise response are analog in nature
Flexibility	Analog hardware is not flexible.	Digital hardware is flexible in implementation.
Uses	Can be used in analog devices only. Best suited for audio and video transmission.	Best suited for Computing and digital electronics.
Applications	Thermometer	PCs, PDAs
Bandwidth	Analog signal processing can be done in real time and consumes less bandwidth.	There is no guarantee that digital signal processing can be done in real time and consumes more bandwidth to carry out the same information.

Power	Analog instrument draws large power	Digital instrument draws only negligible power
Cost	Low cost and portable	Cost is high and not easily
Impedance	Low	High order of 100 megaohm
Errors	Analog instruments usually have a scale which is cramped at lower end and give considerable observational errors.	Digital instruments are free from observational errors like parallax and approximation errors.
Example	Human voice in air, analog electronic devices. opticals	Computers, CDs, DVDs, and other digital electronic devices.