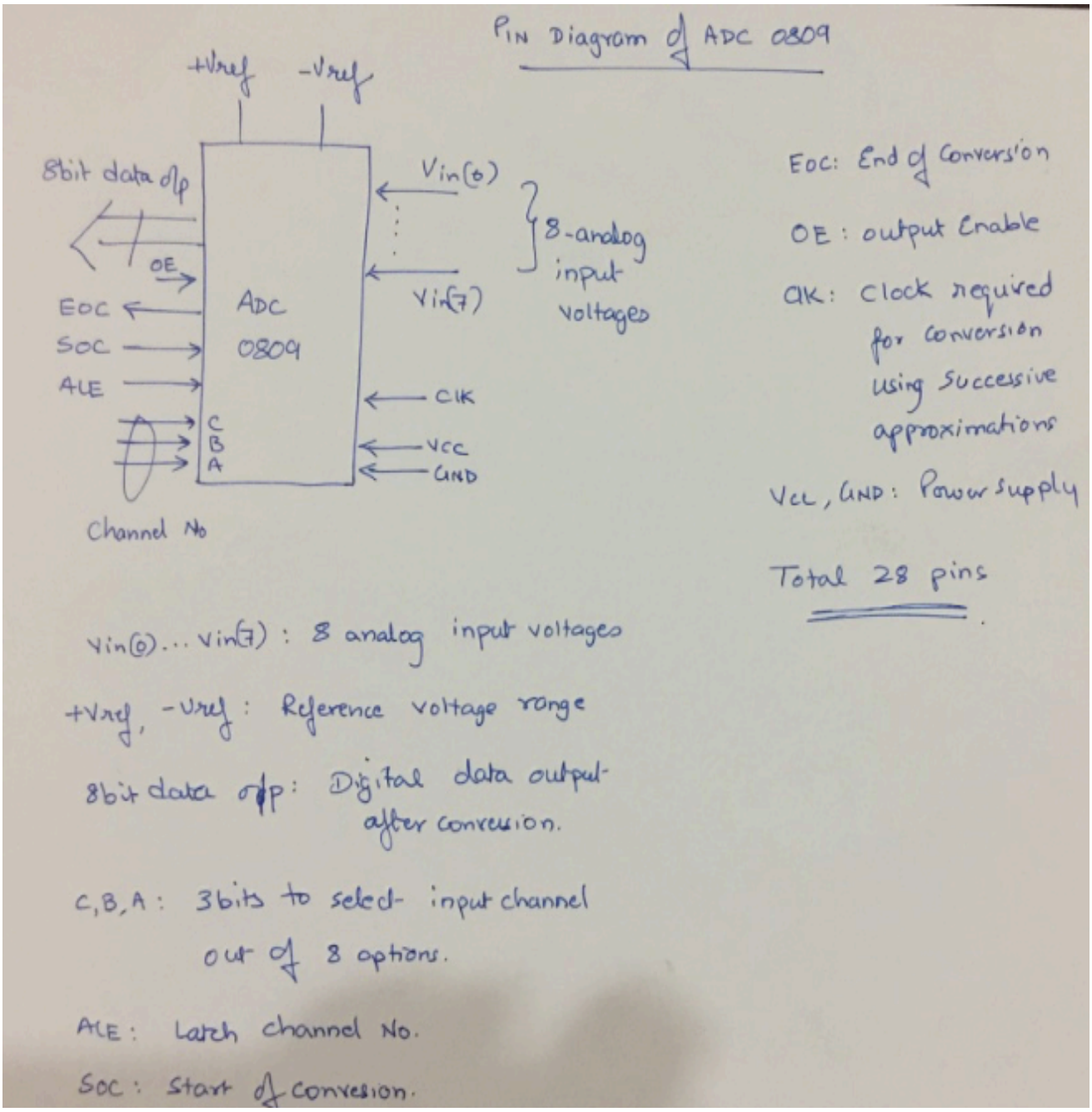
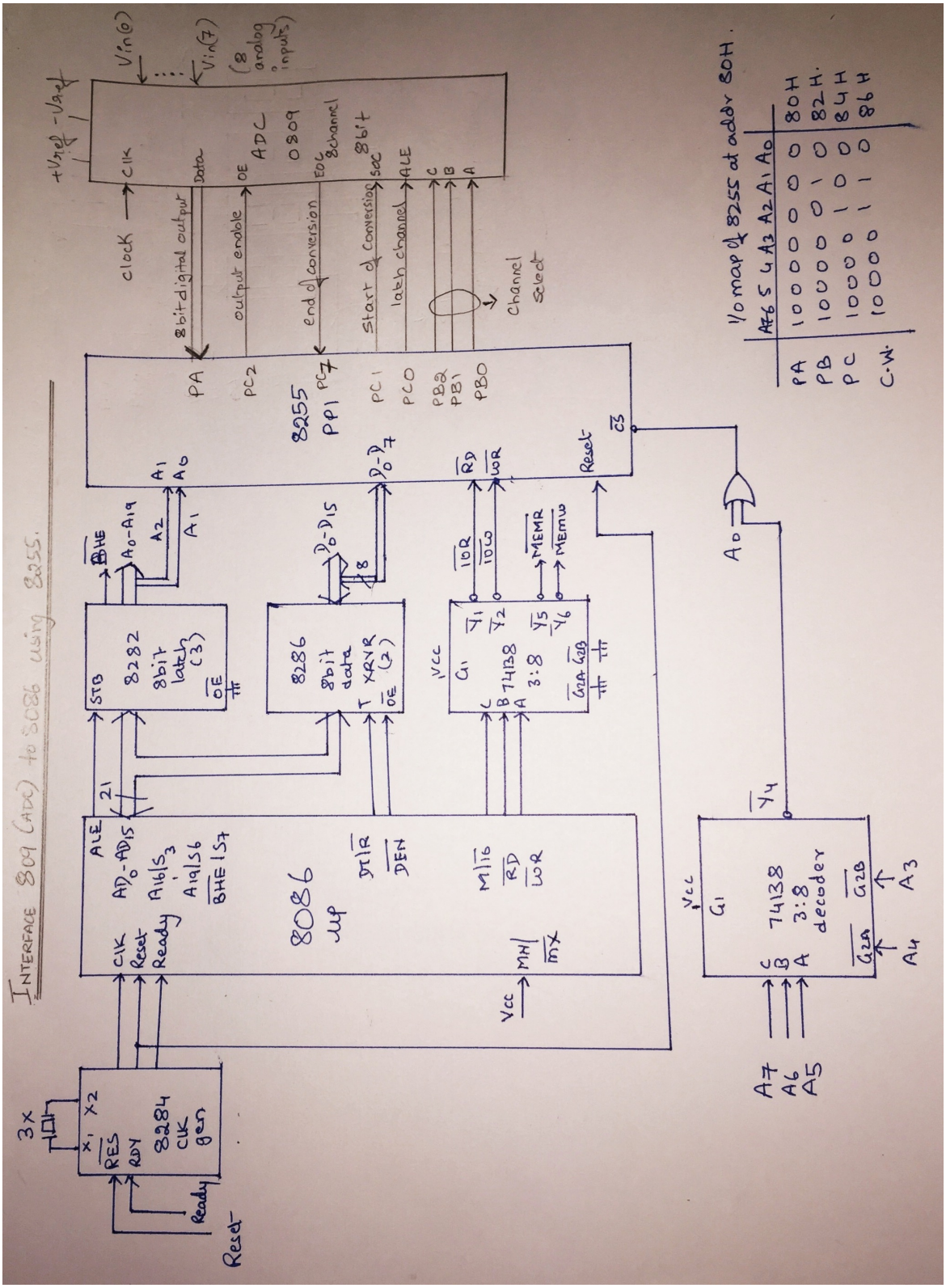
ADC 0809


Pin Diagram of ADC 0809
+Vref
-Vref
8bit data o/p
OE
EOC
SOC
ALE
C
B
A
ADC
0809
Vin(0)
Vin(7)
8-analog input voltages
CLK
Vcc
GND
Channel No
EOC: End of Conversion
OE: output Enable
CLK: Clock required for conversion using successive approximations
Vcc, GND: Power supply
Total 28 pins
Vin(0)... Vin(7): 8 analog input voltages
+Vref, -Vref: Reference voltage range
8bit data o/p: Digital data output after conversion.
C,B,A: 3bits to select input channel out of 8 options.
ALE: Latch channel No.
SOC: Start of conversion.

Interface ADC 0809 to 8086 using 8255

1) ADC 0809 is an **8 channel, 8 bit ADC**.
2) It can **convert** an analog **voltage** input **into** an 8 bit digital **data** output.
3) To select an input out of 8 options, there are **three select lines** (C, B and A).
4) We **put a channel number** on these lines (0…7) and latch it using ALE.
5) Now we **give SOC** indicating start of conversion.
6) The channel voltage is internally **sampled** and held into a capacitor.
7) Conversion takes place internally using "**Successive Approximations** Algorithm".
8) **Reference voltage** for conversion is provided using **+Vref and –Vref**.
9) The **clock supply** needed for conversion is given through **CLK** (typically ~ 1MHz).
10) The **end of conversion** is indicated by the ADC using **EOC signal**.
11) Now we **give the OE** signal enabling 8-bit data output from the **ADC to 8255**.
12) This data from 8255 is now **transferred to the microprocessor**.
13) The process is repeated for **subsequent channels**, by changing the channel number.
14) The ADC could also be connected directly to 8086 but **using an 8255 just makes it easier** as the **port lines of 8255 can control various functions of the ADC.**
15) ADCs have a **vast use** in the modern electronic world for **Data Acquisition Systems**.
16) They can be used for **temperature sensing, voice recording, speed sensing** etc.

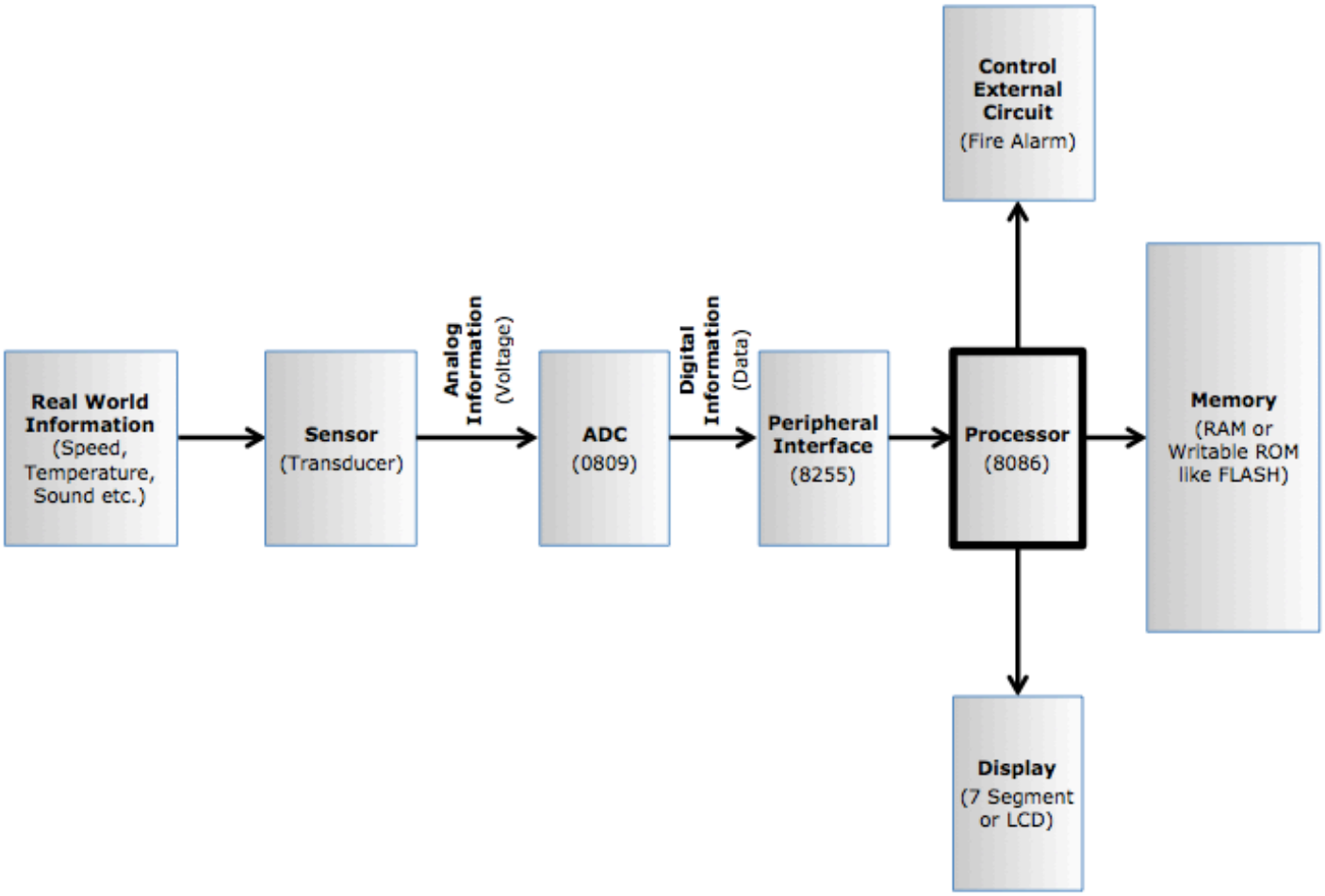

INTERFACE 809 (ADC) to 8086 using 8255.
+Vref -Vref
Vin(0)
Vin(7)
(8 analog inputs)
ADC 0809
clock
8 bit digital output
output enable
end of conversion
Start of Conversion
latch channel
Channel select
8255 PPI
PA
PB
PC
CW
I/O map of 8255 at addr 80H.
A7 A6 A5 A4 A3 A2 A1 A0
PA 10000000 80H
PB 10000010 82H
PC 10000100 84H
C.W. 10000110 86H
8086 up
8282 8bit latch (3)
8286 8bit data T XRVR (2)
74138 3:8 decoder
8284 CLK gen
3x
Reset
Ready

DATA ACQUISITION SYSTEM

Explain a Data Acquisition System using 8086

1) A data acquisition system is required whenever we need to **obtain real world data such as speed, temperature, sound** etc.
2) Real World data is first **converted into electrical voltage pulses** by a sensor like a transducer, a microphone etc.
3) This is now **Analog information**.
4) This is **fed into an ADC** to convert it into **Digital information**, that's data.

   E.g.:: An **ADC 0809** will convert every Analog sample into 8-bit data.
5) Such data is passed on to a **peripheral interface** device like **8255**.
6) From 8255, it is collected by the **microprocessor 8086**.
7) The ADC could also be connected directly to 8086 but using an 8255 **just makes it easier** as the **port lines of 8255 can control various functions of the ADC.**
8) This data is **stored by the microprocessor into the system memory**.
9) Further on, it **can be processed in various ways**.
10) If it is **Audio**, it can be **stored as an mp3 file**.
11) If it is **temperature or speed** it can be displayed on a **seven segment display**.
12) **Applications: Temperature sensing** in Fire Detection systems**, Speed sensing** in Speed Limiting systems**, Audio recording and playback** (Remember Talking Tomcat app ;-))


Real World Information (Speed, Temperature, Sound etc.)
Sensor (Transducer)
Analog Information (Voltage)
ADC (0809)
Digital Information (Data)
Peripheral Interface (8255)
Processor (8086)
Control External Circuit (Fire Alarm)
Memory (RAM or Writable ROM like FLASH)
Display (7 Segment or LCD)