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Batch- B

SEIT-II
2020303021

MPL Assignment-2

Q1) List and Explain the string instructions of 8086 Write 8086 assembly language program to display the given string in reverse

Ans) The String Instructions in 8086 are as follows:-

(i) REP/REPE/REPZ/REPZ/REPZ/REPNE/REPNZ:-

The REP instruction is a prefix which is written before one of the string instruction in 8086. These instructions repeat until specified condition exists. Repeat it until CX=0

The REPE/REPZ instruction repeat it until the CX = 0 or ZF = 0. It is generally used with CMPS or SCAN

Syntax: REPZ CMP SB

REPNE/REPNZ instruction that repeat until CX=0 or the ZF=not 0 i.e ZF=1

(ii) MOVS/MOVSB/MOVSW:-

This instruction copies or move a byte or word from a location in the data segment to another location in extra segment The offset of source byte will be in the SI register and that of destination will in the DI register

If the direction flag is 0, then SI and DI will be incremented by 1 after a byte move and will incremented by 2 after word move

If the direction flag is 1, then SI and DI will be decremented by 1 after a byte move and will be decremented by 2 after word move

Example - REP MOVSB

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(iii) CMPS/CMPSB/CMPW :-
The instructions can be used to compare a byte in one string with a byte in another string or to compare a word in one string with other. The CX contains the count of bytes or word. The comparison is done by subtracting the byte or word pointed to by DI from byte or word pointed to by SI. The AF, CF, OF, PF, SF and ZF flags are affected by the comparison, but the operand is not affected. These instructions are used with REP, REPE or REPNE prefix

Example - REPE CMPSB

(iv) SCAS/SCASB/SCAW instruction :-
SCAS compares a string byte with a byte in AL or string word AX. The instruction affects the flags, but it does not change either the operand in AL or in string. After the comparison DI will be automatically incremented or decremented according to direction flag. SCASB says compare string instruction in 8086 as bytes and SCAW says compare string as words

(v) LODS/LODSB/LODSW instruction :-
This instruction copies a byte from string location pointed by SI to AL or word from a string location pointed by SI to AX. LODS does not affect any flags.
LODSB copies byte and LODSW copies a word

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(vi) STOS/STOSB/STOSW instruction:-
The STOS instruction copies a byte from AL or word from AX to memory location in extra segment. If the direction flag is cleared then DI will be automatically be incremented by one for a byte string or incremented by two for a word string. STOS does not affect any flags. STOSB copies byte and STOSW word.

Program to display string in reverse:-

```
Assume ds: data, cs: code
data segment
  a db 0AH, 0DH, 'Enter a string: $'
  b db 0AH, 0DH, 'Reverse string: $'
  buff db 40H
  buff db 00H
       db 40H dup(00H)
data ends
PRINT MACRO MSG
    MOV AH, 09H
    LEA DX, MSG
    INT 21H
ENDM

Code segment
start: mov AX, Data
       mov DS, Ax
       PRINT a
       Mov AH, 0AH
       Lea Dx, buff
       INT 21H
```

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```
PRINT b
lea Bx,buff
INC Bx
Mov CH,00H
mov CL,buff + 1
Mov DI, Cx

back: mov DL,[Bx + DI]
      Mov AH,02H
      INT 21H
      DEC DI
      JNZ back
      Mov AH,4CH
      INT 21H
code ends
end start
```

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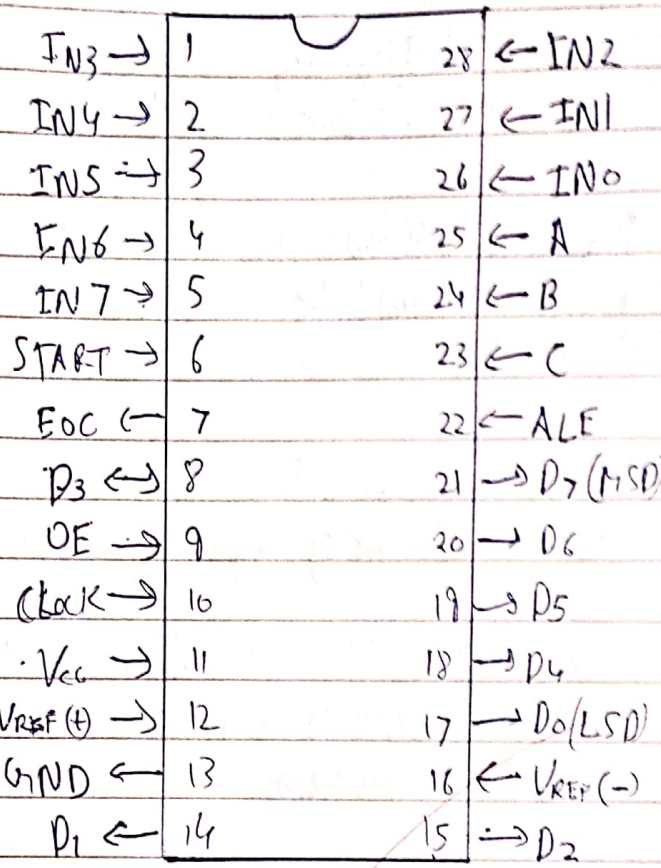
(Q2) Explain pin diagram of ADC 0808/0809 and design its interfacing to 8086 with suitable example.

Ans)



LSD = Least Significant digit, MSD = Most Significant digit

The information about signals is given below:

IN0 - IN7 : Eight single ended analog input to ADC.

A, B, C : 3-bit binary input to select one of the eight analog signal for conversion at any one time.

ALE : Address latch enable. Used to latch the 3-bit address input to an internal latch.

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START: start of conversion pulse input. To start ADC process the signal should be asserted high and low. This signal should remain high for atleast 100 ns

CLOCK: Clock input and frequency of clock can be in the range of 10KHz to 1280 KHz. Typical clock input is 640 Hz

$V_{REF(+)}$, $V_{REF(-)}$: Reference voltage input. The positive reference voltage can be less than or equal to V_{cc} and the negative reference voltage can be greater than or equal to ground

$D_0 - D_7$: The 8-bit digital output. The reference voltage will decide the mapping of analog input to digital data

EOC: End of conversion. This signal is asserted high by the ADC to indicate the end of conversion process and it can be used as interrupt signal to processor

OE: Output enable. This signal is used to read the digital data from output buffer after a valid EOC

V_{cc}: Power supply, +5V

GND: Power supply ground, 0V

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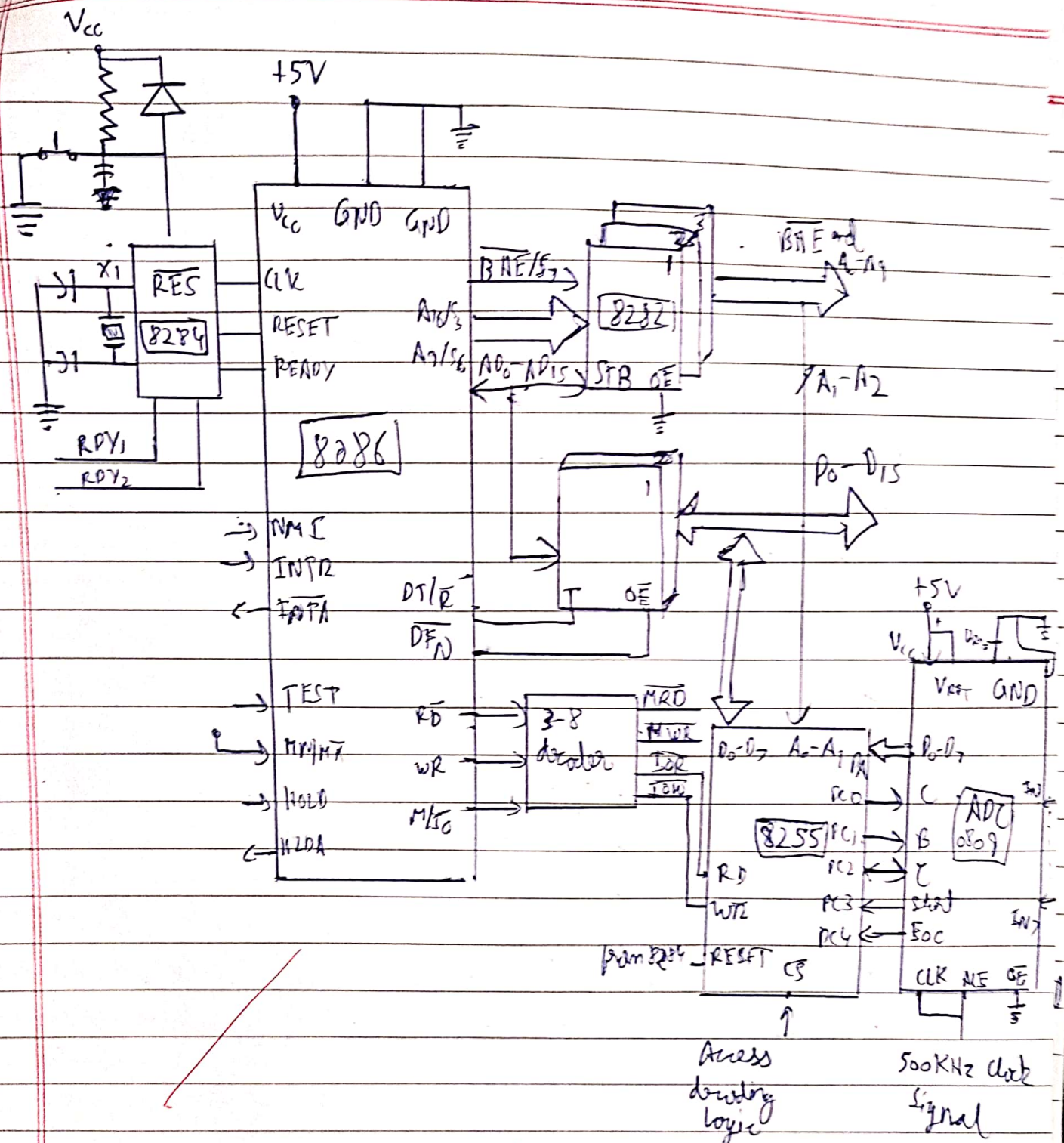

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