

LAB ASSIGNMENT

UCS617: Microprocessor based Systems Design

Submitted by:

Anupriya Lathey (102103373)

Sunali (102103375)

Deepanshi Sharma (102103376)

Nitleen Kaur (102103377)

Pia Gupta (102103394)

Submitted To:

Dr. Rohan Sharma

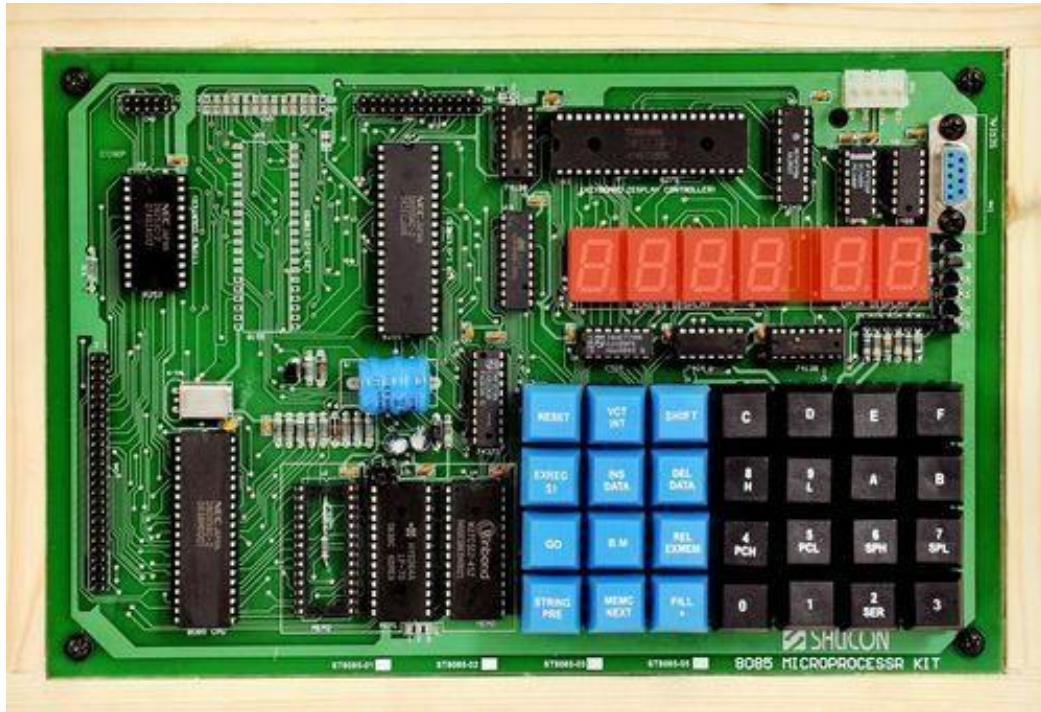


Science and Engineering Department
Thapar Institute of Engineering and Technology, Patiala
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8085 Microprocessor

Q1. Introduction of 8085-microprocessor kit and steps for execution on the kit.



The Intel 8085 microprocessor is an NMOS 8-bit device. It has a 16-bit address bus and an 8-bit data bus. The total addressable memory size of 8085 microprocessor is 64 KB. It has a set of registers which contribute to the effective and efficient working of the microprocessor.

To view the overall working of the 8085 microprocessor, a kit has been designed so that the programming on this microprocessor can be best understood by the students.

The kit consists of the following components:

- A 6-byte display screen which is further divided into two parts, one containing 4-byte displaying the address and the remaining 2-bytes which are used to display the data.
- A keypad which is used to operate the kit.
- A 40-pin 8085 microprocessor.
- A 20-pin address latch used to manage the address transfer from the AD bus.
- A memory unit which consists of three 28-pin IC's which are used to provide memory to the processor.
- A 24-pin timer controller which is used to control the clock frequency.

- A 40-pin I/O Lines which are used to provide input to the microprocessor and to store the output from the microprocessor.
- A 40-pin KB/Display controller used to control the display.

Follow the steps given below in order to execute the program on 8085 Microprocessor Kit:

I. Enter Program

- A. Press RESET
- B. Press EXAMINE MEMORY (EXMEM)
- C. Enter starting address of the program
- D. Press NEXT
- E. Start entering the opcodes
- F. Press NEXT

II. Enter Data

- A. Press RESET
- B. Press EXAMINE MEMORY (EXMEM)
- C. Enter the address of operand
- D. Press NEXT
- E. Enter data
- F. Press FILL

III. Execute Program

- A. Press RESET
- B. Press GO
- C. Enter starting address of the program
- D. Press FILL

IV. Check Result

- A. Press RESET
- B. Press EXAMINE MEMORY (EXMEM)
- C. Enter address of result

D. Press NEXT

Q2. Write a program to store 8-bit data into one register and then copy that to all registers.

```
MVI A,52H
MOV B,A
MOV C,A
MOV D,A
MOV E,A
MOV H,A
MOV L,A
RST 5
```

Q3. Write a program for addition of two 8-bit numbers.

```
MVII    B,52
MVI C,24
MOV A,C
ADD B
RST 5
```

Q4. Write a program to add 8-bit numbers using direct and indirect addressing mode.

Direct Addressing Mode:

```
LDA 8500
MOV B,A
LDA 8501
ADD B
STA 8502
RST 5
```

Indirect Addressing Mode:

```
LXI B,8500
```

```
LDAX B
MOV D,A
LXI B,8501
LDAX B
ADD D
STA 8502
RST 5
```

Q5. Write a program to add 16-bit numbers using direct and indirect addressing mode.

Direct Addressing Mode:

```
LHLD 8500
XCHG
LHLD 8502
DAD D
SHLD 8504
RST 5
```

Indirect Addressing Mode:

```
LXI B,8500
LDAX B
MOV D,A
LXI B,8502
LDAX B
ADD D
STA 8504
LXI B,8501
LDAX B
MOV D,A
LXI B,8503
LDAX B
ADC D
```

STA 8505

RST 5

Q6. Write a program to 8-bit numbers using carry. (using JNC instruction).

MVIII C,00

LXI H,2500

MOV A,M

INX H

ADD M

JNC NEXT

NEXT: INX H

MOV M,A

Q7. Write a program to find 1's complement and 2's complement of 8-bit number.

1's Complement

MIX A,44H

CMA

STA 8500

RST 5

2's Complement

MVI A,44

CMA

ADI 01

STA 8500

RST 5

Q8. Write a program for the sum of series of numbers.

LXI H,3000

MOV C,M MVI A,00

BACK: INX H
 MOV B,M
 ADD B
 DCR C
 JNZ BACK
 INX H
 MOV M,A
 HLT

Q9. Write a program for data transfer from memory block B1 to memory block B2.

 LXI H,4150
 MVI B,08
 MVI A,54

LOOP1: RRC
 JC LOOP1
 MVI M,00
 JMP COMMON

LOOP2: MVI M,01

COMMON: INX H
 DCR B
 JNZ LOOP
 HLT

Q10. Write a program for multiply two 8-bit numbers.

 MVI D,00
 MVI A,00

LXI H,5000

MOV B,M

INX H

LOOP: ADD B

MOV C,M

STA 5003

JNZ LOOP

STA 5002

MOV A,D

STA 5003

HLT

Q11. Write a program to add ten 8-bit numbers. Assume the numbers are stored in 2500-2509.

Store the result in 250A and 250B memory address.

LXI H,2500

LXI D,250A

MVI C,09

MVI B,00

MOV A,M

UP: INX H

ADD M

INR B

DOWN: DCR C

STAX D

MOV A,B

STA 250B

HLT

Q12. Write a program to find the negative numbers in a block of data.

LDA 2200

MOV C,A

MVI B,00

LXI H,2201

BACK: MOV A,M

ANI 80

JZ SKIP

INR B

SKIP: INX H

DCR C

JNZ BACK

MOV A,B

STA 2300

HLT

Q13. Write a program to count the number of one's in a number.

MVI B,00

MVI C,08

MOV A,D

BACK: RAR

JNC SKIP

INR B

SKIP: DCR C

JNZ BACK

HLT

Q14. Write a program to arrange numbers in Ascending order.

MVI B,09

LXI H,2200

MVI C,09

BACK: MOV A,M

INX H

CMP M

JC SKIP

JZ SKIP

MOV D,M

MOV M,A DCX H

MOV M,D

INX H

SKIP: DCR C

JNZ BACK

DCR B

Q15. Calculate the sum of series of even numbers.

LDA 2200

MOV C,A

MVI B,00

LXI H,2201

```

BACK:  MOV A,M
        ANI 01
DCR C
        JNZ SKIP
        MOV A,B
        ADD M
        MOV B,A

SKIP:   INX H
        DCR C
        JNZ BACK
        STA 2210

HLT

```

Q16. Write an assembly language program to verify how many bytes are present in a given set, which resembles 10101101 in 8085.

```

        MVI B,0A
        MVI D,AD
        MVI C,00
        LXI H,8500

BACK:   MOV A,M
        CMP D
        JNZ NEXT
        INR C

NEXT:   INX H
        DCR B
        JNZ BACK
        MOV A,C
        STA 8053
        RST 5

```

!14

Q17. Write an assembly language program to find the numbers of even parity in ten consecutive memory locations in 8085.

```
MVI B,0A  
MVI C,00  
LXI H,8500
```

```
BACK: MOV A,M  
      ANI FF  
      JPO NEXT  
      INR C
```

```
NEXT: INX H  
      DCR B  
      JNZ BACK  
      MOV A,C  
      STA 850A  
      RST 5
```

Q18. Write an assembly language program to convert a BCD number into its equivalent binary in 8085.

```
LDA 2200
MOV B,A
ANI 0F
MOV C,A
MOV A,B
ANI F0
RRC
RRC
RRC
RRC
MOV B,A
XRA A
MVI D,0A
```

```
SUM:  ADD D
      DCR B
      JNZ SUM
      ADD C
      STA 2300
HLT
```

Q19. Write an assembly language program to exchange the contents of memory location.

Direct Addressing Mode

```
LDA 2000
MOV B,A
LDA 4000
STA 2000
MOV A,B
```

STA 4000

Indirect Addressing Mode

LXI H,2000

LXI D,4000

MOV B,M

LDAX D

MOV M,A

MOV A,B

STAX D

HLT

Q20. Write a program to find the largest number in an array of 10 elements.

MVI B,09

LXI H,8500 MOV A,M

BACK: CMP M

 JNC NEXT

 MOV A,M

NEXT: INX H

 DCR B

 JNZ BACK

 STA 850A

 RST 5