Daffodil International University

Department of Electrical and Electronic Engineering

EEE 324: Microprocessors and Interfacing Laboratory

Experiment No: 06

**NAME OF THE EXPERIMENT: Introduction of microprocessor kit 8086 and to write instruction to memory and execute.**

**Introduction of 8086 Microprocessor:** The Intel 8086 is a 16-bit microprocessor that is intended to be used as the CPU in a microcomputer. The term 16-bit means that its arithmetic logic unit, its internal registers. The 8086 has a 16-bit data bus, so it can read data from or write data to memory and ports either 16 bits or 8 bits at a time. The 8086 has a 20-bit address bus, so it can address any one of 2^20, or 1,048,576, memory locations. Each of the 1,048,576 memory addresses of 8086 represents a byte-wide location. Sixteen-bit words will be stored in two consecutive memory locations.

If the first byte of the word is at an even address, the 8086 can read the entire word in one operation. If the first byte of the word is at an odd address, the 8086 will read the first byte with one bus operation and the second byte with another bus operation.

For Serial Monitor

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P1

## Jumper Setting:

For MDE-8086 Kit

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P1

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| --- | --- |
|  |  |

## Basic operation:

On a power up, following message will be displayed on a LCD.

MDE-8086 Kit V9.5

Midas 335-0964/5

Whenever RES is pressed, the display the same message and user can operate keyboard only in this situation.

**Kind & Function of Key :** MDE-8086 has high performance 64K byte monitor program. It is designed for easy function. After power is on, the monitor begins to work. In addition to all the key function the monitor has a memory checking routine.The following is a simple description of the key functions.

## Key Layout:

|  |  |
| --- | --- |
| Function Key | Data Key |
|  |  |  |  | MON | RES |
| GO | STP | C | D | E | F |
| + | REG | 8 | 9 | A | B |
| - | DA | 4 | 5 | 6 | 7 |
| : | AD | 0 | 1 | 2 | 3 |

## Description of key functions:

|  |  |
| --- | --- |
| RES | System reset. |
| AD | Set memory address. |
| DA | Update segment & offset and input data to memory. |
| : | Offset set. |
| + | Segment & Offset +1 increment. Register display increment. |
| - | Segment & Offset -1 decrement. Register display decrement. |
| GO | Go to user’s program or execute monitor functions. |
| MON | Immediately break user’s program and Non maskable interrupt. |
| REG | Register Display |
| STP | Execute one instruction and show register status |

## MDE-8086 ADDRESS MAP:

|  |  |  |
| --- | --- | --- |
| ADDRESS | MEMORY | DESCRIPTION |
| 00000H ~ 0FFFFH | RAM | PROGRAM & DATA |
| F0000H ~ FFFFFH | ROM | MONITOR ROM |
| 10000H ~ EFFFFH | USER’S RANGE |

## Operation :

1. To input data to any location first press AD and type segment number then press ‘:’ and type offset address then press DA and type the data you want to store in Hexadecimal
2. To write to another location you can again press AD and type segment number then press ‘:’ and type offset address and DA and type the data.

Or press + to go to next offset address

Or press - to go to previous offset address

1. To display register press REG and values of some registers will be displayed

AX=0000 BX=0000

CX=0000 DX=0000

Then press + or – to see values of other registers.

SP=0540 BP=0000

SI=0000 DI= 0000

1. To execute unit instruction and see register values (called ‘trace’) press STP.

## Procedure:

1. In a text editor (Notepad) write the following code.

CODE SEGMENT

ASSUME CS: CODE

ORG 1000H

MOV AX,1234H

MOV BH,80H

MOV BL,AH

MOV CX,1144H

MOV DX,0001H

ADD DX,1234H

SUB AX,CX

DEC BH

INT 3

CODE ENDS

END

1. Save, assemble and link and debug the code to see machine code by ‘U’ command. You will see

C:\mda>DEBUG EXP5.EXE

-U

# 0B6E:0000 B83412 MOV AX,1234

# 0B6E:0003 B780 MOV BH,80

# 0B6E:0005 8ADC MOV BL,AH

# 0B6E:0007 B94411 MOV CX,1144

# 0B6E:000A BAFFFF MOV DX,FFFF

# 0B6E:000D 83C201 ADD DX,+01

# 0B6E:0010 2BC1 SUB AX,CX

# 0B6E:0012 FECF DEC BH

# 0B6E:0014 CC INT 3

1. Now input the machine code from start up to the end starting from location 0000:1000.

For example

# 0000:1000 B8

# 0000:1001 34

# 0000:1002 12

# 0000:1003 B7

# 0000:1004 80

# . . . . . . . . . . . .

# . . . . . . . . . . . .

1. Press REG and write down register values.
2. Press STP once. This will execute one instruction and show register status. Write down again which registers has been changed.
3. Continue until all instructions are executed.

## Report:

1. Show the change in registers after execution of each instruction.
2. Expand flag register and find status of overflow, carry, sign and zero flag after execution of ADD, INC and DEC instructions.
3. What is the address of first executed instruction by 8086 after power up/RESET? Is it RAM or ROM.?
4. Find out the 8086 present in Kit. Count how many pins it has.