Department of Information and Communication Engineering

CSE-3102: Microprocessor and Interfacing Lab

Experiment No. 02:

To load the machine codes of a sample program to MDA-8086, execute it and verify the results.

Objective:

1. To learn the procedure of loading program in RAM of MDA-8086 in "Machine Code" mode.
2. To load the program to MDA-8086, execute the program in single step mode and verify the result.

Program:

In this experiment we shall execute a simple assembly language program after loading it to MDA-8086 Kit. This program consists of one addition, one subtraction, one increment and decrement instructions. To load the program, we shall save the machine code of different instructions to the respective memory (RAM) location of our microprocessor kit. We shall observe different registers of 8086 to verify results, after execution of each instruction. Here is our program:

```
CODE SEGMENT
        ASSUME  CS:CODE,DS:CODE,ES:CODE,SS:CODE
        ORG 1000H
        MOV AX, 805EH
        MOV DX, 0540H
        ADD AX, DX
        MOV BX, 0050H
        SUB AX, BX
        INC DX
        DEC BX
        HLT
CODE ENDS
        END
```

Experiment Requirements:

1. 8086 microprocessor kit.
2. Instruction Guide.
3. Assembler "MASM".

Experiment Procedures:

1. Write the above program in notepad and save the file as "filename.asm". Place this file in the folder where "masm.exe" exists.
2. Go to command prompt and execute "masm.exe". You will see the following message

   Microsoft (R) Macro Assembler Version 5.10
   Copyright (C) Misrosoft Corp 1981, 1988. All right reserved.

   Source filename [.ASM]:

3. Follow the procedure given below to prepare machine code for your program:

Source filename [.ASM]:	filename Press ENTER
Object filename [filename.OBJ]:	Press ENTER
Source listing [NUL.LST]:	filename Press ENTER
Cross reference [NUL.CRF]:	Press ENTER

4. Open the file "filename.lst" using notepad. Here you will find respective machine code for each instruction.

5. Turn on the 8086 microprocessor kit
6. Set the address 0000H : 1000H in MDA-8086 kit.
7. Write the machine codes in the appropriate memory address according the following table:

Offset Address	Machine Code	Instruction / Mnemonics
1000	B8 805E	MOV AX, 805EH
1003	BA 0540	MOV DX, 0540H
1006	03 C2	ADD AX, DX
1008	BB 0050	MOV BX, 0050H
100B	2B C3	SUB AX, BX
100D	42	INC DX
100E	4B	DEC BX
100F	F4	HLT

8. Execute this program in single step using "STP". Observe the register contents after execution of each instruction and note down in the data table. Perform theoretical calculations and verify results.

Data Table :

Instruction / Mnemonics	AX	BX	DX	Set Flag Bit(s)	Remarks
Initial Status					
MOV AX, 805EH					
MOV DX, 0540H					
ADD AX, DX					
MOV BX, 0050H					
SUB AX, BX					
INC DX					
DEC BX					
HLT					

Report:

1. Discuss the effect of each instruction/ mnemonics that is used in this program.

References:

1. User's manual of MDA-8086 microprocessor kit, Midas Engineering, www.midaseng.com
2. "Assembly Language Programming and Organization of the IBM PC", Ytha Yu and Charles Marut, Mitchell McGraw-Hill.

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