Dhaka University of Engineering & Technology (DUET), Gazipur

Department of Computer Science and Engineering (CSE)

Course Title: Microprocessor & Interfacing Sessional (CSE-3812)

Lab: 02

Familiarizing with MDA 8086 trainer Kit Commands in Serial Monitor Mode.

Objectives:

1. To familiarize with the operation of MDA-8086 in "Serial Monitor" mode.
2. To learn the procedure of loading a program in RAM of MDA-8086 in "Serial Monitor" mode.

Basic Theory:

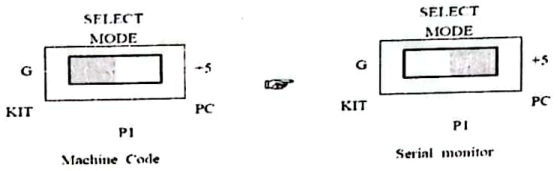
Serial monitor is the basic monitor program to perform data communication between MDA-8086 and a computer. So as to use serial monitor, we have to move jumper P1 which located on the PCB like this.

observe the contents of different registers in the LCD. On the other hand, users can load instructions/programs from the computer via serial port in Serial Monitor Mode.

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

MDA-8086 Kit ! ! Midas 2109-5964	Or	Serial monitor! Midas 2109-5964

To use "Serial Monitor" mode, move jumper P_1 which is located on the PCB like this.



Connect the serial interface of the MDA-8086 with the computer (PC) interface and run the WinComm program in PC and press the RES key to change the mode of MDA-8086 trainer Kit.

Operation of serial monitor command

Users can only use commands which are stored at the serial monitor. Serial monitor can execute to command when the user types command and then CR (carriage return) key. If there is no command at the serial monitor, an error message will be displayed with a bell sound and the serial monitor prompt will be displayed again.

8086>?

HELP Command

E segment: offset.....: Enter Data to Memory

D segment: offset length.....: Dump Memory Contents

R [register name].....: Register Display & Change

M address1, length, address2.....: Move Memory From 1 to 2

F address, length, data.....: Fill Memory with any Data

L Return Key.....: Program Download

G Segment : offset .....: Execute Program

T.....: Program 1 step execute

Basic Command Syntax:

1. **Memory Modify Command**
   Syntax: E segment: offset
   Purpose: This command is used to enter data to memory.
   Example:
   8086> E 0000:1000 ↵
   0000:1000 FF? 11
   0000:1001 FF? 22
   0000:1002 FF? 33
   0000:1003 FF? 44
   0000:1004 FF? 55

0000:1005 FF? / (Offset decrement)
0000:1004 55?

2. **Memory Display Command**
   Syntax: D segment: offset
   Purpose: This command is used to display the data stored in memory.
   Example:
   8086> D 0000:1000
   0000:1000 11 22 33 44 55 FF FF FF – FF FF FF FF FF FF FF FF
   0000:1020 FF FF FF FF FF FF FF FF – FF FF FF FF FF FF FF FF

3. **Display Register Command**
   Syntax: R
   Purpose: The R command is used to display the 8086 processor registers
   Example:
   8086> R

AX=0000	BX=0000	CX=0000	DX=0000
SP=0540	BP=0000	SI=0000	DI=0000
DS=0000	ES=0000	SS=0000	XS=0000
IP=1000	FL=0000=		

To Change individual register:

8086 > R AX

AX= 0000 1234

8086 > R BX

BX= 0000 4567

8086 > R CX

CX= 0000 7788

8086 > R DX

DX= 0000 1111

4. **Program download and execute command:**

The L command moves object data in hex format from an external device to memory.

8086> L ↵

Download start!! (Note: See section 5. Serial monitor experiment)

:14100000B800008ED88EC0BB00208B078A6F028A4F038BB6

:101014003E8B5604268B76068B7E088B1E0A20CCCC

:0E20000012345678ABCDF0146853B1C41020E2

:00000001FF

OK completed!!

- Set IP
  8086>R IP
  IP=1000
  8086>T ↵

AX=1234	BX=4567	CX=7788	DX=1111
SP=0540	BP=0000	SI=0000	DI=0000
DS=0000	ES=0000	SS=0000	CS=0000
IP=1003	FL=0100	=. . . t	

  Next address

- Execute Program Command

  8086> G 0000:1000 ↵
  Execute Address = 0000:1000

Task to do:
Write Assembly Language Program using notepad to transfer the following hexa-decimal values to the specified registers:

AX=3789 h, BX= AB9F h, CX=C25A h, DX= B21C h

Then, **ADD** the value of AX with BX and **SUBTRACT** the value of DX from CX. **MOV** the content from AX to BX and CX to DX. Then, make an **AND** operation using the updated contents of AX and CX.

Experiment Procedure:

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 the command prompt and execute "masm.exe". You will see the following message
   Microsoft (R) Macro Assembler Version 5.10
   Copyright (C) Microsoft 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 [C: file name.OBJ]: Press ENTER
   Source listing [NUL.LST]: filename Press ENTER
   Cross reference [NUL.CRF]: Press ENTER

4. Execute "LOD186.exe". You will see the following
   message Paragon LOD186 Loader-Version 4.0h
   Copyright (C) 1983 - 1986 Microtec Research Inc.
   ALL RIGHT RESERVED.
   Object/Command File [.OBJ]:

5. Follow the procedure given below to prepare HEX (ABS) file for your program:

Object/Command File	[.OBJ]: filename	Press ENTER
Output Object File	[C:filename.ABS]:	Press ENTER
Map Filename	[C:NUL.MAP] :	Press ENTER

   **LOAD COMPLETE

6. Turn on the 8086 microprocessor kit.
7. Open the "Wincomm" window. Press "L" then "Enter". You will see the following message:

   ** Serial Monitor 1.0 **
   ** Midas 335-0964/5 **
   8086 >L Press ENTER
   Down load start!!

8. Strike PgUp or F3 key of your keyboard. A new window will appear. Locate the "filename.ABS" file and open it.

9. You will observe that file download has started. A message like the following one will be shown:
   :14100000B800008ED88EC0BB00208B078A6F028A4F038BB6
   :101014003E8B5604268B76068B7E088B1E0A20CCCC
   :0E20000012345678ABCDF0146853B1C41020E2
   :00000001FF
   OK completed!!

10. After loading the program, run the program in (press T command or G from the keyboard, then press enter) in MDA-8086 kit and ensure the display output and verify the calculated value of different registers. Perform theoretical calculations and verify results and fill-up the given data table.

Seg. Address	Offset Address	Machine Code	Instruction

Instruction	AX	BX	CX	DX	Flag Reg.