ASM51
MetaLink Corporation

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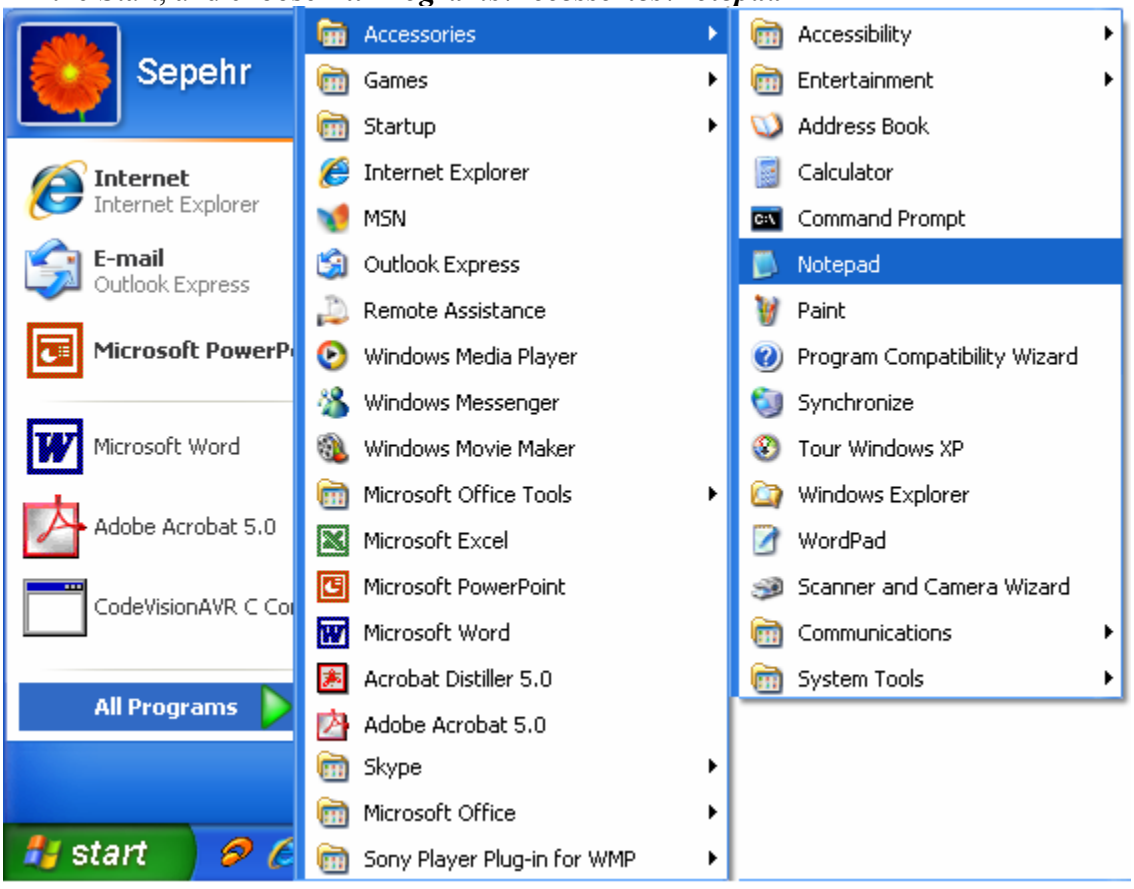
Preparing ASM51 for use

1. First download ***ASM51.zip***. You can download the file from the following web address:
   http://www.microdigitaled.com/8051/software/Software.htm
2. Unzip the ***ASM51.ZIP*** file. There are different programs for decompressing zip files:
   - If you are using windows, right click on the ***asm51.zip*** file, and then choose ***Extract All…*** A dialog appears and asks you where to unzip the file.
3. Now, ASM51 is ready to be used.

Writing a simple program

4. There are different editors available nowadays, such as *notepad* and *Word* in Windows, and *EDIT* in ***DOS***.
   - If you are using windows, open the notepad software. To do so, click on the Start, and choose ***All Programs\Accessories\Notepad***



   - If you are using DOS, type ***edit***.

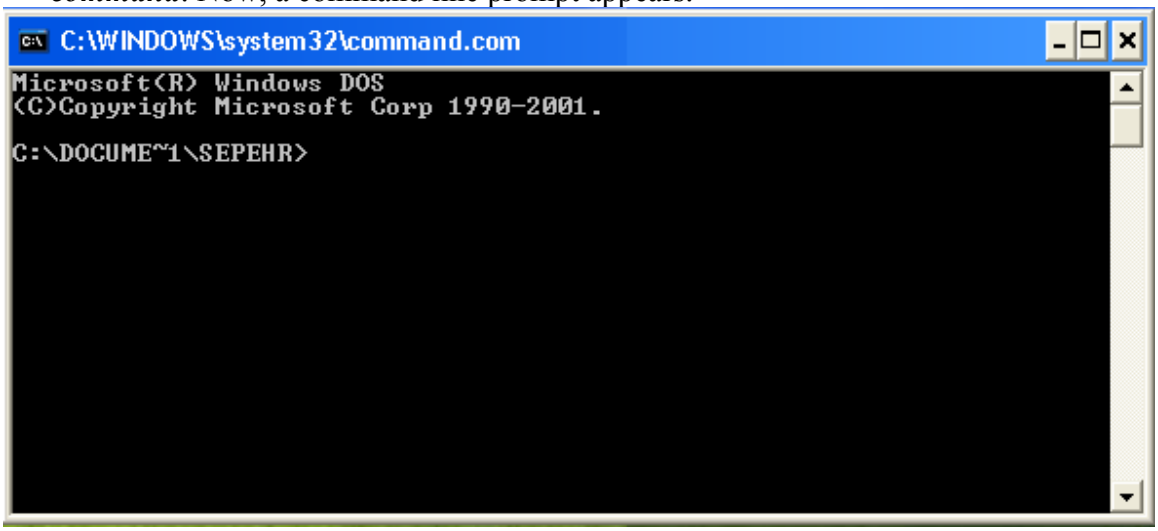
5. Enter the following program in your editor.

```
        ORG 0H
        MOV A, #20H
        ADD A, #40H
HERE:  SJMP HERE
        END
```

6. Choose ***Save*** from the ***File*** menu. A dialog appears that asks you to name the file. Type ***first.asm*** and press the ***OK*** Button.
7. Choose ***Exit*** from the ***File*** menu, to exit the editor.

Compiling the program

8. To use the ***asm51*** software, first you should run the command line, if you are in windows. To do so, click on Start and choose ***Run…*** A dialog appears. Type ***command***. Now, a command line prompt appears.



9. Now, go to the directory where you have saved the ***first.asm*** file. The following table shows some of the DOS useful commands.

Command	Description
DIR	shows the files and directories which are in the current path.
drvName:	To change the active drive, type the drive name followed by ***:*** for example to go to drive ***E***, type ***E:***
CD *dirName*	To go into a directory, type ***CD*** followed by the name of the directory. For example, if there is a directory with name of ***asm51***, in the current path, you can go into the ***asm51*** directory by typing ***CD asm51***
CD\	Goes to the root. For example if you are in ***E:\temp\asm51*** directory, typing ***CD*** changes the current path to ***E:***
CD..	Exits the current directory.

For example, if you have saved ***first.asm*** in ***E:\temp\first.asm*** type the following commands:

```
E:
CD\
CD temp
```

10. Now type the path where you have unzipped the ***asm51.zip*** file followed by ***asm51.exe first.asm*** for example if you have unzipped asm51.zip in ***E:\asm51*** type the following command, and then press the ***Enter*** button:

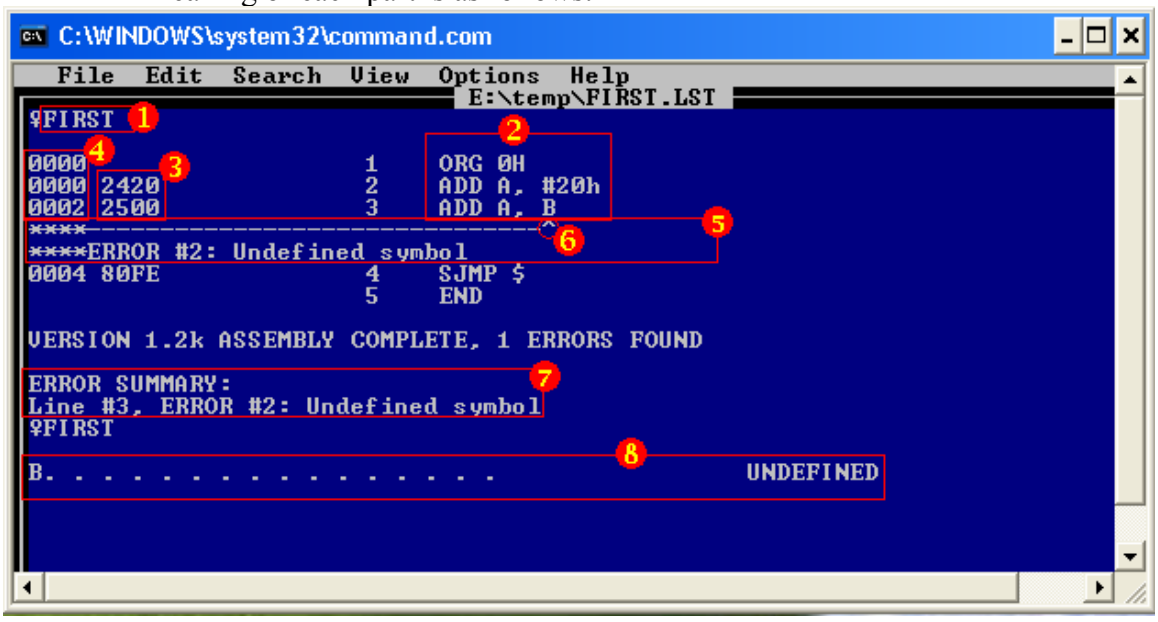
```
E:\asm51\asm51.exe first.asm
```

11. If your program compiles successfully the following message appears:

```
8051 Cross-Assembler, Version 1.2k
     (c) Copyright 1984-1996 by MetaLink Corporation
     First pass
     Second pass
     ASSEMBLY COMPLETE, 0 ERRORS FOUND
```

Otherwise, the message informs you the number of errors your program has.

12. The compiler makes two files with extensions of ***lst*** and ***hex***, where your source file is located.
    - lst (list) file: It is a text file, which informs you the machine equivalent instructions of your assembly program, and also the errors your program has. In the following figure the different parts of a lst file are marked. The meaning of each part is as follows:



1) Displays the name of the source file. So, the source file is created as the result of compiling ***first.asm*** file.
2) This part contains your assembly source code. For example the first instruction, in your source code is ***ORG 0H***

3) The part informs you the machine equivalent of your source code. For example the machine equivalent of the instruction ***ADD A, #20h*** is ***2420***H
4) The part informs you where each of the instructions are located. For example, instruction ***ADD A, #20h*** is located in address ***0000***H of the ROM.
5) It shows that in the upper line, there is an error.
6) The ^ points to the part of the instruction that has caused the error. In the example, ***B*** is the undefined symbol.

Undefined symbol, is one of the most common errors that you may face, while using the ASM51. In ASM51, SFRs (Special Function Registers) are not defined. If you want to use any of the SFRs in your program, you must define the SFR at the beginning of your program, using the EQU pseudo-instruction followed by the address of the SFR. The following table lists the 8051 SFRs and their addresses.

Symbol	Address	Symbol	Address	Symbol	Address
ACC	0E0H	B	0F0H	PSW	0D0H
SP	81H	DPL	82H	DPH	83H
P0	80H	P1	90H	P2	0A0H
P3	0BH	IP	0B8H	IE	0A8H
TMOD	89H	TCON	88H	T2CON	0C8H
T2MOD	0C9H	TH0	8CH	TL0	8AH
TH1	8DH	TL1	8BH	TH2	0CDH
TL2	0CCH	RCAP2H	0CBH	RCAP2L	0CAH
SCON	98H	SBUF	99H	PCON	87H

For example, if you compile the following program, using the ASM51 compiler, you will face an undefined symbol error.

```
       ORG 00H
       MOV A, B
HERE:  SJMP HERE
       END
```

To fix the error you must add the following line, at the beginning of your program

```
B EQU 0F0H
```

So, the correct program is as follows:

```
       B EQU 0F0H
       ORG 00H
       MOV A, B

HERE:  SJMP HERE
       END
```

7) This is a list of the different errors, your source code has.
8) This is the list of the defined symbols in your program.

- Hex file: The hex file is your program in machine language. You burn the file into the IC using the 8051 programmer.