Initialization steps of Keil µVision used with ESA51E

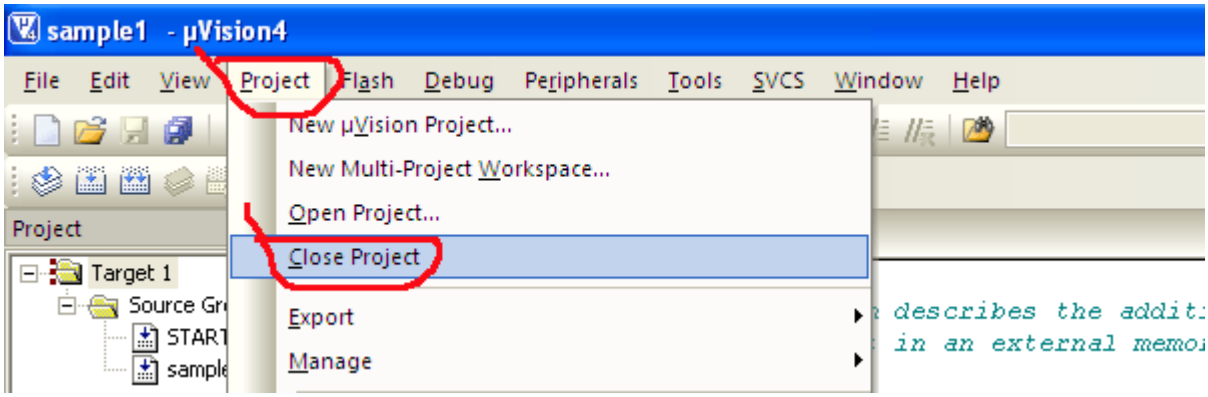
The **ESA51E** board consists of **80C51BH** microcontroller from Intel. This board is connected to PC through a RS232C cable which is connected to COM port of the board. The power is supplied to the board by a power supply.

Two software programs are used to work with this ESA51E board. The software **Keil µVision** is used to write the program in assembly language, compiling and generating the Hex code from the corresponding Assembly code and **Win 51E** is used to download the Hex Code to the ESA51E board and execute the code in the ESA51E board.

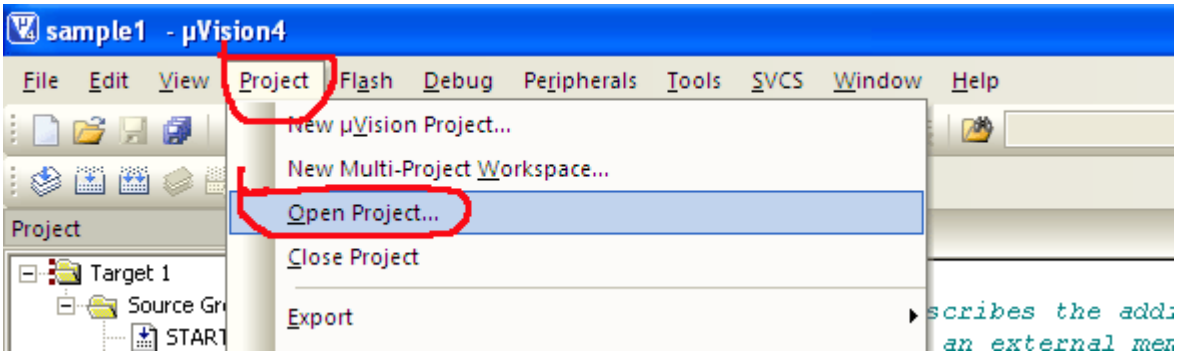
The following write up shows you how to run the **Keil µVision** and **Win 51E** with the 80C51BH based ESA51E board.

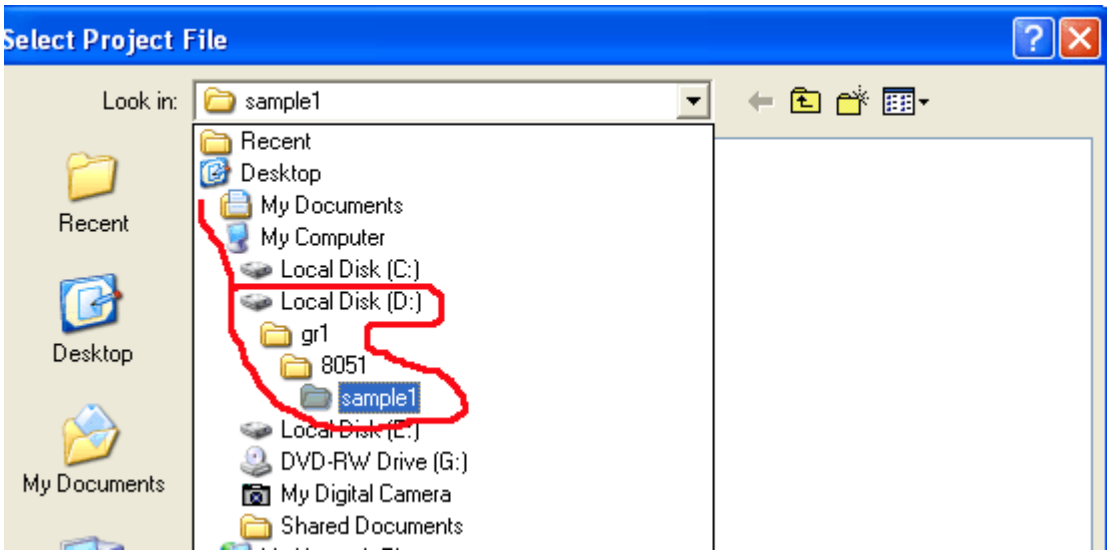
To open the software **Keil µVision**, double click on the desktop icon shown below:

After opening the software window, close any previously opened project by clicking the **Project** menu and then select the **Close project** submenu.



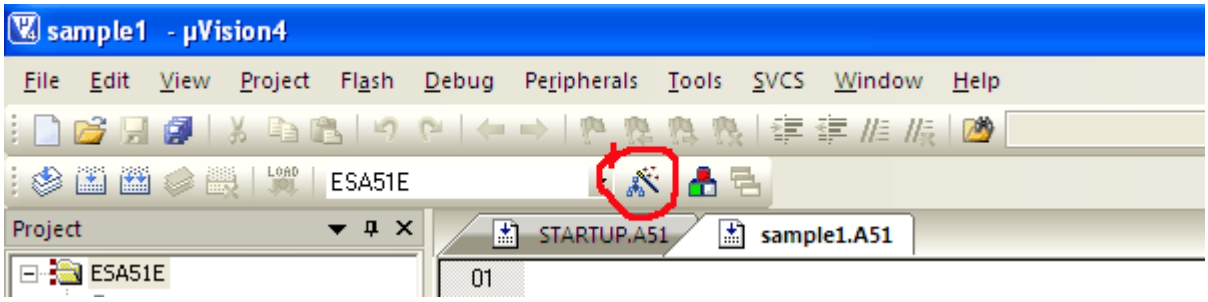
Now to see a sample project, click on the **project** menu and select the **open project** submenu. After clicking the **open project** submenu select the path of the project **sample1** and open the project as shown below :



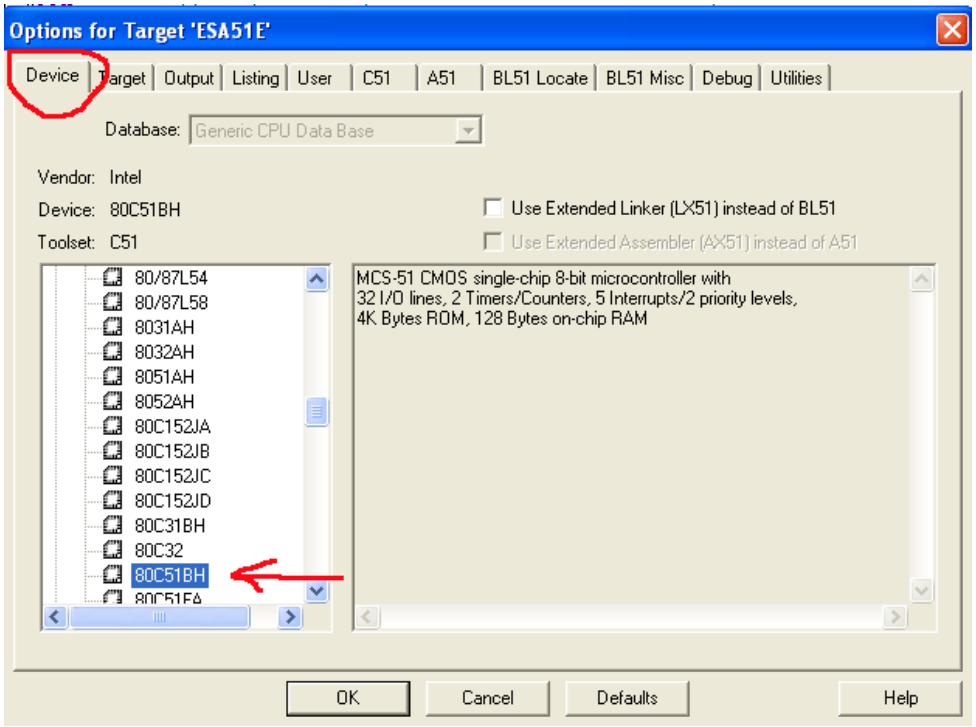


Here the path is **D:\gr1\8051\sample1**. Replace **"gr1"** by your group number e.g. **bt-10 / mt-10 (bt=B.Tech, mt=M.Tech).**

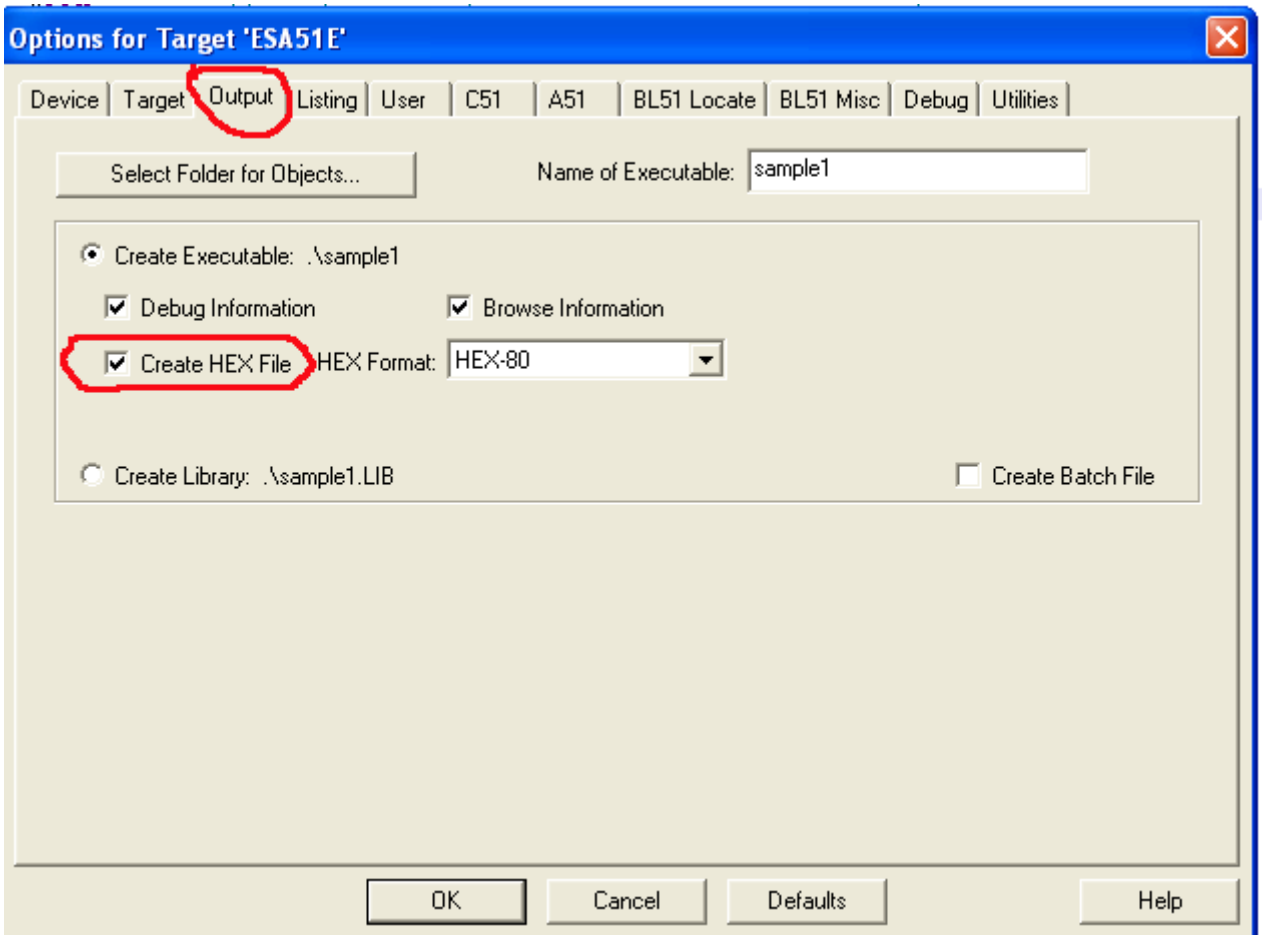
The options for the target system (here it is 80C51 based ESA51E) is to be set by clicking the **Option for Target icon**



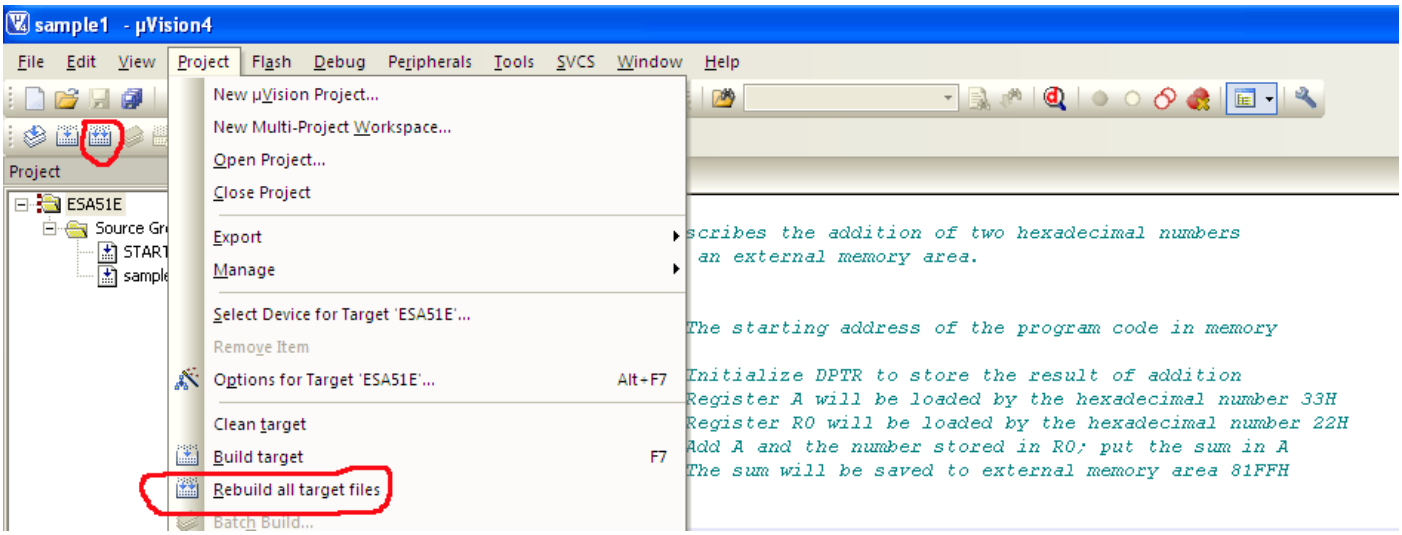
The following window will open. The **Device button** is to be clicked to select the device of the target system. **80C51BH** is to be selected.



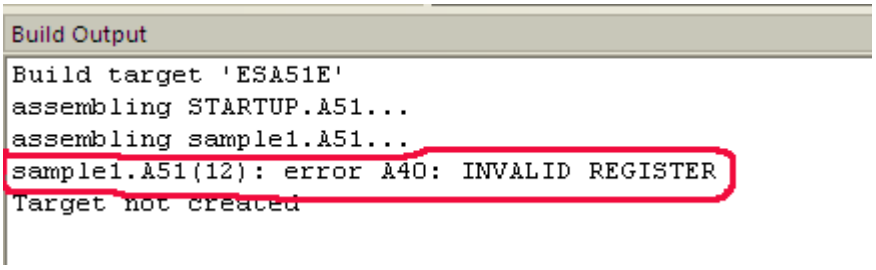
Next click on the **Output** button and tick the **Create Hex File** checkbox and then click **OK.**



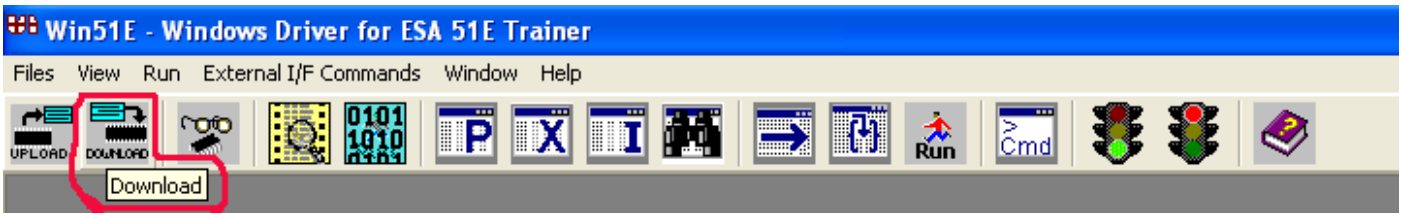
The project can be compiled by clicking the **Rebuild all target files** icon . The positions of the icon in the µvision window is shown below :

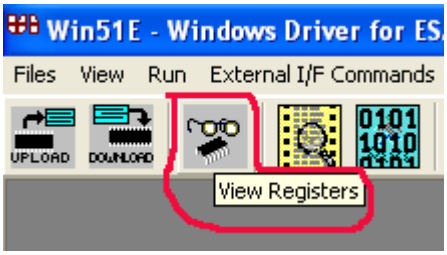


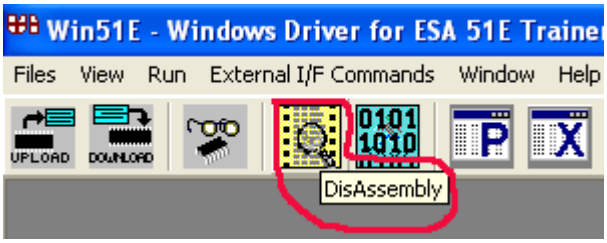
The compilation results will be shown in the **Output Window.** The errors like encircled by red line in the image below are to be taken care. See one hex file has been generated in the project directory. This hex file is to be downloaded to the ESA51E board using **Win51E** software. Generally the icon **Win51E** is in the desktop, otherwise it is in the **ESA Trainers** program in **start > Programs** menu.

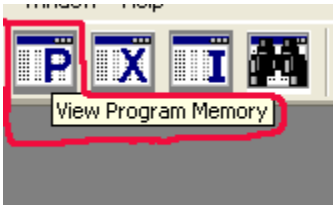


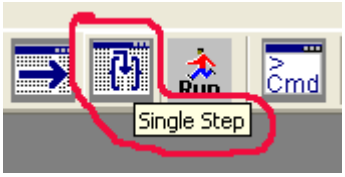
The **Win51E** software window is shown below. The functions of each icon can be known by placing the cursor on the icons. Some of which is shown below.



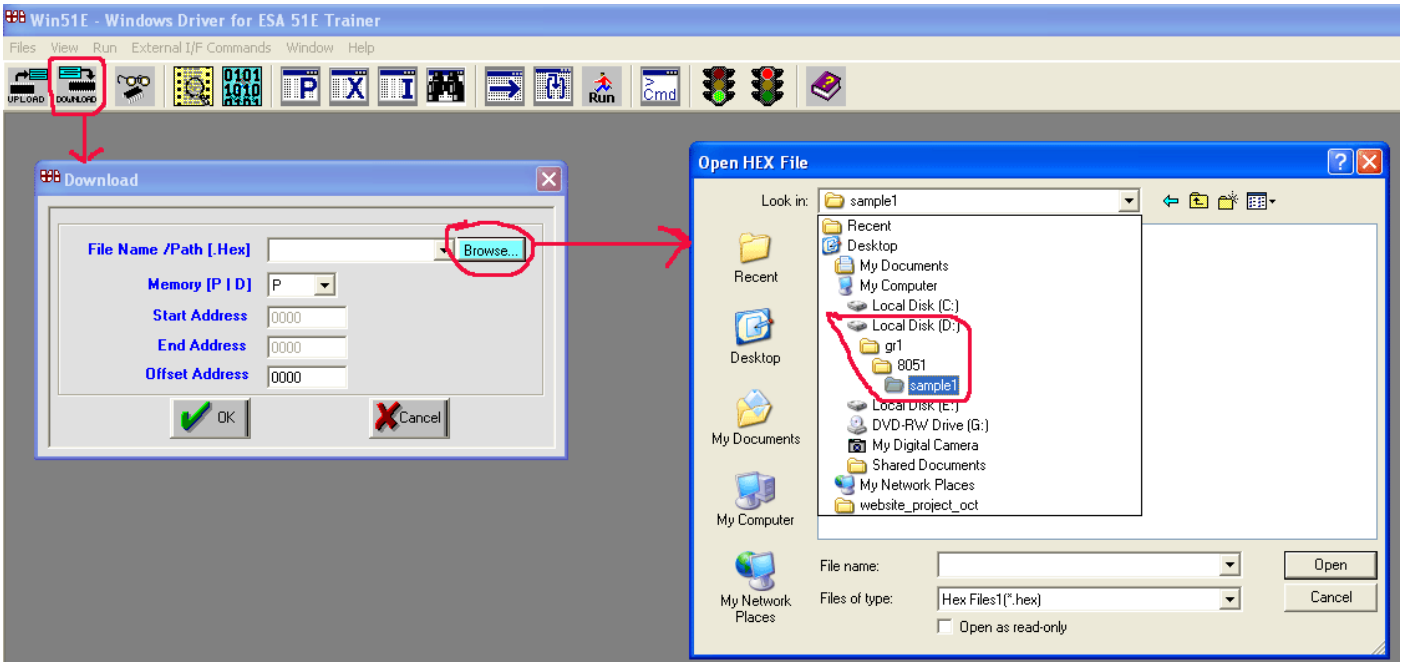




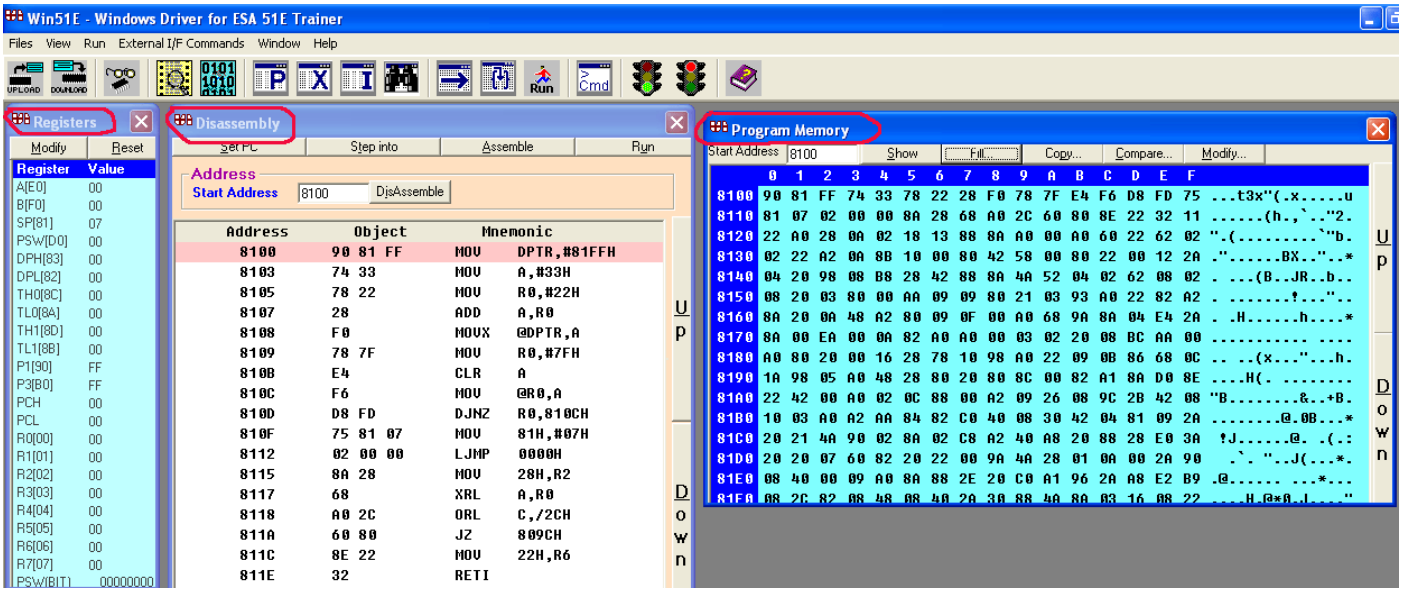




Now the **HEX** file generated by **µvison4** is to be downloaded to the **ESA51E** board by clicking the **DOWNLOAD** icon and selecting the path of the HEX file (in this case the path is **D:\gr1\8051\samplel**). Normally the other options of the **Download window** like **memory, offset** will remain unchanged. There is one file named **sample1.hex** in the abovementioned path. Select the file and click **OK**. The HEX file will be downloaded to the ESA51E board.



After downloading the HEX file in the ESA51E board, you will be able to run the code in the board both in **single step execution mode** or **normal execution mode**. Single step mode is preferable for the program debugging. In single **step mode execution** only one instruction will be executed at a time when you click **single step icon** once. While the program is executed in this mode the value of registers, memory areas, which line is being executed (disassembly window) is shown in different small windows in the WIN51E main window. These windows can be opened by clicking the different icons e.g. to see the value of registers click the **view registers** icon. The necessary windows which can be opened in single step execution is shown below.



Now set the **PC** to the starting point of the program (here it is 8100H) by **Set PC** icon and run the program in single step mode by **Single Step** icon One time clicking on the icon will proceed the

program execution one step. During execution the value of the registers and memory locations can be seen in the different windows shown above. Thus you see the sample program.

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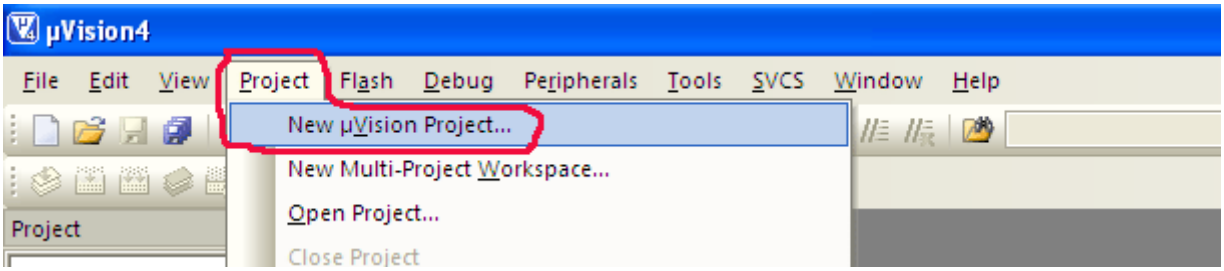
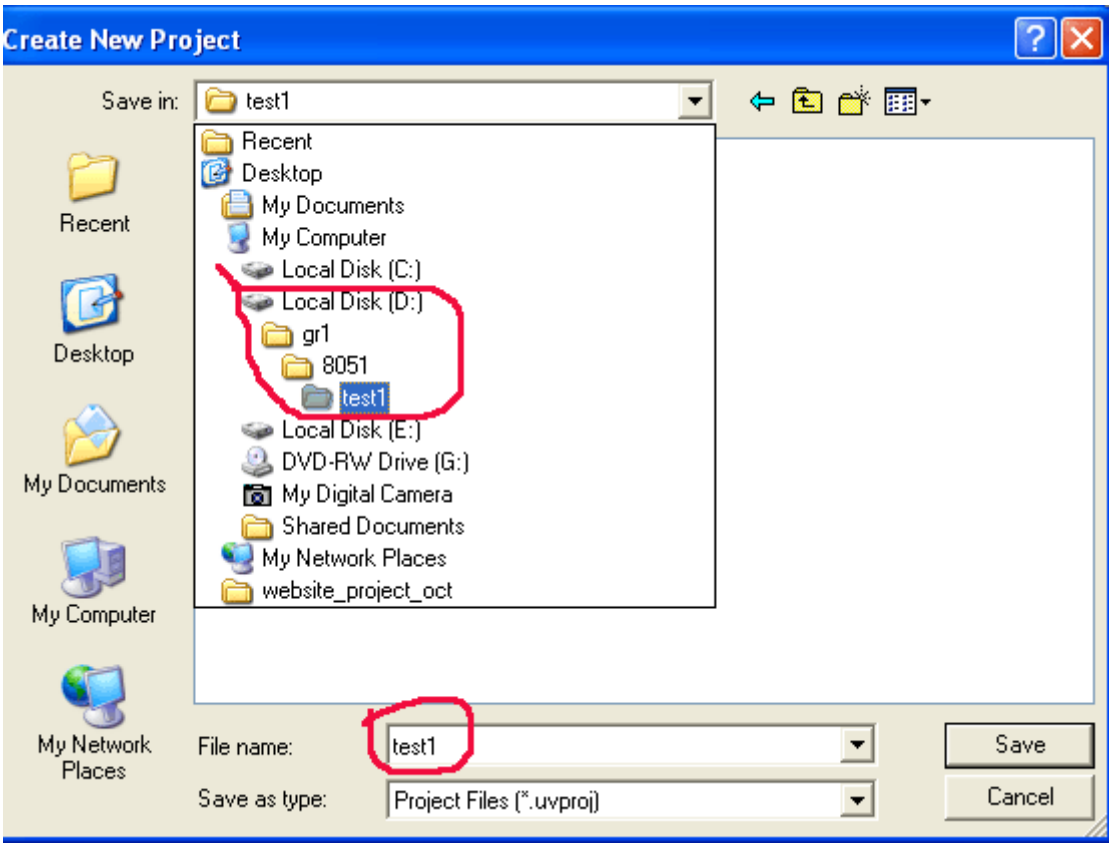
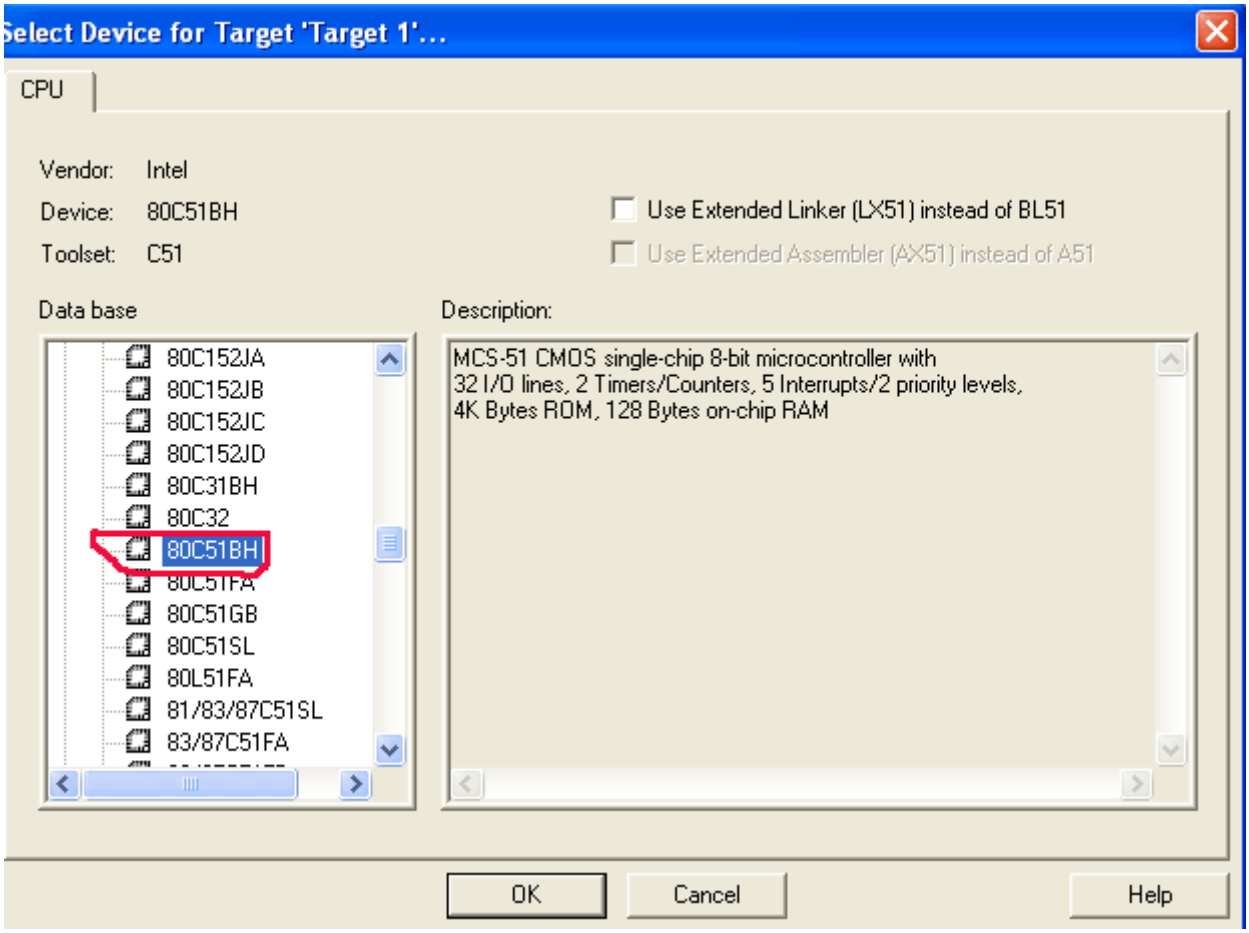
Now you can start a new project. Before starting a new project a folder is to be created under D:\<group name>8051 subdirectory. It is desirable to give the name of the folder similar to the project.

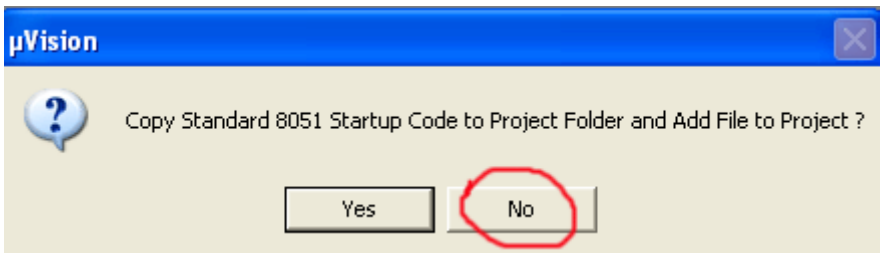
The **Keil µvision4** software is to be invoked by double clicking the icon. **Close** any opened project and from the **Project menu** select the **New µvision Project** submenu and the path of your new project as shown below (here the new project is **test1** and folder name is also **test1**).



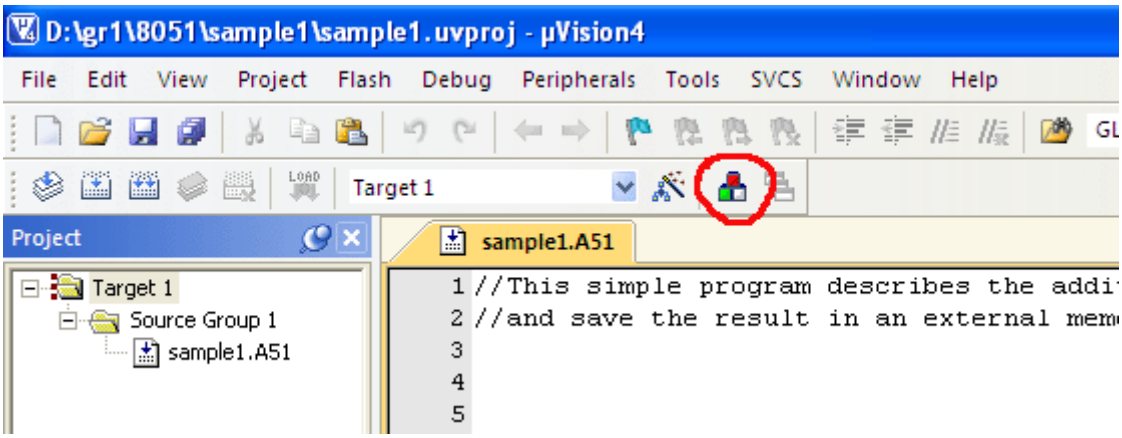


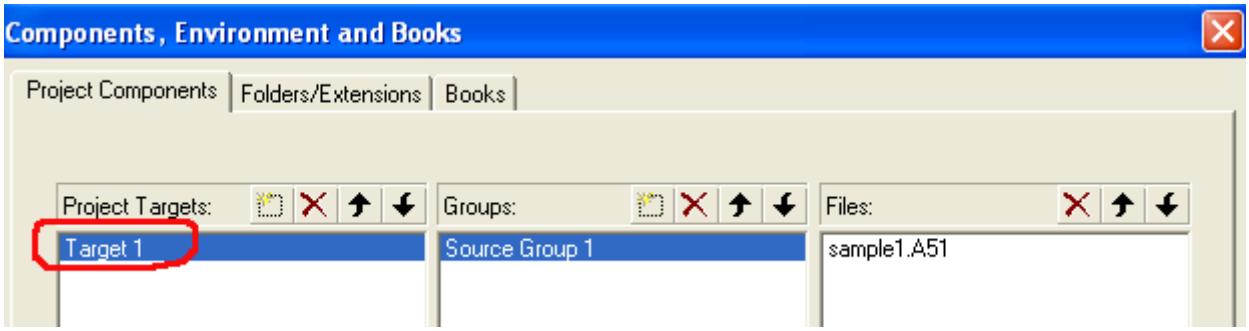
Select the device for the target. The device here is **80C51BH** from **Intel** and click OK. Select the option **No** for startup code addition to the project.

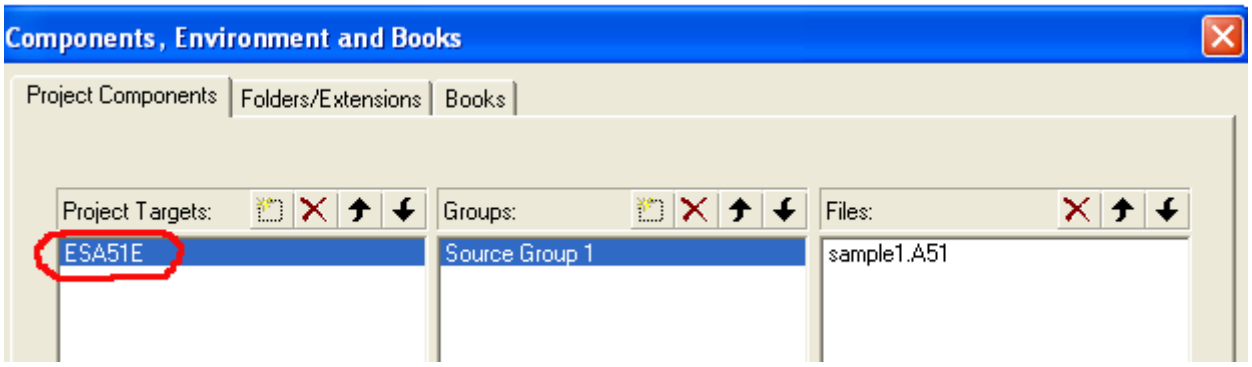




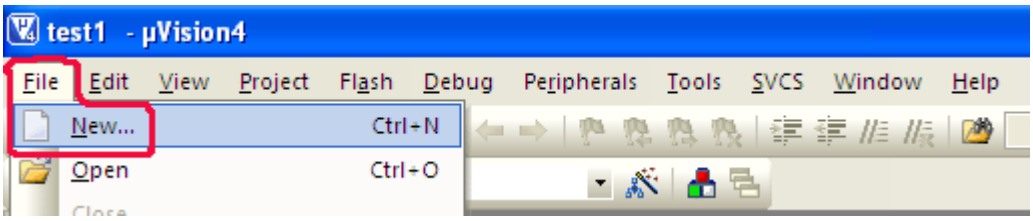
The µvision is now ready to accept your code. You can modify the target name i.e. target1 by clicking the **icon** . After clicking the icon another window will appear named **Conponents, environments and books**. Double click on **Target1** in this window and edit the name of the target and click **OK**. (Here the target name is given **ESA51E**).

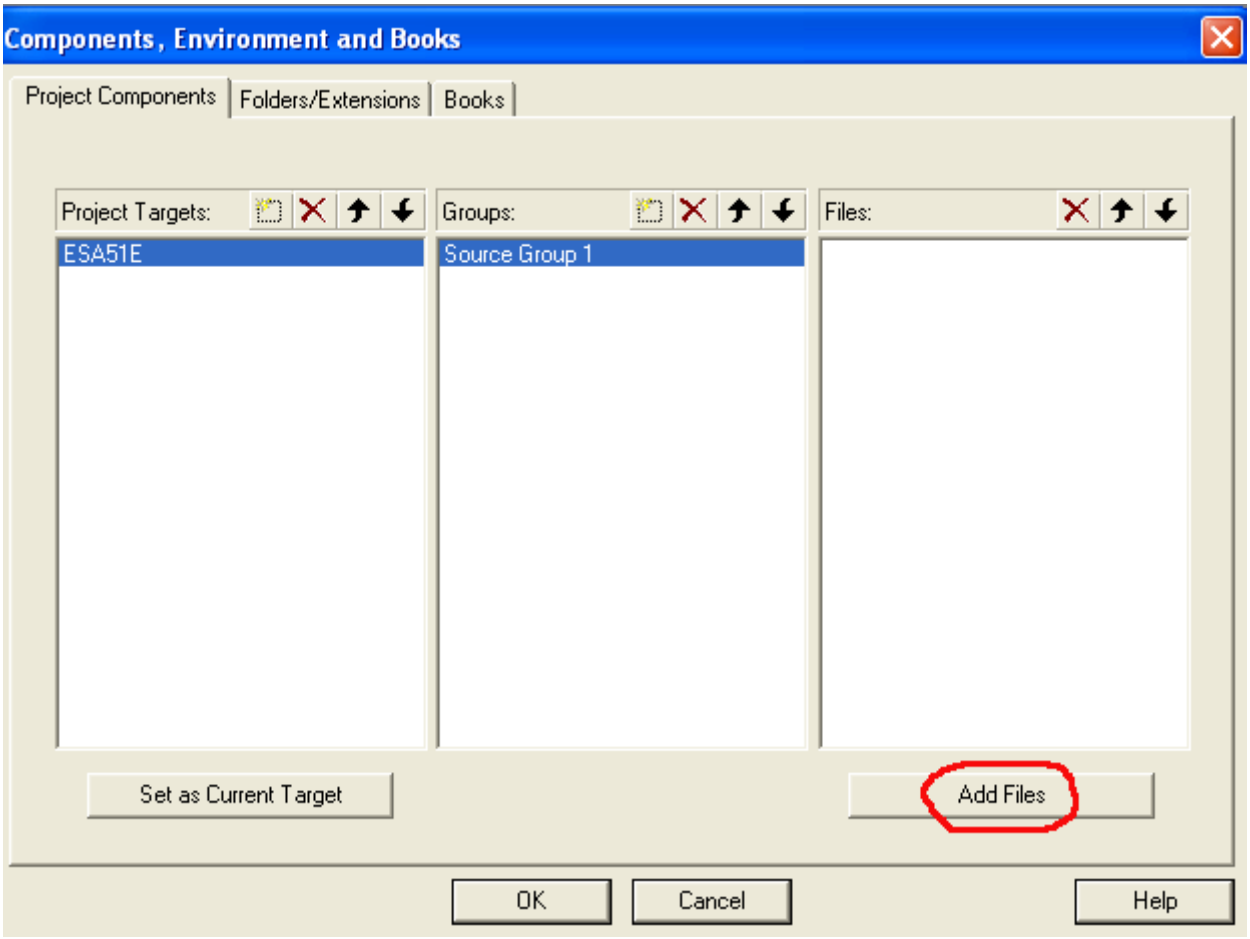




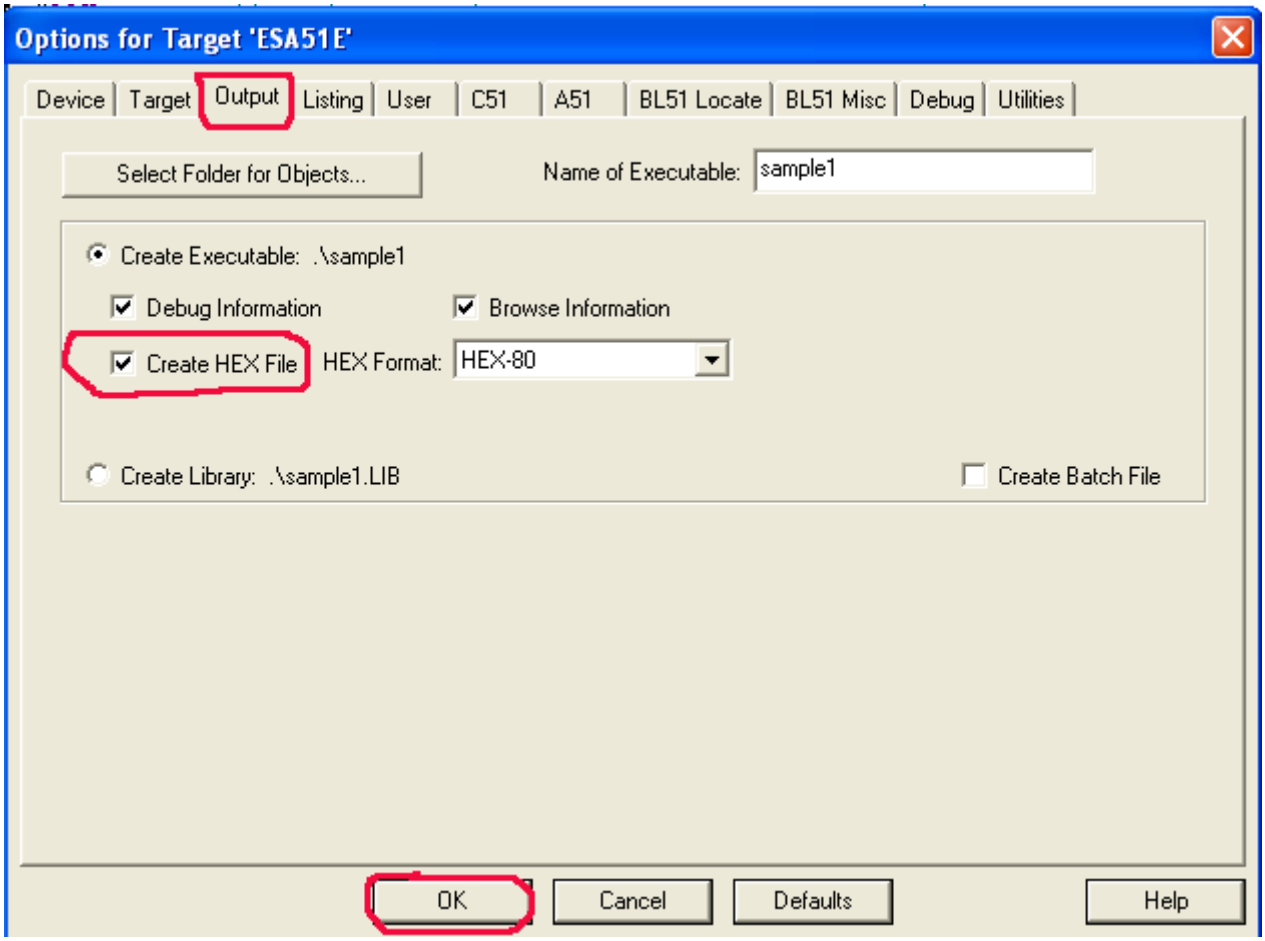


You have to create your own code file now. Click on the **File menu** of the µvision window and select **New**. This will open a **Text** window in µvision. Write your own assembly code and save it to a file in the project directory **(While writing your own code, provide one TAB from left. The first line i.e. ORG 8100H and the last line END must be incorporated in the program as in the sample1 project)**. Here the directory is **D:\gr1\8051\test1**. **The filename extension of the code file must be ".A51"**. **This file must be added to this project**. This can be done by clicking the **icon** . The **Conponents, environments and books** window will appear and click on the **Add Files** button and select the path of the file. Here the path is **D:\gr1\8051\test1.**





Before rebuilding the project the **Output file** format is to be set from the **Options for Target** window as shown below. The **Options for Target** window can be opened by clicking the **Options for target button** . Then **Rebuild** all the target files by clicking on **Rebuild** button and for rest of the things follow the instruction earlier mentioned in this document for the sample project.


Options for Target 'ESA51E'
Device
Target
Output
Listing
User
C51
A51
BL51 Locate
BL51 Misc
Debug
Utilities
Select Folder for Objects...
Name of Executable:
sample1
Create Executable: .\sample1
Debug Information
Browse Information
Create HEX File
HEX Format:
HEX-80
Create Library: .\sample1.LIB
Create Batch File
OK
Cancel
Defaults
Help