

USER'S MANUAL FOR

OPEN ARM LPC1768 BOARD

Manufactured By



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INTRODUCTION & OVERVIEW OF ARM LPC1768 BOARD

Logsun's ARM LPC1768 is 32-bit LPC1768 is an ARM Cortex-M3 based Microcontroller evaluation module. ARM LPC1768 OPEN BOARD is a general-purpose development board for ARM Controller. This board can be used extensively to test and validate programs. This provides advance features like ISP, I2C and IAP. The microcontroller has 512 kB on-chip flash programming memory and Up to 64 kB On-chip SRAM. The development board comes with RS-232 and USB interface to allow user to program microcontroller directly from PC. ARM LPC1768 board and related software routines help the system designers to rapidly design and prototype their designs based on ARM Core. It provides a complete development platform with different modules interface that accelerates the task of designers to run application software on target ARM Controller hardware, thus providing a platform to benchmark their system, save time & expense of building their own application test board and enabling them to get their designs to market quickly. ARM LPC1768 is a unique hardware and software combination, providing designers the tool to develop most advanced ARM series Microcontroller applications. The ARM LPC1768 hardware reference and software application programs also simplify ARM based hardware and software development.

SPECIFICATION:

1. LPC1768 ARM Cortex-M3 microcontroller
2. On board MICRO USB Connector for Programming
- All ports pins brought on 10 PIN FRC (User selection is possible)
3. ADC 8 CHANNEL INTERFACE
4. 16x2 LCD INTERFACE
5. I²C EEPROM INTERFACE
6. 7-segment display INTERFACE
7. DC Motor INTERFACE
8. SPI+SSP INTERFACE
9. ONE WIRE SENSOR INTERFACE
10. ISP+UART 0 INTERFACE
11. JTAG INTERFACE
12. 4x4 Matrix KEYPAD INTERFACE
13. ETH.P1 INTERFACE
14. GSM INTERFACE
15. LCD 3.2 CONNECTION
16. UART1 INTERFACE
17. CAN 1, CAN2 INTERFACE
18. RS485 INTERFACE
19. I2S INTERFACE
20. CT SENSOR INTERFACE
21. I2C0 INTERFACE
22. TOUCH/HALL SENSOR INTERFACE
23. MOISTURE SENSOR INTERFACE
24. IR/FLAME SENSOR INTERFACE
25. RAIN/LDR SENSOR INTERFACE
26. BODY TEMP SENSOR INTERFACE
27. MIC/SOUND SENSOR INTERFACE
28. DHT11/22 SENSOR INTERFACE

Getting Started:

LGS –ARM LPC1768 Board Includes:

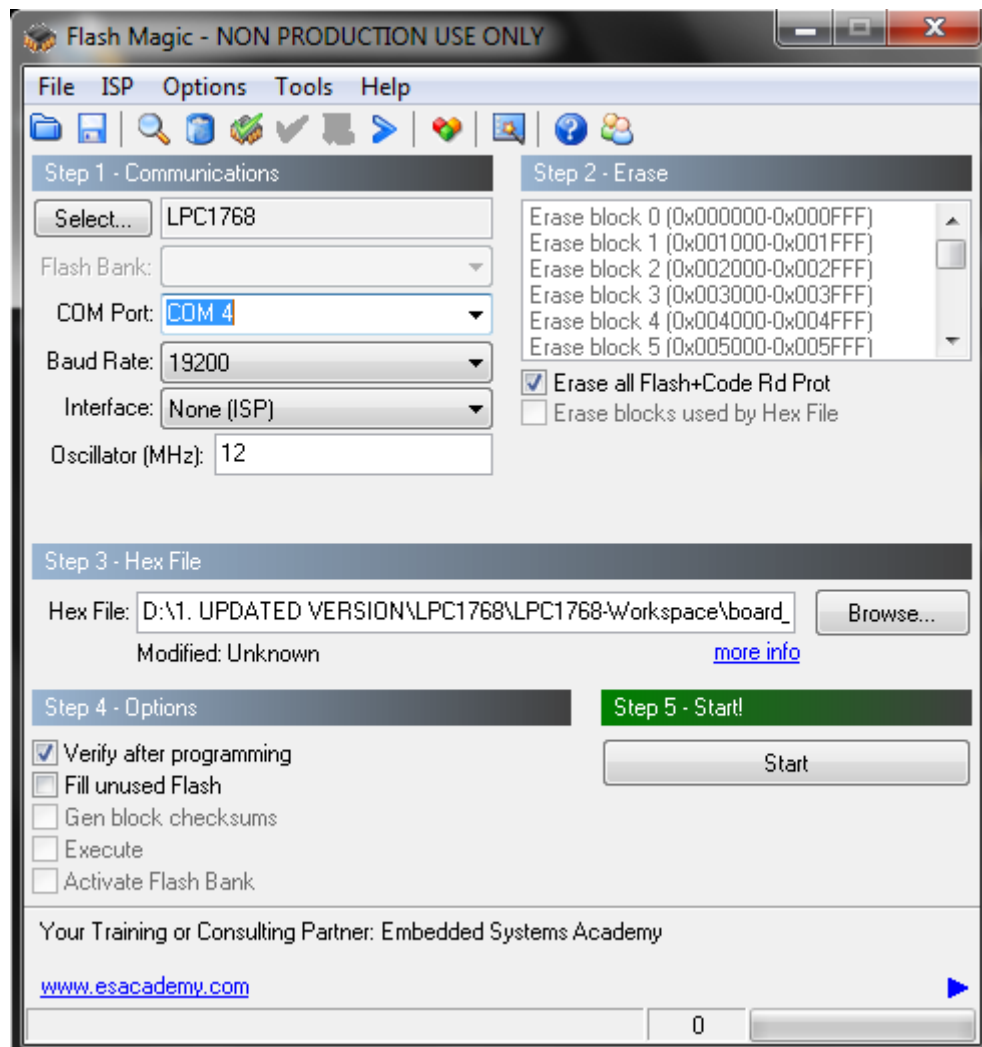
1. MICRO USB Cable.
2. 12V Power Adapter.
4. User's Manual
5. Compact Disc Containing:
 - a) Flash Utility for IC
 - b) Required Software (Keiluvision Evaluation Version) (16K Code Size)
 - c) Sample Codes for development
 - c) Circuit diagram and layout.
 - d) Data sheet

HOW TO USE FLASH MAGIC?

LPC1768 is used as Main Microcontroller in ARM BOARD. Flash magic software by NXP is used to upload the firmware to the target board. To install the Flash Magic software, run the setup provided.

Program Uploading Steps using flash Magic:

- Connect 12V Power adaptor to the board.
- Connect the supplied **MICRO USB** at X6 connector between the microcontroller board & computer.
- Open Flash Magic Software.



- In Step 1 – **Communications** select the following parameters:
 - **Select: LPC1768**
 - **COM Port:** COM1/COM2 (As per USB cable connected to PC)
 - **Baud Rate:** 19200
 - **Interface:** None (ISP)
 - **Oscillator (MHz):** 12
- In Step 2 – **Erase** select the following parameters:
 - Click on Erase all Flash+Code Rd Prot
- In Step 3 – **Hex File** select the following parameters:
 - Using the Browse button load the appropriate *.**HEX** file provided.
- In Step 5 – **Start!**

Press RESET switch then program switch (hold both) then click on START on flash magic. Now release RESET then release PROGRAM switch.
- At the right bottom of Flash Magic window, you can see the progress of program downloading in graphical format and at left bottom you can see the process. Wait until it shows “**Finished**” to finish downloading process.
- Now press the **RESET** Key on board & you can see / observe the corresponding output.

EXPERIMENT NO.1

AIM: - INTERFACING OF TFT LCD DISPLAY WITH ARM LPC 1768.

REQUIREMENT: - ARM LPC 1768 board, 12V power adaptor, micro USB cable, TFT interfacing adaptor module, 3.2 inch TFT LCD display.

PROCEDURE:-

- 1) Connect 12V power adaptor to LPC 1768 board.
- 2) Connect the micro USB cable to open LPC 1768 board at X6 USB connector.
- 3) Open the Flash Magic software and make setting as per given.
- 4) **Press RESET switch then program switch (hold both) then click on START on flash magic. Now release RESET then release PROGRAM switch.**
- 5) Download the Hex file of TFT LCD display to LPC 1768 Board.
- 6) Connect LCD adaptor module to J11 of TFT interfacing connector.
- 7) Connect TFT LCD display to LCD adaptor module. Press Reset Switch.
- 8) Message "Open 1768 Development Board" displays on LCD.

PIN DESCRIPTION: - J11

LCD 3.2 CONNECTOR

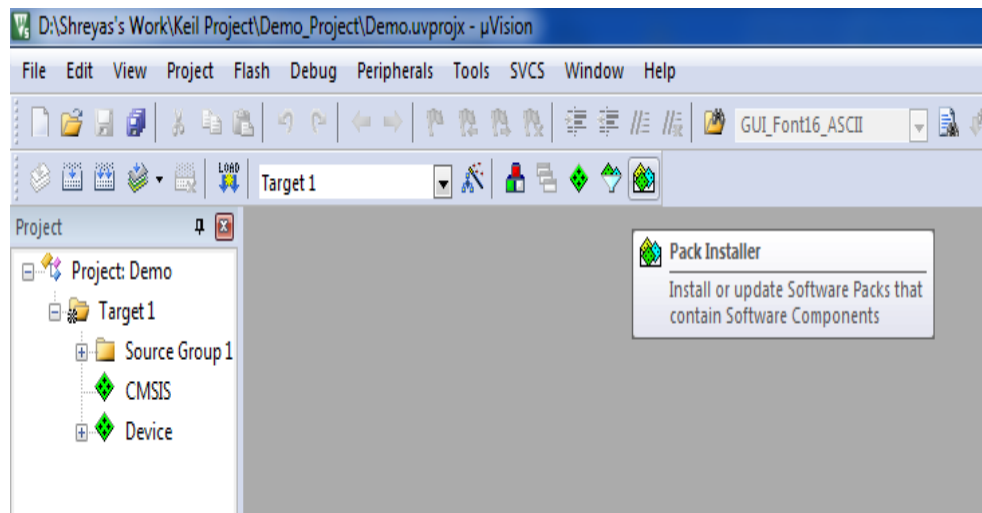
TSW-LCD_3.2-CONN

RD	P0.21	—	LCD_3.2_CONN-1	P2.0	—	LCD_3.2_CONN-2	D0
RS	P0.20	—	LCD_3.2_CONN-3	P2.1	—	LCD_3.2_CONN-4	D1
RST	RESET	—	LCD_3.2_CONN-5	P2.2	—	LCD_3.2_CONN-6	D2
WR	P0.23	—	LCD_3.2_CONN-7	P2.3	—	LCD_3.2_CONN-8	D3
CS	P0.22	—	LCD_3.2_CONN-9	P2.4	—	LCD_3.2_CONN-10	D4
T_CS	P0.6	—	LCD_3.2_CONN-11	P2.5	—	LCD_3.2_CONN-12	D5
T_DI	P0.9	—	LCD_3.2_CONN-13	P2.6	—	LCD_3.2_CONN-14	D6
T_DO	P0.8	—	LCD_3.2_CONN-15	P2.7	—	LCD_3.2_CONN-16	D7
T_SCK	P0.7	—	LCD_3.2_CONN-17	P1.25	—	LCD_3.2_CONN-18	EN
T_IRQ	P0.19	—	LCD_3.2_CONN-19	P1.24	—	LCD_3.2_CONN-20	DIR
BL		—	LCD_3.2_CONN-21	P1.23	—	LCD_3.2_CONN-22	LE
GND	GND	—	LCD_3.2_CONN-23	3.3V	—	LCD_3.2_CONN-24	VCC

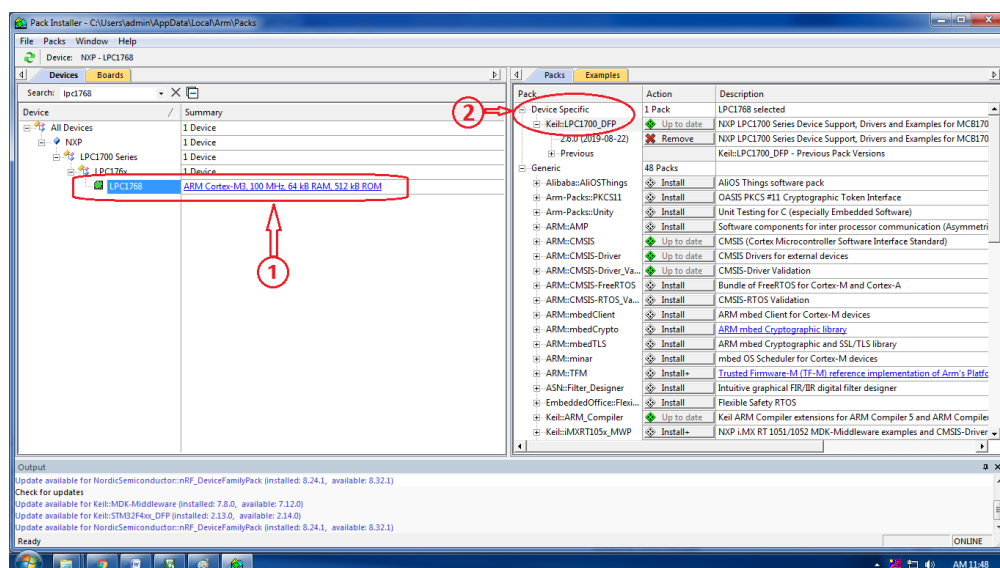
Programming and Generating Hex file steps:

Requirement: u-Vision Keil version 5 or higher.

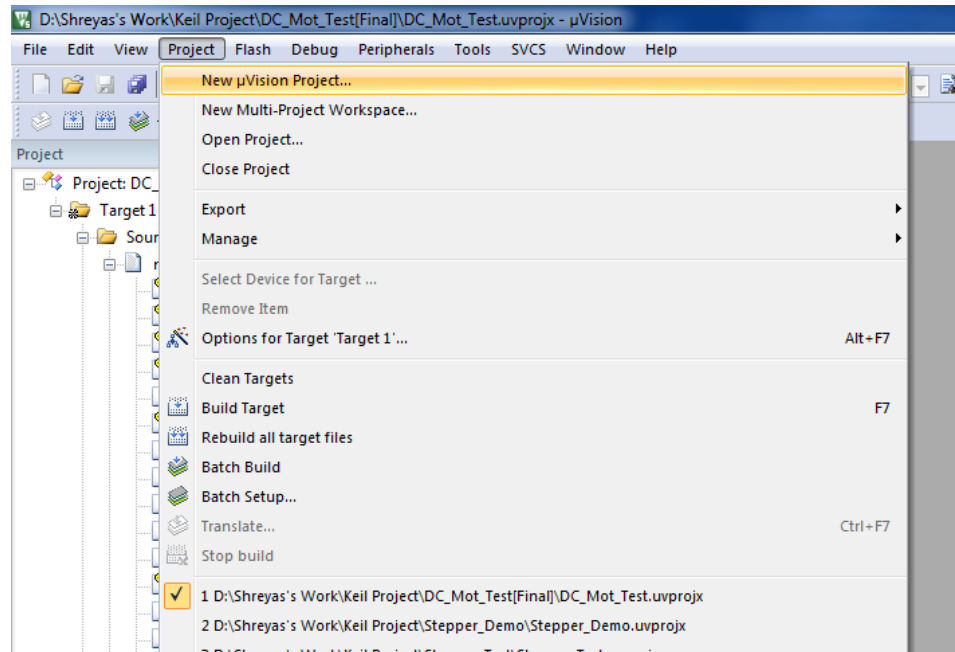
1. Create a Folder where you want to store your project.
2. Open the **u-vision Keil** software.
3. Click on Pack Installer Icon as shown bellow.



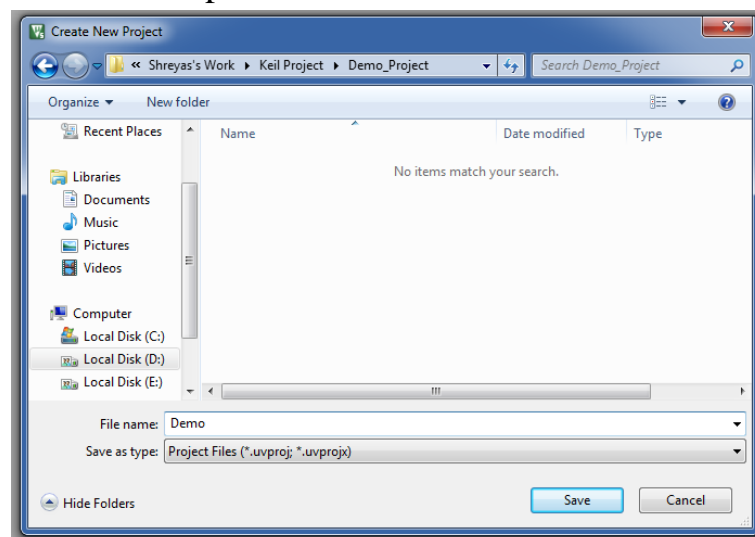
4. Search for “**LPC1768**” and Select the Microcontroller first and then Install the packages related to microcontroller, as shown in image bellow.



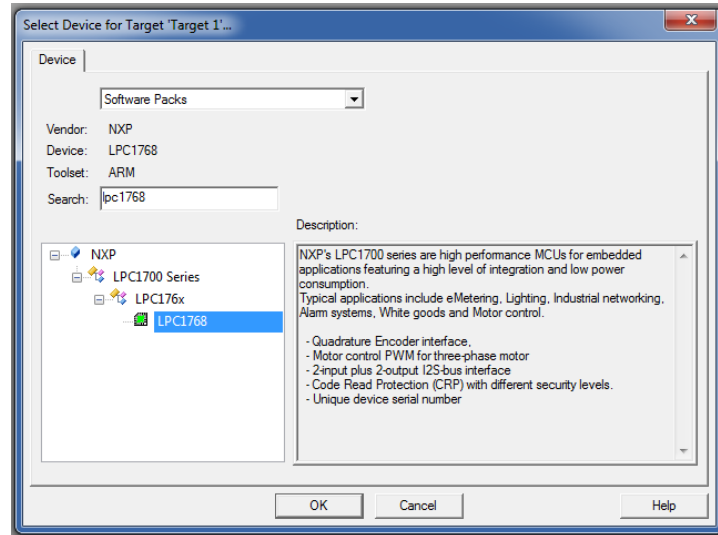
5. After installing the packages close the window. Step-3 and Step-4 are only required once. Once you complete these steps for one computer then no need to do these steps. You can directly jump to Step-6.
6. From Menu-bar go to 'Project' menu and select 'New uVision Project'.



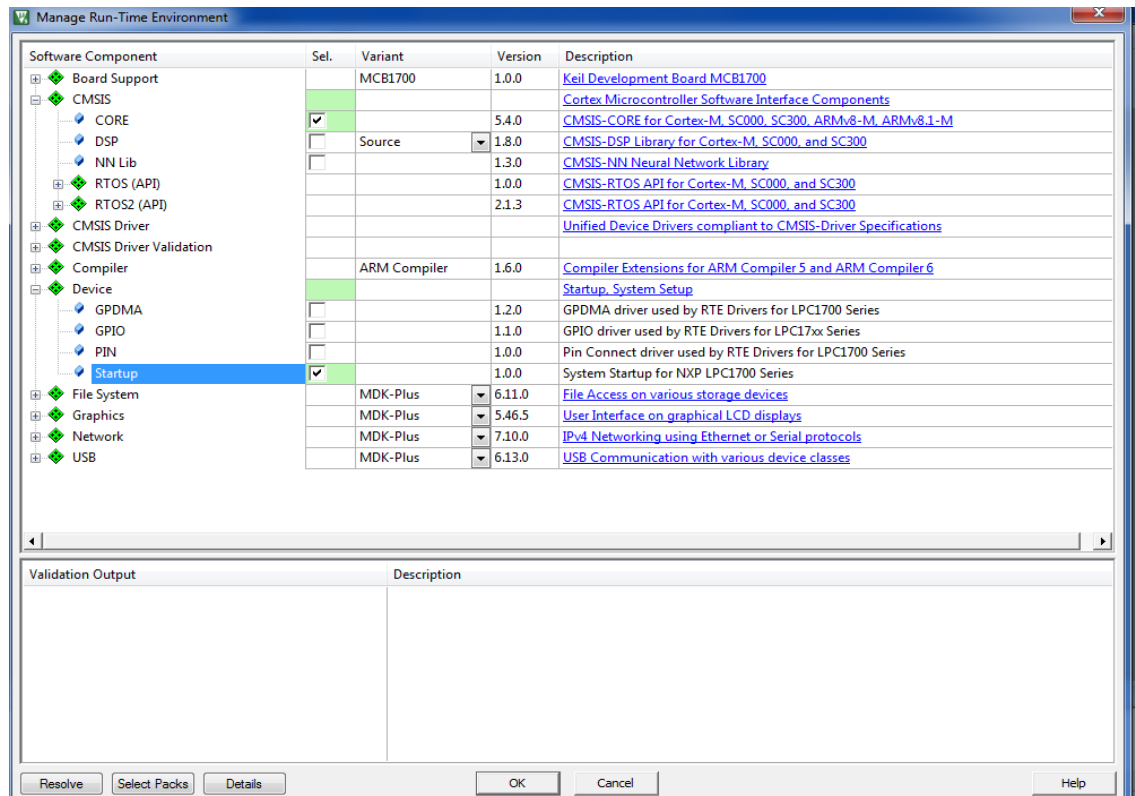
7. Give a name to your project and save it in the folder we have created in Step-1.



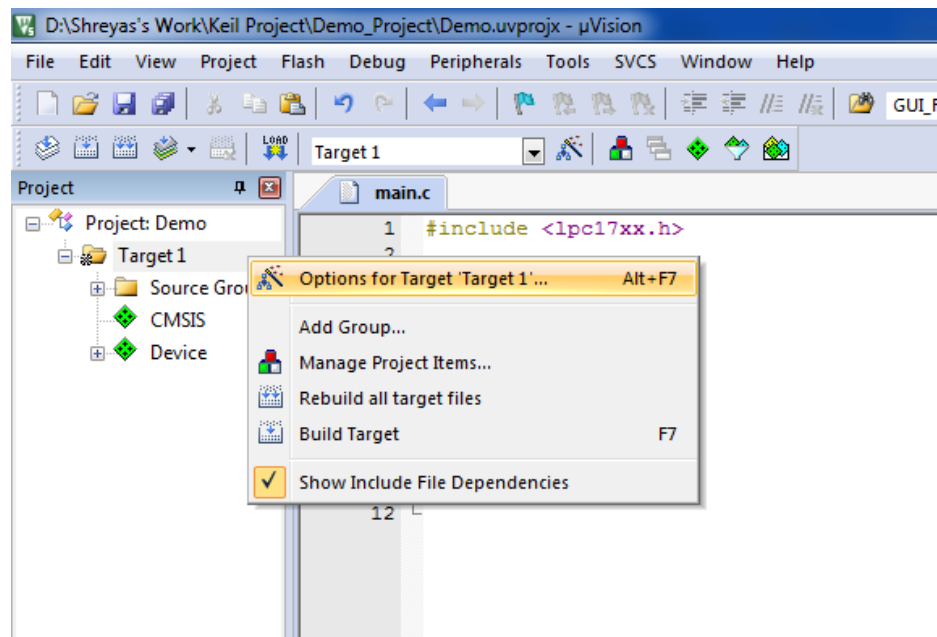
8. In Search bar, type 'LPC 1768' and select the micro-controller as shown bellow.



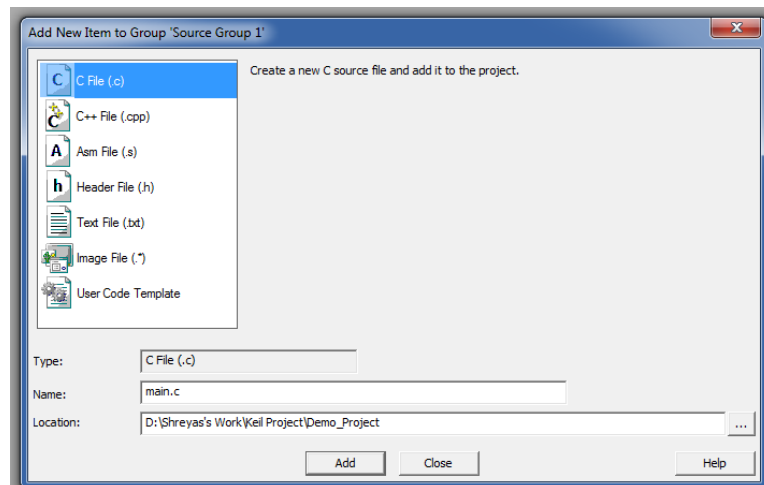
9. Select the Options as shown in following image and click on OK.



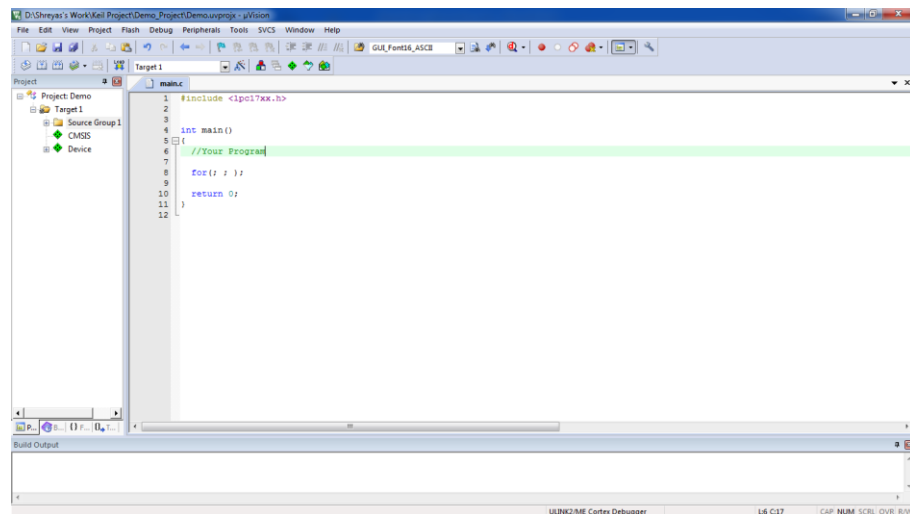
10. Now our project is created. Now into project explorer in left side of window, right click on 'Source Group 1' and select 'Add new Item to group source group 1'.



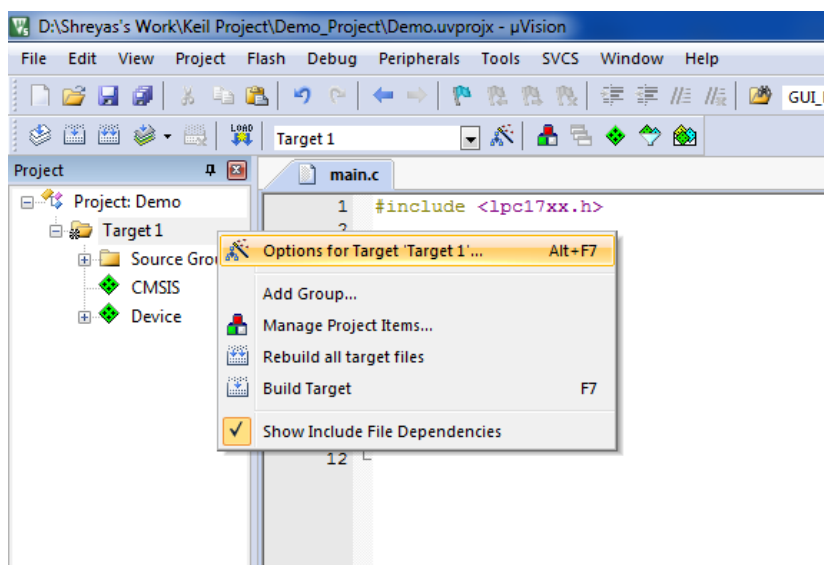
11. Select 'C File', name it as "main.c" and click on 'Add' button.



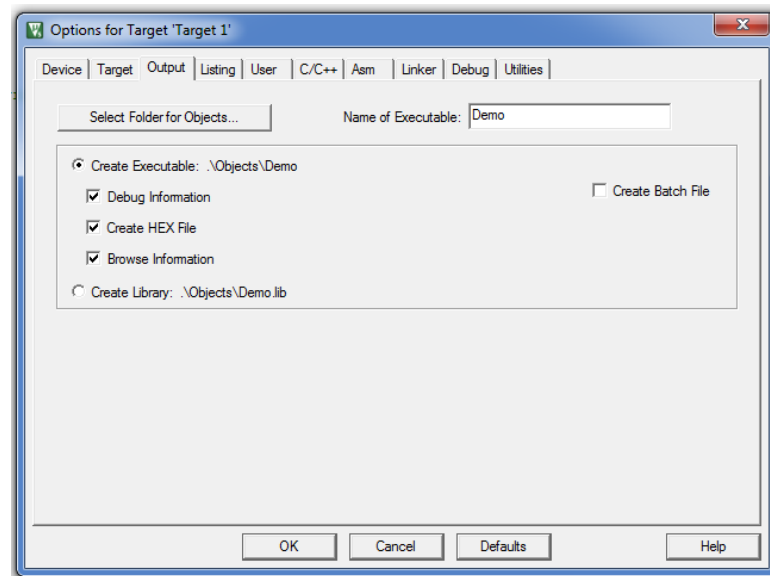
12. Type the code for your project and save it.



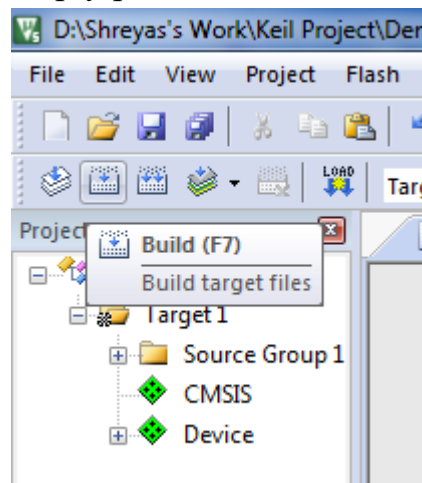
13. Now, again in Project explorer right click on 'Target 1' and select 'Options for target Target1'.



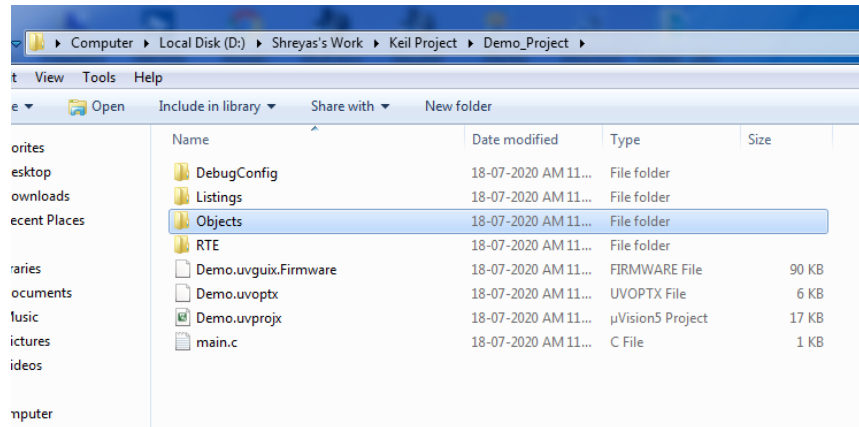
14.Go to output tab and select ‘Create HEX file’ and click on ‘OK’



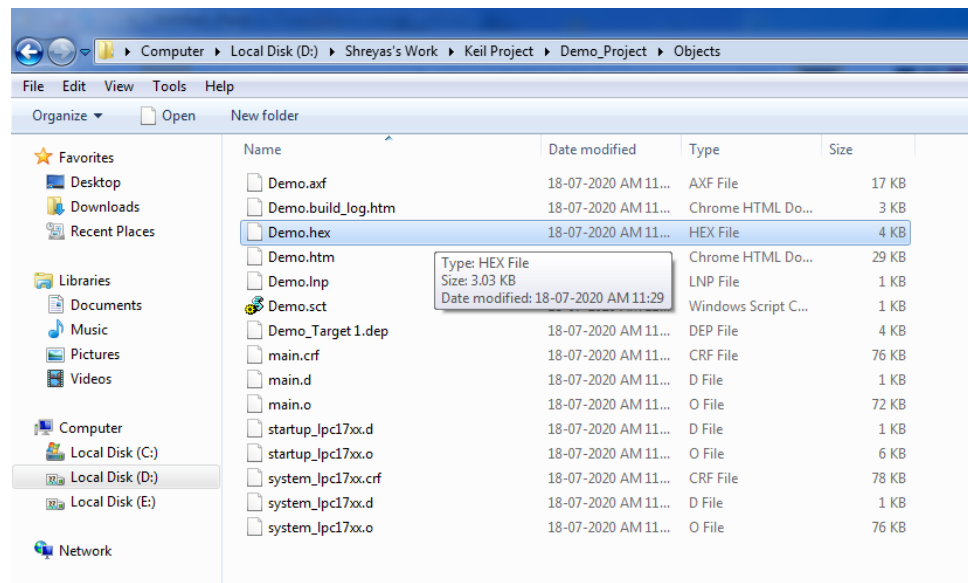
15.Now above the project explorer, click on the ‘Build’ icon or simply press ‘F7’ function key on the keyboard.



16. In your project folder, you will find a folder gets created called as 'Objects' . Open that folder.



17. In that folder you can see the HEX file generated at the time of build process.



Uploading Hex file to micro-controller using flash magic software as mentioned on page no 5.