Lab3: Hardware Interface - Real Board

OBJECTIVES

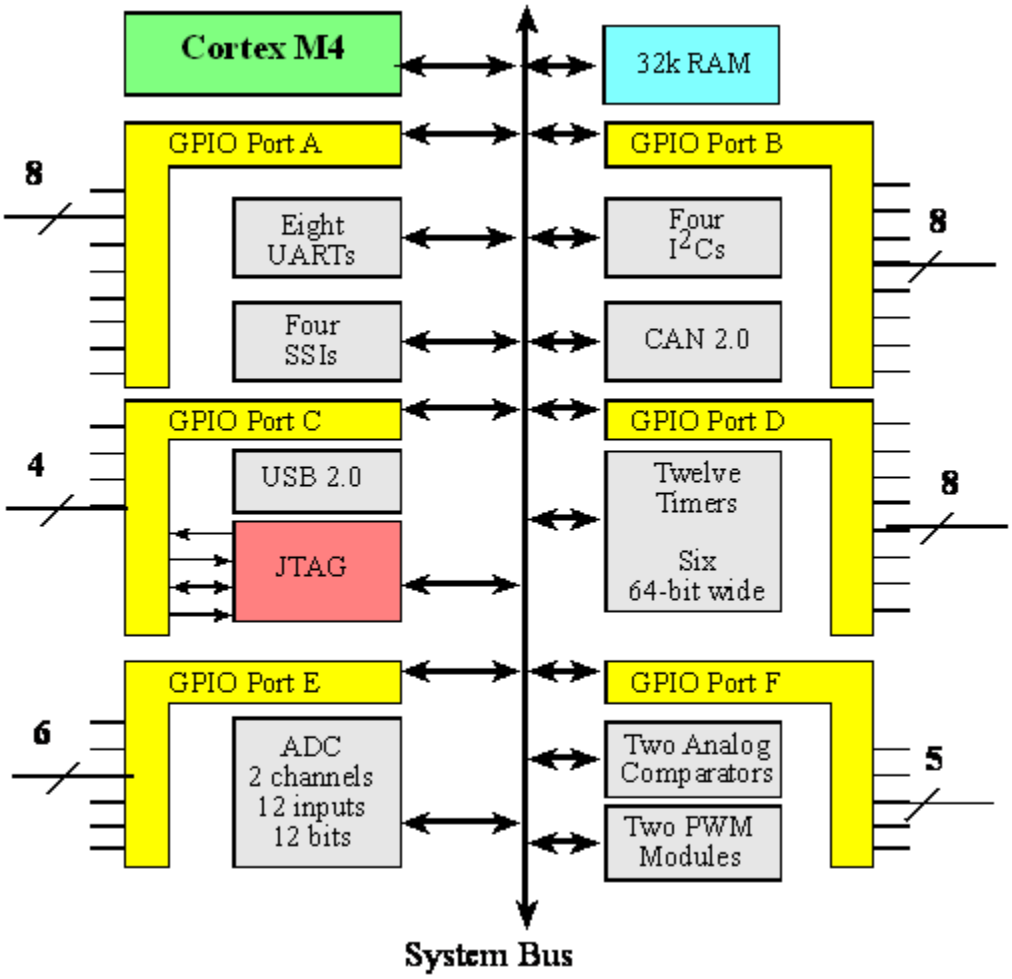
This is your first program to run on the LaunchPad
You will run this program without modification as your Lab 2 If the left switch SW1 is
not pressed the LED toggles blue-red
pressed the LED toggles blue-Green

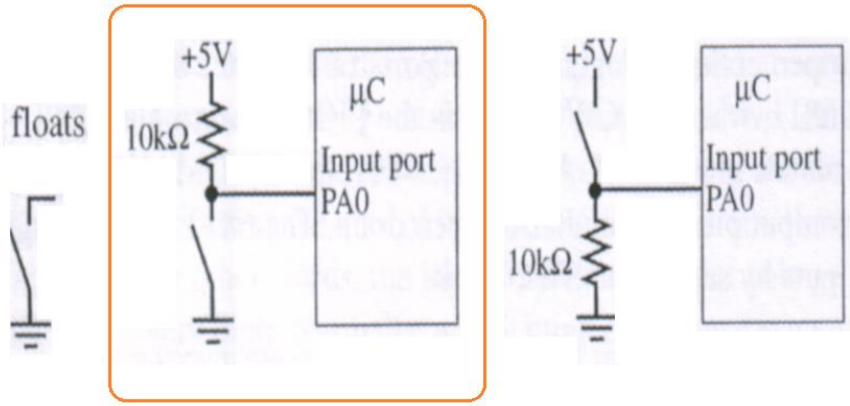
MATERIALS/EQUIPMENT NEEDED

- Keil µVision Integrated Development Environment (IDE) for the ARM.

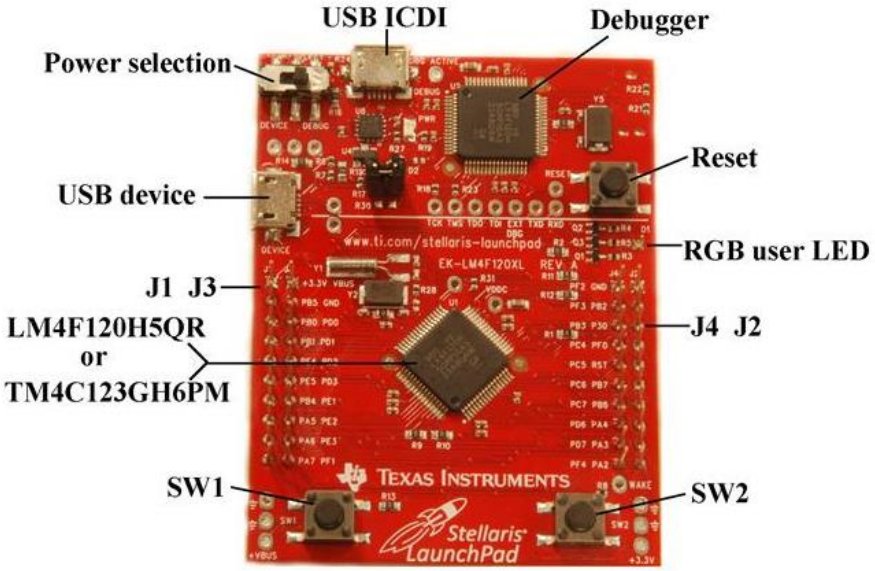
INTRODUCTION

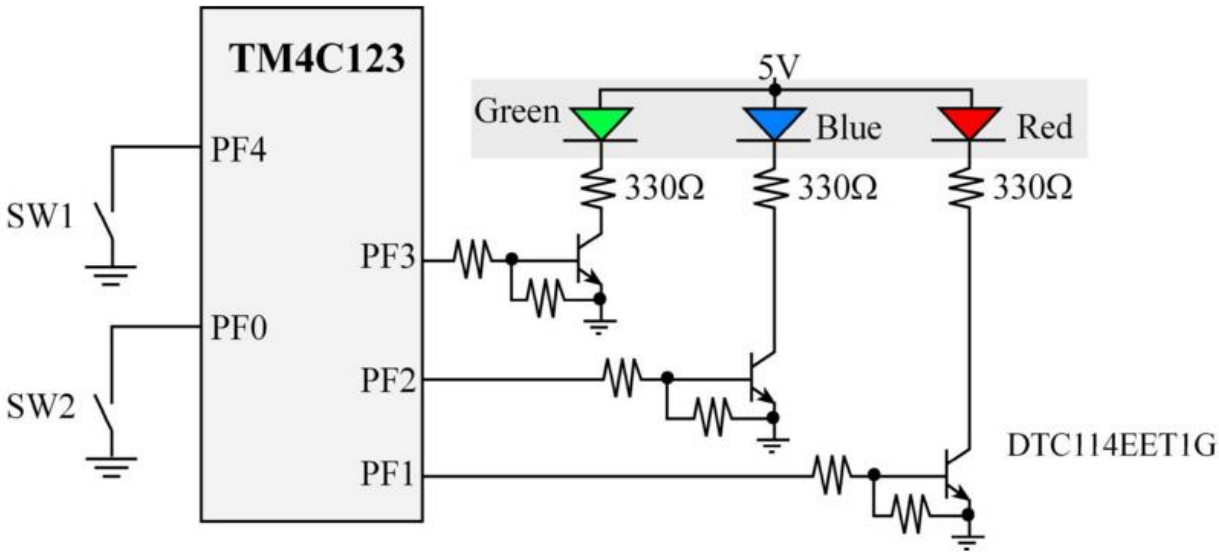
- Compile (build) your project in Keil, and start the debugger in simulation mode.
- Execute **Peripherals->TExaS PortF** to open the **Lab 2** window.





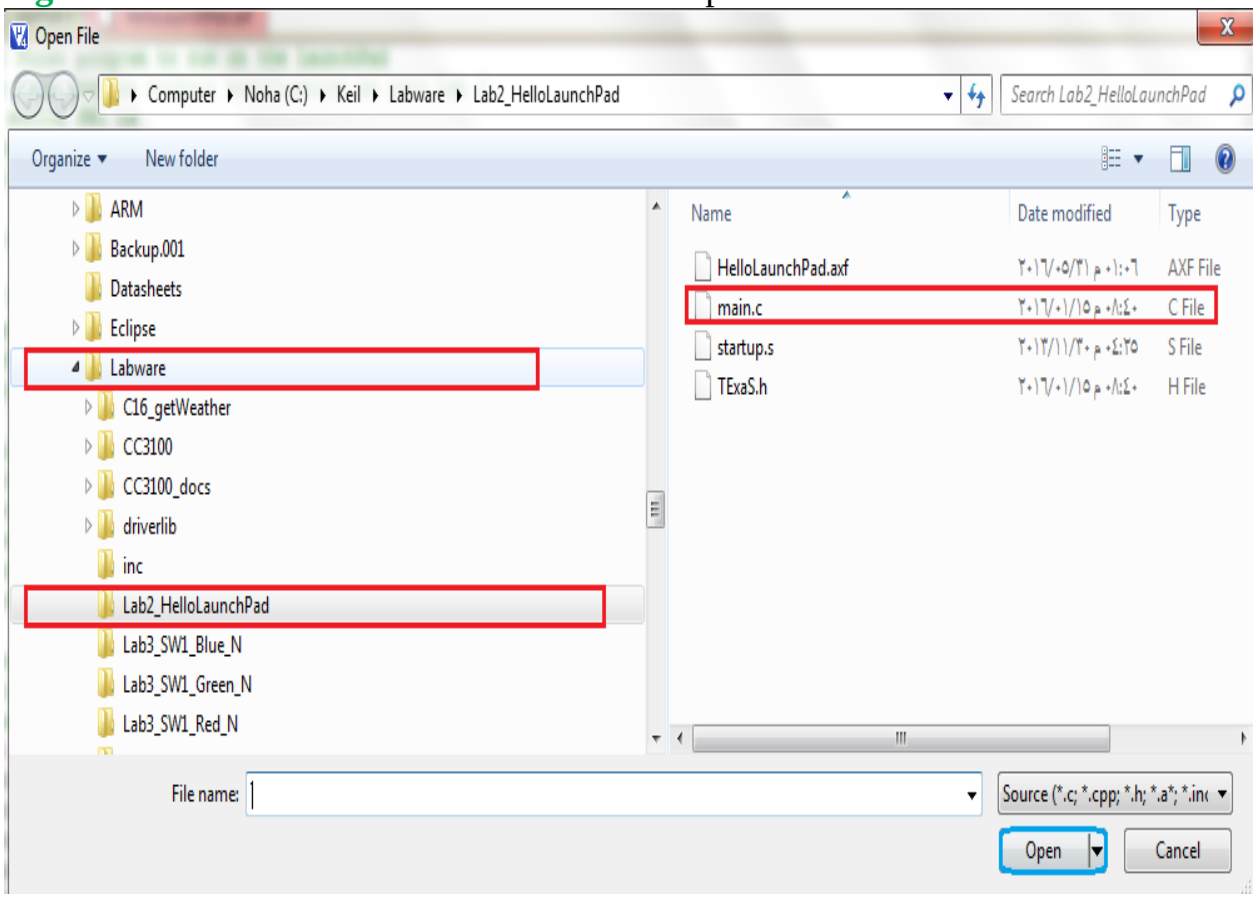
PROCEDURE





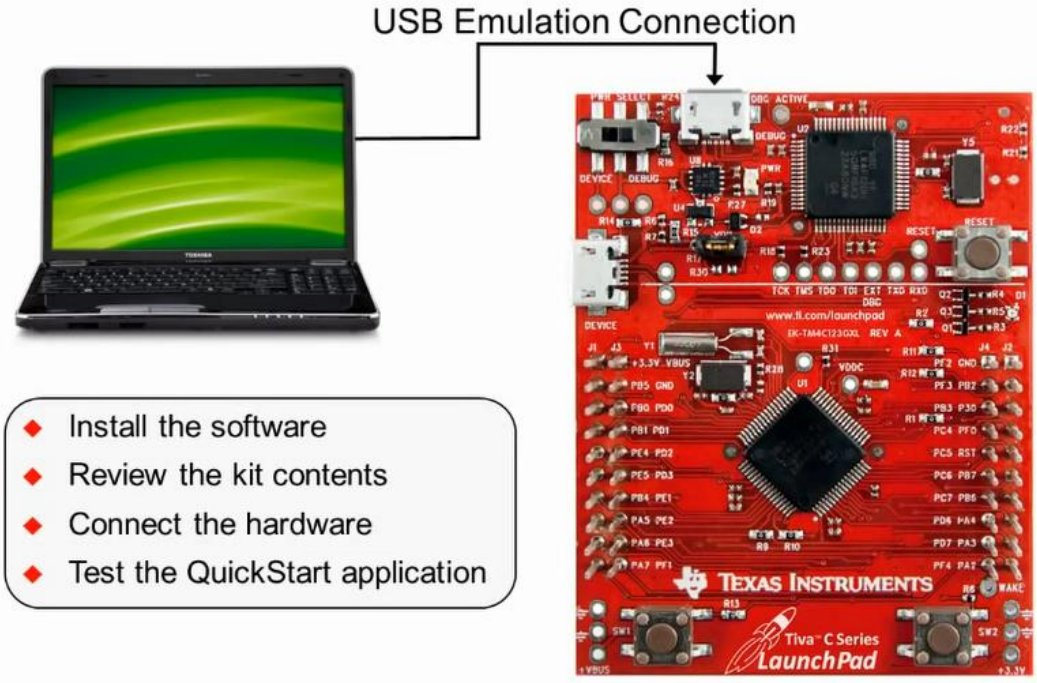
// **SW1** left switch is negative logic **PF4** on the Launchpad
// **SW2** right switch is negative logic **PF0** on the Launchpad
// **red LED** connected to **PF1** on the Launchpad
// **blue LED** connected to **PF2** on the Launchpad

// **green LED** connected to **PF3** on the Launchpad



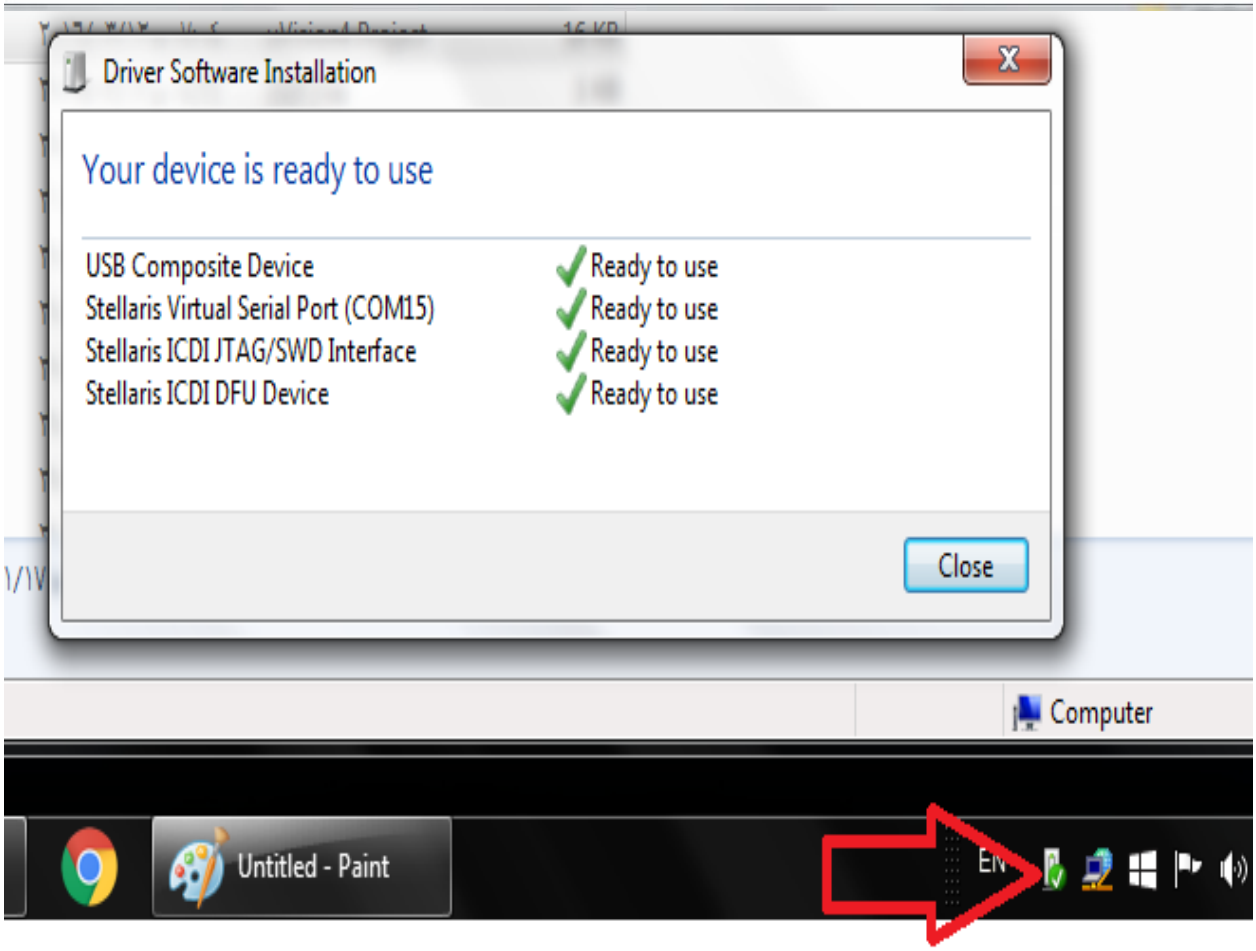
			PF7	PF6	PF5	PF4	PF3	PF2	PF1	PF0
// red	R	0x02	0	0	0	0	0	0	1	0
// blue	B	0x04	0	0	0	0	0	1	0	0
// green	G	0x08	0	0	0	0	1	0	0	0

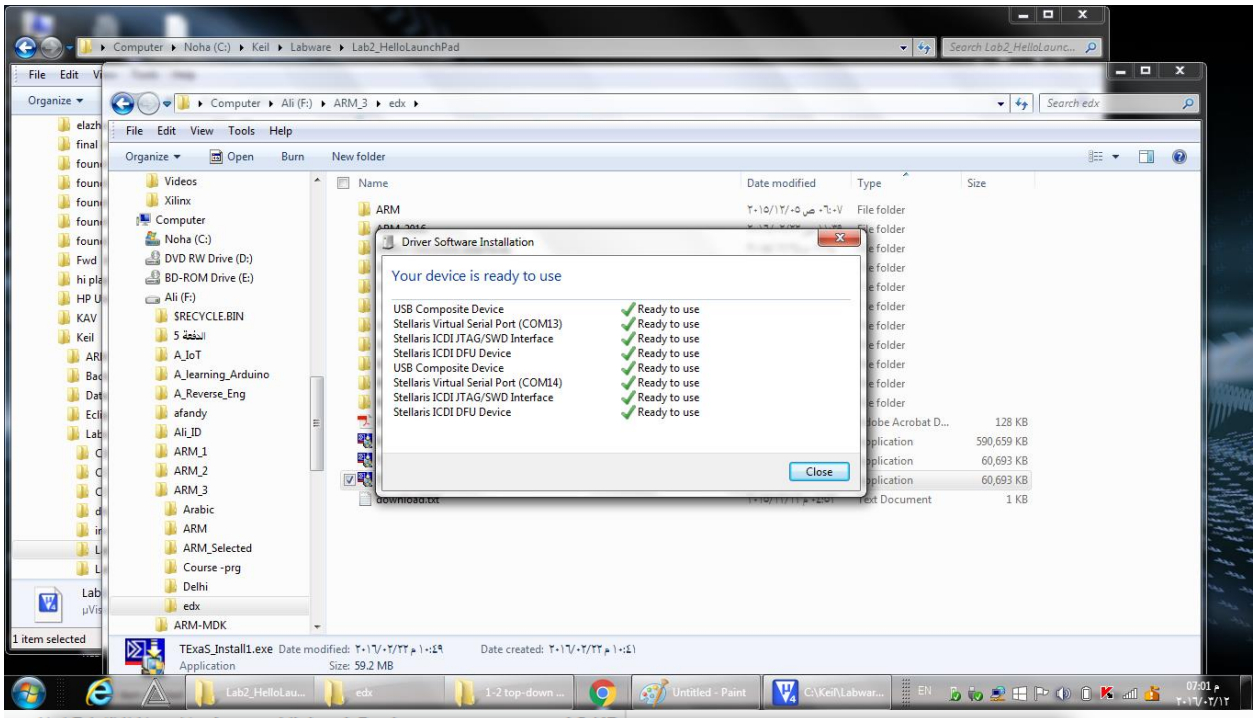
Lab 1: Hardware and Software Setup

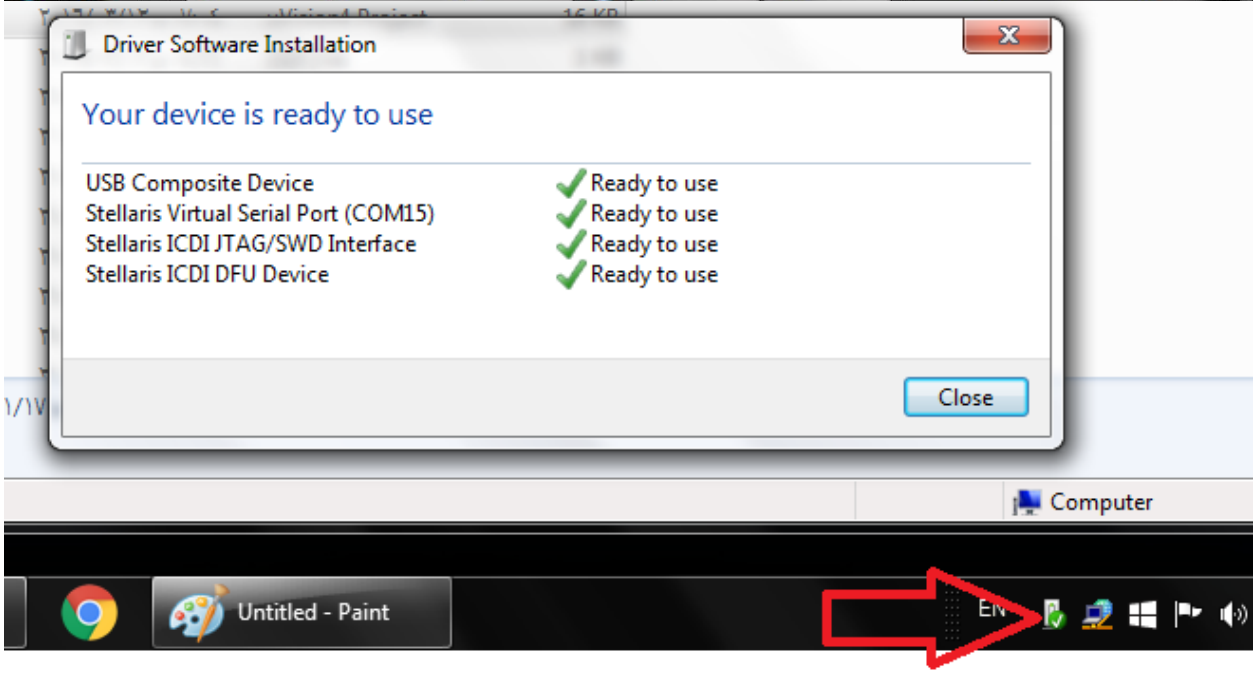


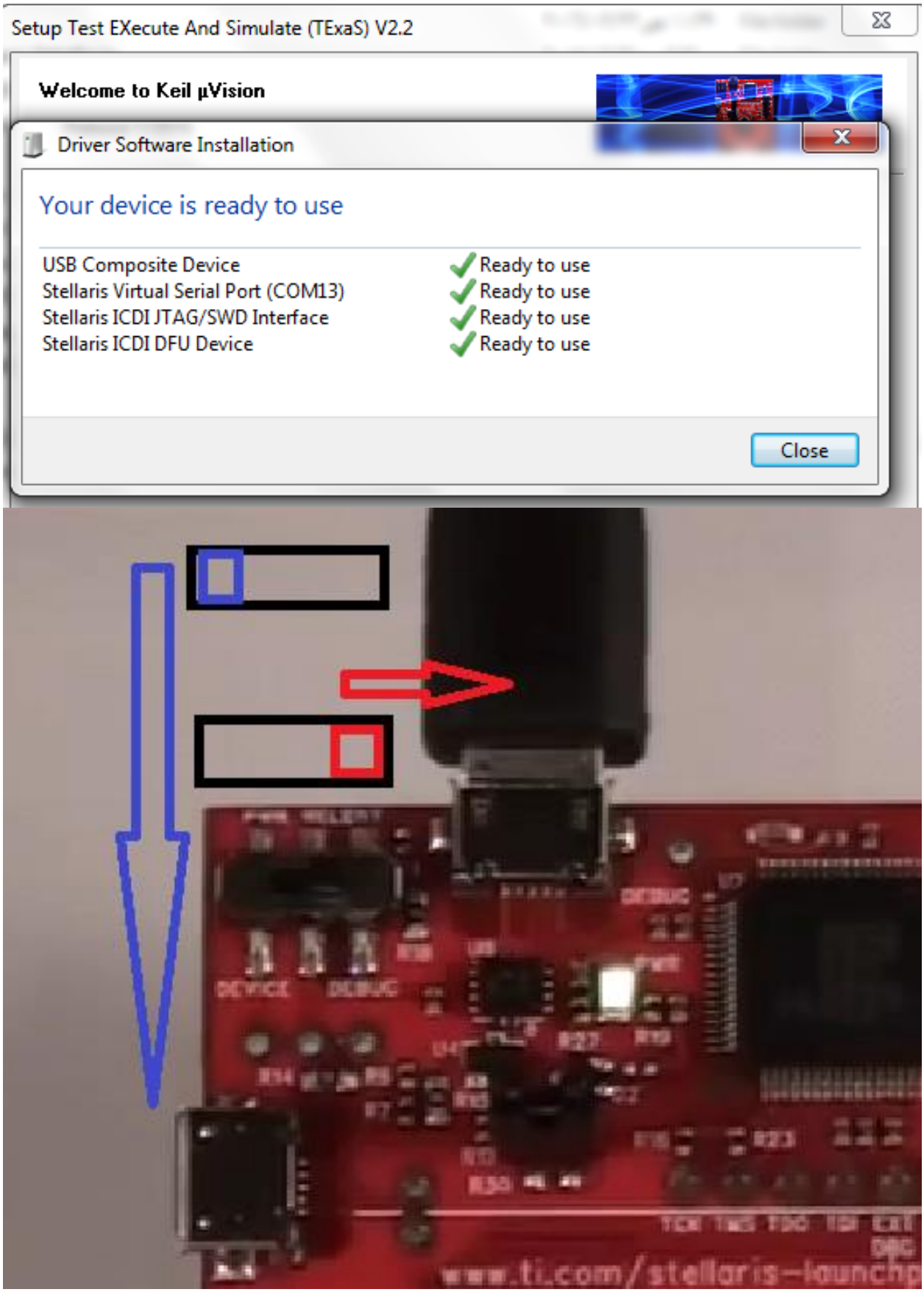
- Install the software
- Review the kit contents
- Connect the hardware
- Test the QuickStart application

Agenda ...

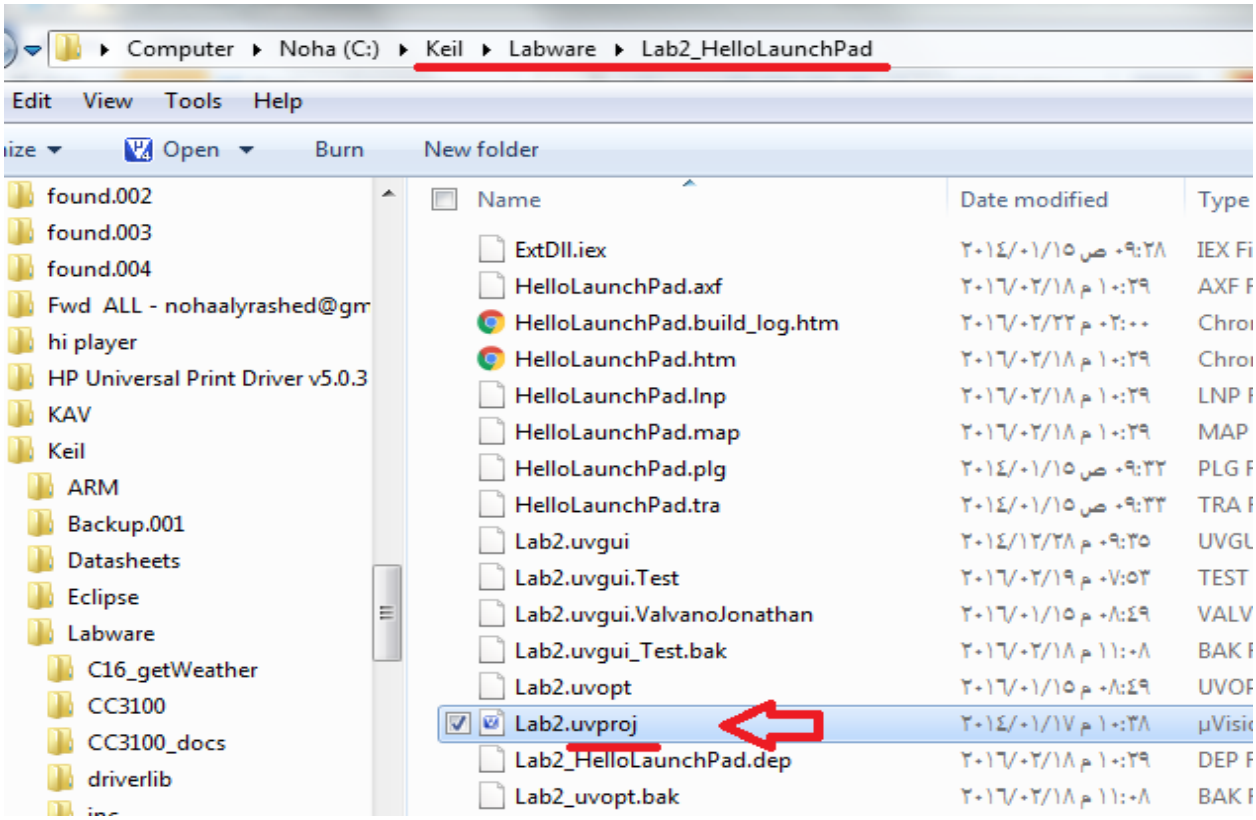


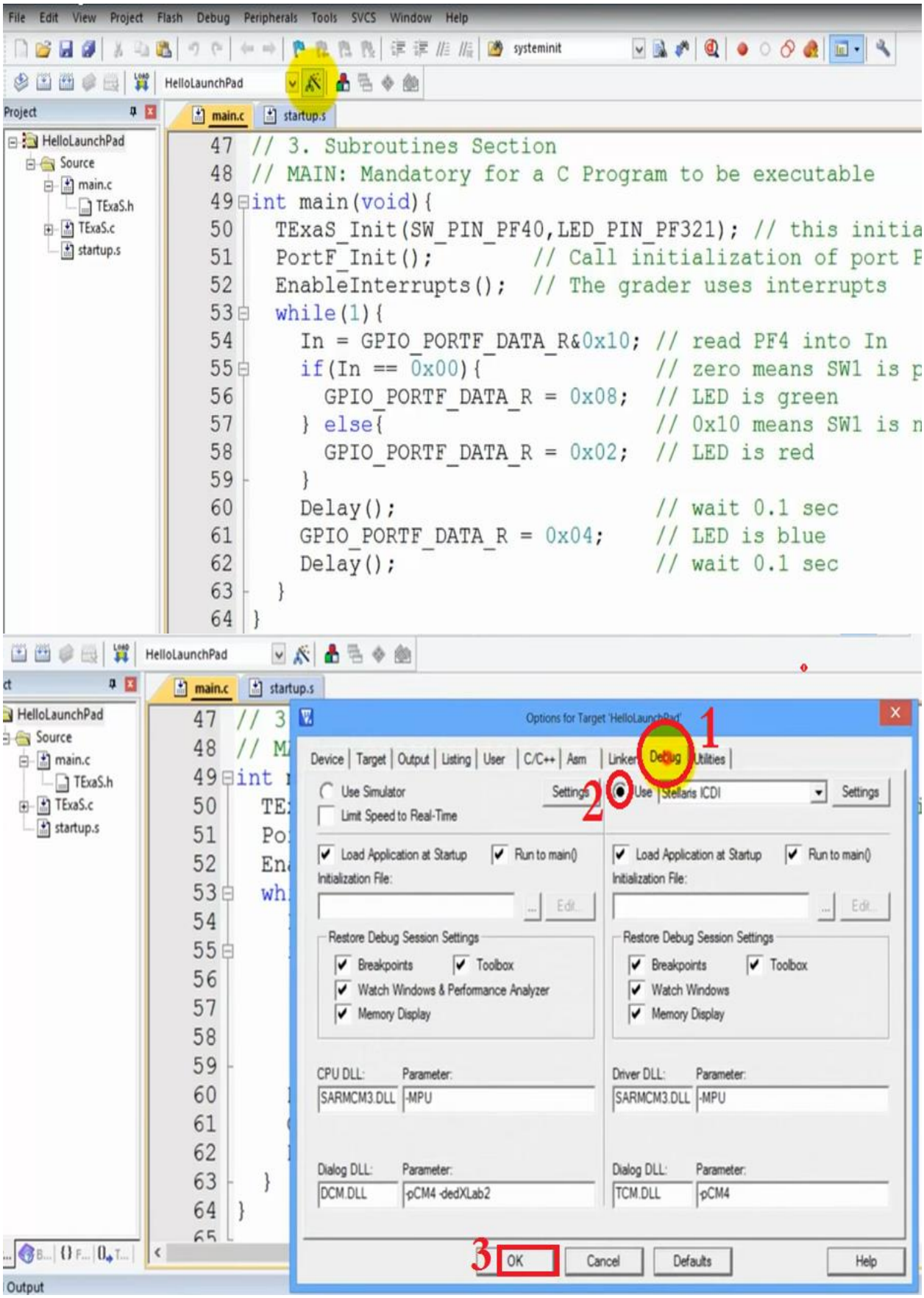

Computer ▸ Noha (C:) ▸ Keil ▸ Labware ▸ Lab2_HelloLaunchPad
Computer ▸ Ali (F:) ▸ ARM_3 ▸ edx
File Edit View Tools Help
Organize Open Burn New folder
Videos
Xilinx
Computer
Noha (C:)
DVD RW Drive (D:)
BD-ROM Drive (E:)
Ali (F:)
$RECYCLE.BIN
A_IoT
A_learning_Arduino
A_Reverse_Eng
afandy
Ali_ID
ARM_1
ARM_2
ARM_3
Arabic
ARM
ARM_Selected
Course -prg
Delhi
edx
ARM-MDK
Name
Date modified
Type
Size
ARM
Driver Software Installation
Your device is ready to use
USB Composite Device
Stellaris Virtual Serial Port (COM13)
Stellaris ICDI JTAG/SWD Interface
Stellaris ICDI DFU Device
USB Composite Device
Stellaris Virtual Serial Port (COM14)
Stellaris ICDI JTAG/SWD Interface
Stellaris ICDI DFU Device
Ready to use
Close
TExaS_Install1.exe
Application
Size: 59.2 MB
1 item selected

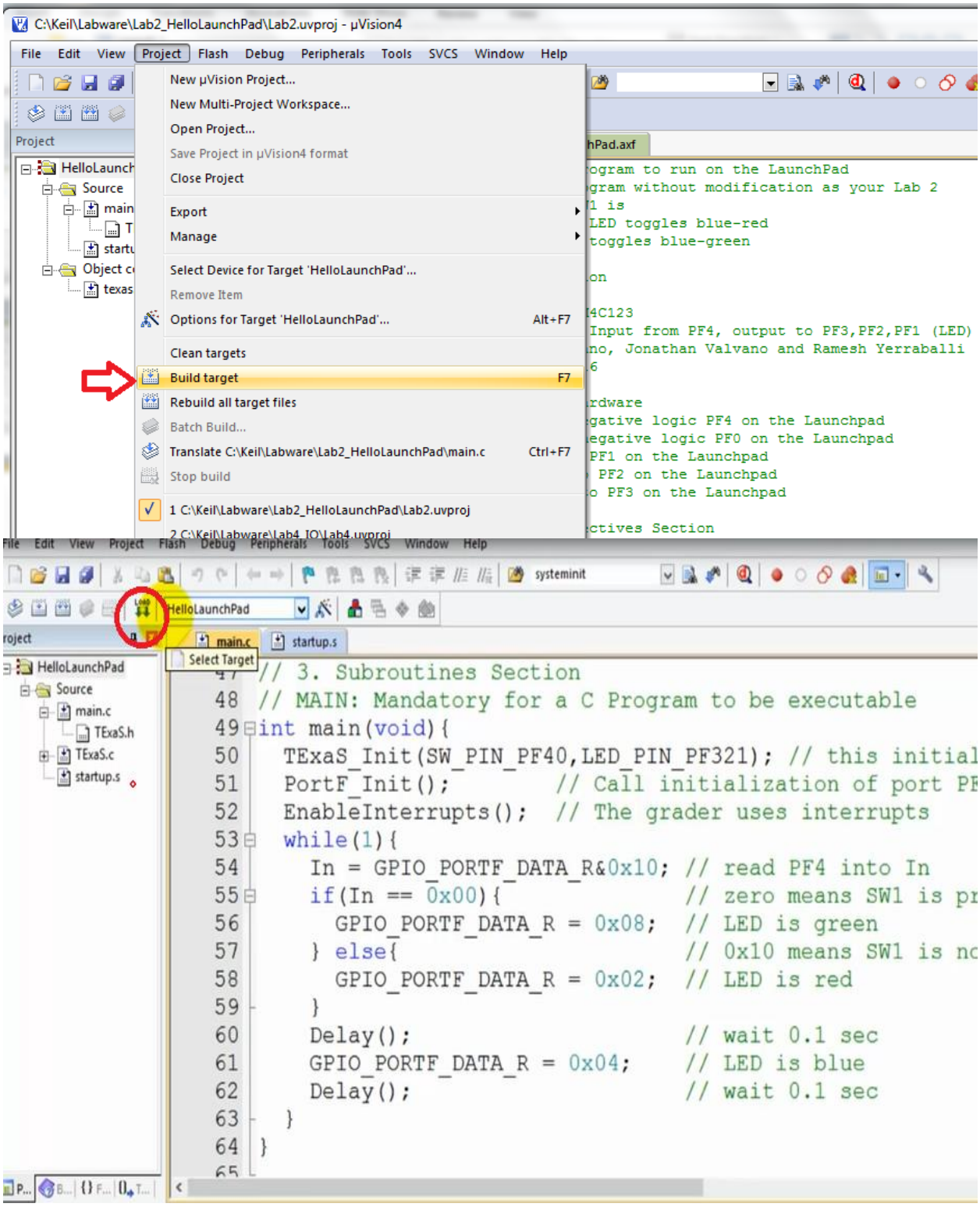

Driver Software Installation
Your device is ready to use
USB Composite Device
Stellaris Virtual Serial Port (COM15)
Stellaris ICDI JTAG/SWD Interface
Stellaris ICDI DFU Device
Ready to use
Close
Computer
Untitled - Paint
EN


Setup Test EXecute And Simulate (TExaS) V2.2
Welcome to Keil µVision
Driver Software Installation
Your device is ready to use
USB Composite Device
Ready to use
Stellaris Virtual Serial Port (COM13)
Ready to use
Stellaris ICDI JTAG/SWD Interface
Ready to use
Stellaris ICDI DFU Device
Ready to use
Close
DEVICE
DEBUG
www.ti.com/stellaris-launchp

1- connect the LaunchPad to the PC using the USB cable.
2- assign the target to the board
3- Compile (build) your project in Keil build target
4-download it to the board
5- start the debugger in real board mode.
6-Make sure your program is running F5.
In the debugger, perform a reset and then run your software.




File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
HelloLaunchPad
Project
HelloLaunchPad
Source
main.c
TExaS.h
TExaS.c
startup.s
main.c
startup.s
// 3. Subroutines Section
// MAIN: Mandatory for a C Program to be executable
int main(void){
TExaS_Init(SW_PIN_PF40,LED_PIN_PF321); // this initia
PortF_Init(); // Call initialization of port P
EnableInterrupts(); // The grader uses interrupts
while(1){
In = GPIO_PORTF_DATA_R&0x10; // read PF4 into In
if(In == 0x00){ // zero means SW1 is p
GPIO_PORTF_DATA_R = 0x08; // LED is green
} else{ // 0x10 means SW1 is n
GPIO_PORTF_DATA_R = 0x02; // LED is red
}
Delay(); // wait 0.1 sec
GPIO_PORTF_DATA_R = 0x04; // LED is blue
Delay(); // wait 0.1 sec
}
}
Options for Target 'HelloLaunchPad'
Device Target Output Listing User C/C++ Asm Linker Debug Utilities
1
2
Use Simulator
Limit Speed to Real-Time
Settings
Use Stellaris ICDI
Settings
Load Application at Startup
Run to main()
Initialization File:
Edit...
Restore Debug Session Settings
Breakpoints
Toolbox
Watch Windows & Performance Analyzer
Watch Windows
Memory Display
CPU DLL:
Parameter:
SARMCM3.DLL
-MPU
Driver DLL:
Parameter:
SARMCM3.DLL
-MPU
Dialog DLL:
Parameter:
DCM.DLL
-pCM4 -dedXLab2
Dialog DLL:
Parameter:
TCM.DLL
-pCM4
3
OK
Cancel
Defaults
Help
Output


C:\Keil\Labware\Lab2_HelloLaunchPad\Lab2.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
New µVision Project...
New Multi-Project Workspace...
Open Project...
Save Project in µVision4 format
Close Project
Export
Manage
Select Device for Target 'HelloLaunchPad'...
Remove Item
Options for Target 'HelloLaunchPad'... Alt+F7
Clean targets
Build target F7
Rebuild all target files
Batch Build...
Translate C:\Keil\Labware\Lab2_HelloLaunchPad\main.c Ctrl+F7
Stop build
1 C:\Keil\Labware\Lab2_HelloLaunchPad\Lab2.uvproj
HelloLaunchPad
Source
main.c
TExaS.h
TExaS.c
startup.s
Select Target
// 3. Subroutines Section
// MAIN: Mandatory for a C Program to be executable
int main(void){
TExaS_Init(SW_PIN_PF40,LED_PIN_PF321); // this initial
PortF_Init(); // Call initialization of port PF
EnableInterrupts(); // The grader uses interrupts
while(1){
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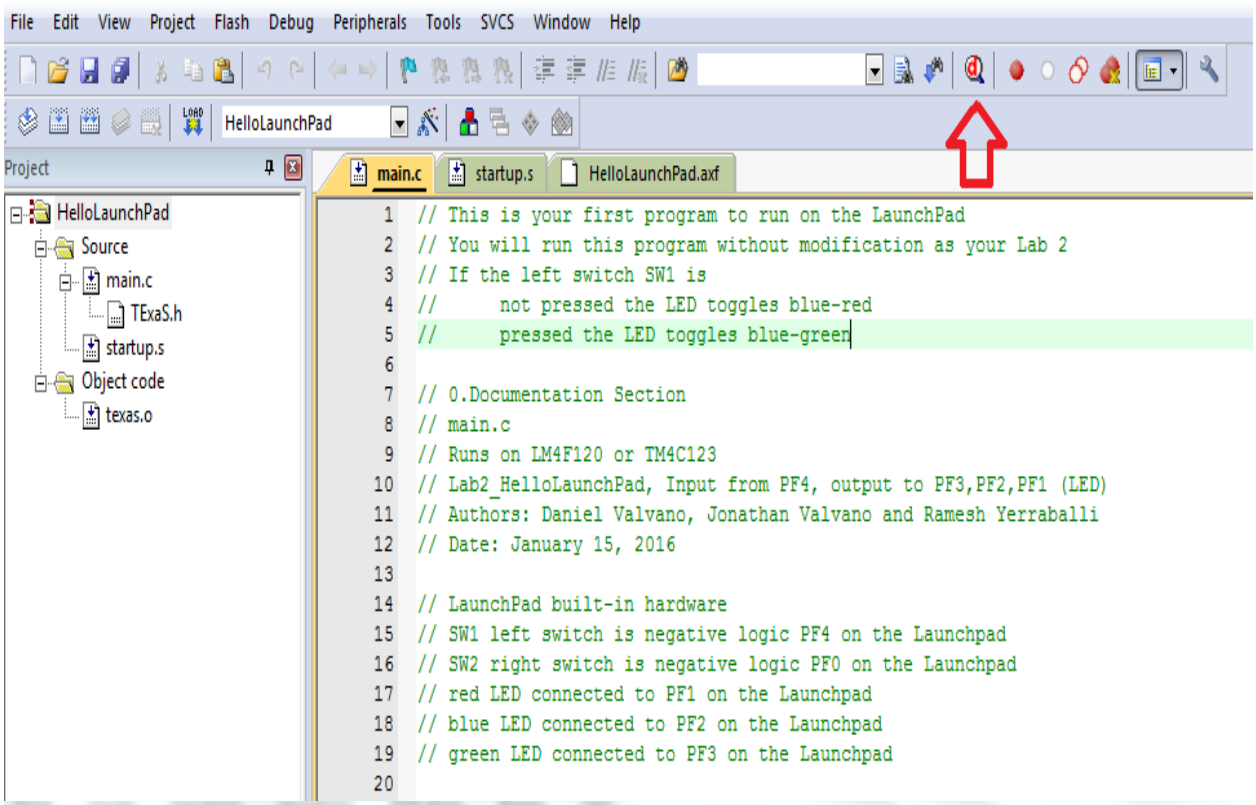
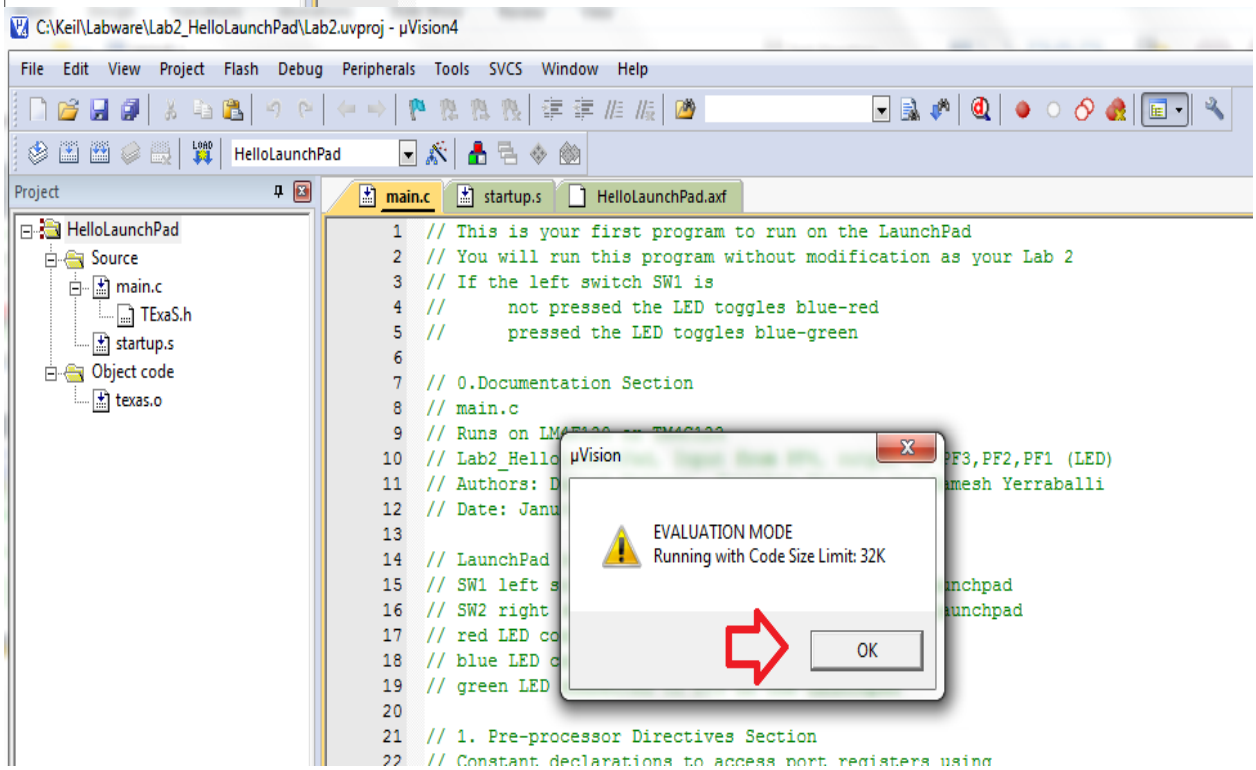
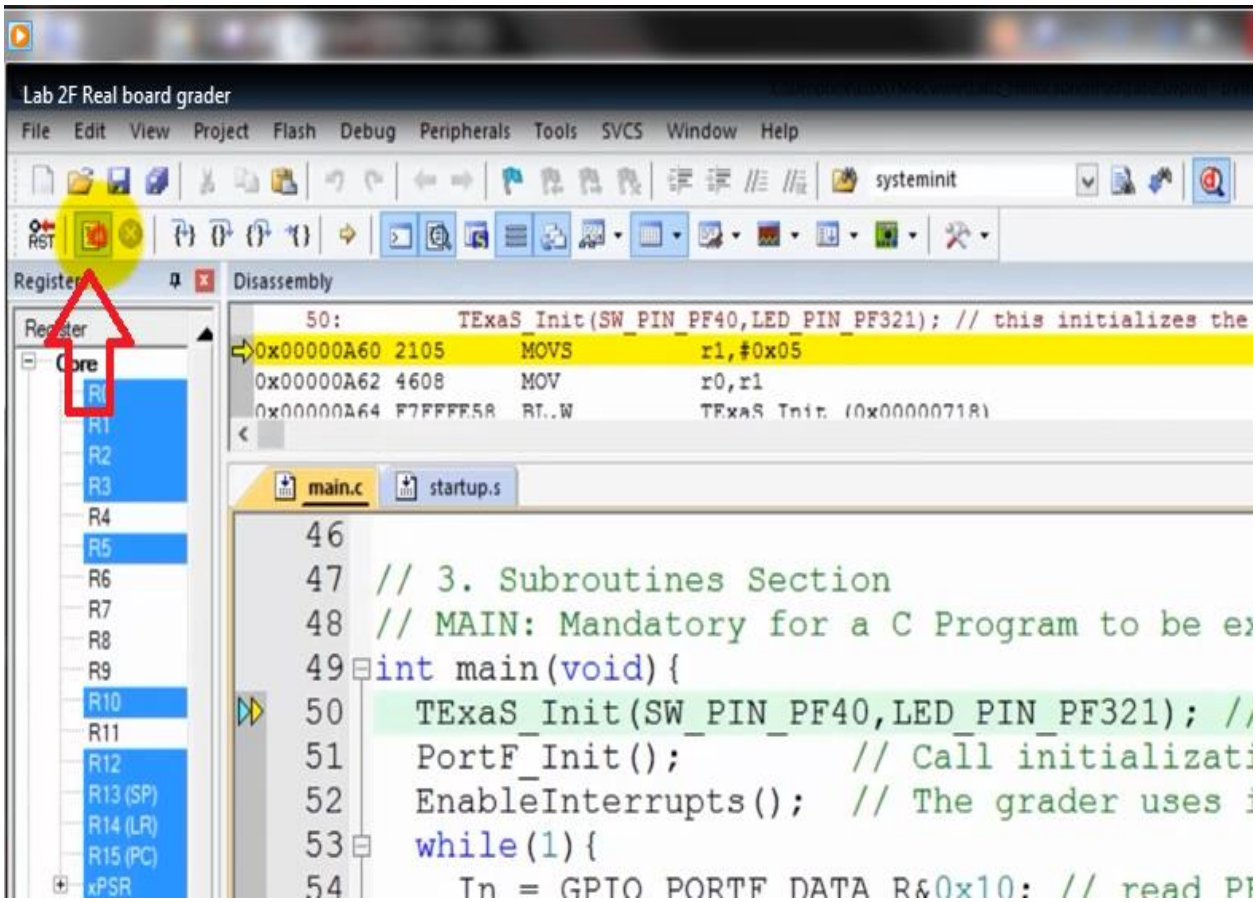
if(In == 0x00){ // zero means SW1 is pr
GPIO_PORTF_DATA_R = 0x08; // LED is green
} else{ // 0x10 means SW1 is nc
GPIO_PORTF_DATA_R = 0x02; // LED is red
}
Delay(); // wait 0.1 sec
GPIO_PORTF_DATA_R = 0x04; // LED is blue
Delay(); // wait 0.1 sec
}
}


File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
HelloLaunchPad
Project
HelloLaunchPad
Source
main.c
TExaS.h
startup.s
Object code
texas.o
main.c
startup.s
HelloLaunchPad.axf
// This is your first program to run on the LaunchPad
// You will run this program without modification as your Lab 2
// If the left switch SW1 is
//   not pressed the LED toggles blue-red
//   pressed the LED toggles blue-green
// 0.Documentation Section
// main.c
// Runs on LM4F120 or TM4C123
// Lab2_HelloLaunchPad, Input from PF4, output to PF3,PF2,PF1 (LED)
// Authors: Daniel Valvano, Jonathan Valvano and Ramesh Yerraballi
// Date: January 15, 2016
// LaunchPad built-in hardware
// SW1 left switch is negative logic PF4 on the Launchpad
// SW2 right switch is negative logic PF0 on the Launchpad
// red LED connected to PF1 on the Launchpad
// blue LED connected to PF2 on the Launchpad
// green LED connected to PF3 on the Launchpad


C:\Keil\Labware\Lab2_HelloLaunchPad\Lab2.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
HelloLaunchPad
Project
HelloLaunchPad
Source
main.c
TExaS.h
startup.s
Object code
texas.o
main.c
startup.s
HelloLaunchPad.axf
µVision
EVALUATION MODE
Running with Code Size Limit: 32K
OK
// This is your first program to run on the LaunchPad
// You will run this program without modification as your Lab 2
// If the left switch SW1 is
//   not pressed the LED toggles blue-red
//   pressed the LED toggles blue-green
// 0.Documentation Section
// main.c
// 3,PF2,PF1 (LED)
// mesh Yerraballi
// nchpad
// unchpad
// 1. Pre-processor Directives Section


Lab 2F Real board grader
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
systeminit
Register
Disassembly
50: TExaS_Init(SW_PIN_PF40,LED_PIN_PF321); // this initializes the
0x00000A60 2105 MOVS r1,#0x05
0x00000A62 4608 MOV r0,r1
Core
R0
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13 (SP)
R14 (LR)
R15 (PC)
xPSR
main.c
startup.s
46
47 // 3. Subroutines Section
48 // MAIN: Mandatory for a C Program to be ex
49 int main(void){
50 TExaS_Init(SW_PIN_PF40,LED_PIN_PF321); //
51 PortF_Init(); // Call initializati
52 EnableInterrupts(); // The grader uses i
53 while(1){