
Brooklyn Board by Silica Architech Documentation

Release .0

Silica

Mar 16, 2017

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Version 1.0.0

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Silica Brooklyn Board is useful system to evaluate MAXIM Pmod device and is designed for use with Freescale TWR-K70F120M tower system

This software release is working on Kinetis K70 devices but not under MQX rtos

A further revision working with MQX rtos will be relased soon.

You can find and download TWR-K70 documentation by clicking:

http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=TWR-K70F120M&tid=m32TWR

Developement software used is CodeWarrior MCU v10.3 Special Edition.

This application is free downloadable from Freescale site. Go to:

http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=CW-MCU10&fsp=1&tab=Design_Tools_Tab

and select “offline” package. (note that download can take much time ...)

We suggest you to read the Quick Start Guide to setup your evaluation system

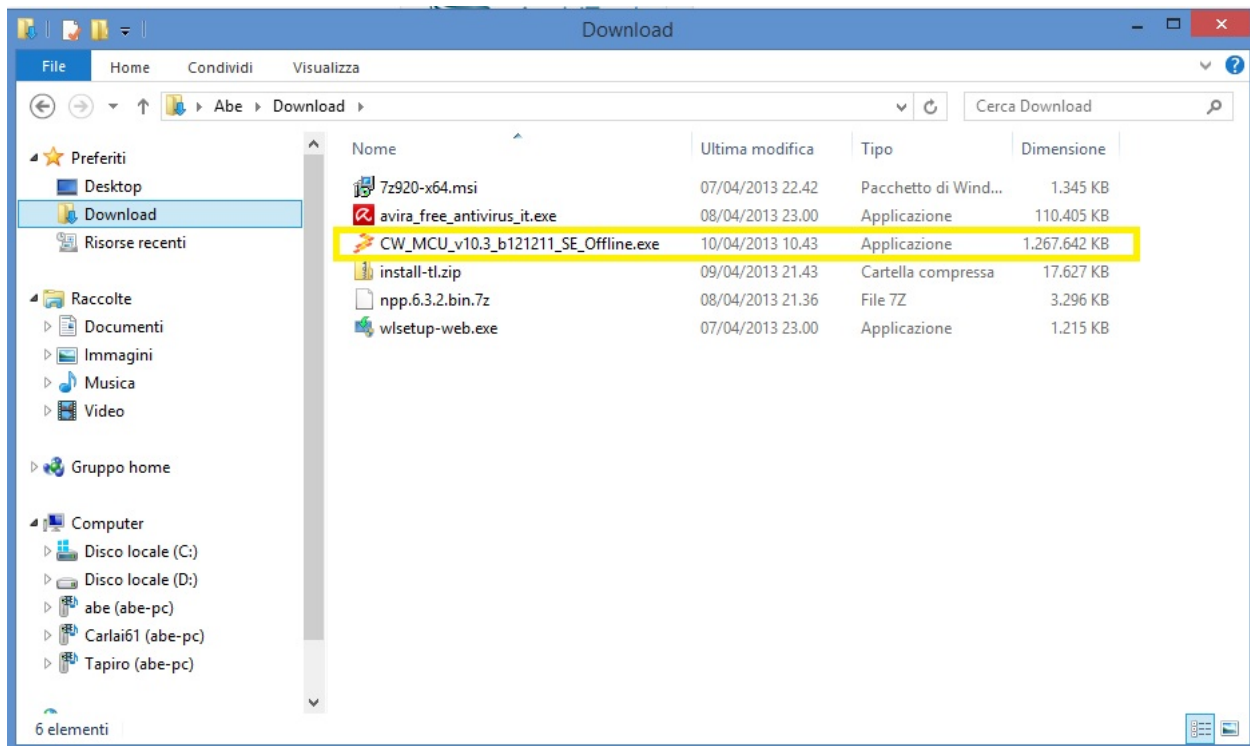
Quick start guide

This guide explains how to use this application and provides an overview of on the structure of the project firmware

CHAPTER 1

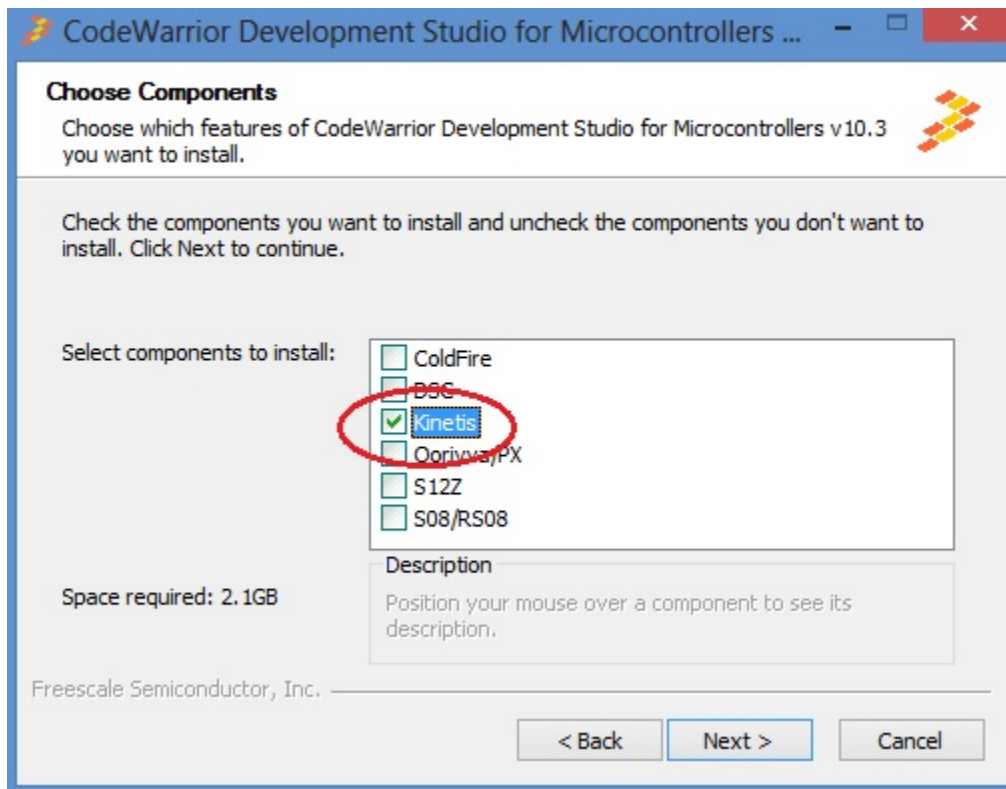
Installing Codewarrior on WIN7 or WIN8

Double click on 'CW_MCU_v10.3_b121211_SE_Offline.exe' that you have downloaded first, and follow installation instruction.

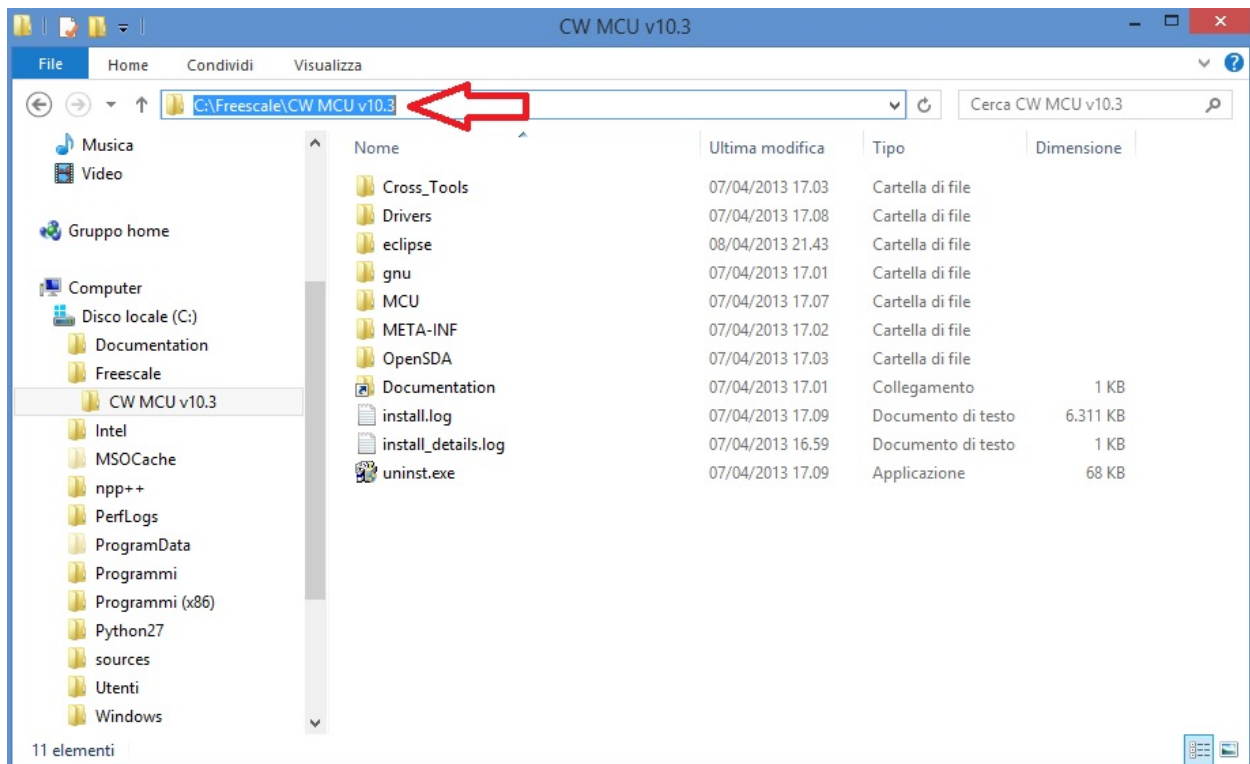


Quick start guide for Codewarrior install can be found at http://cache.freescale.com/files/soft_dev_tools/doc/quick_ref_guide/MCU_QS.pdf?fp=1

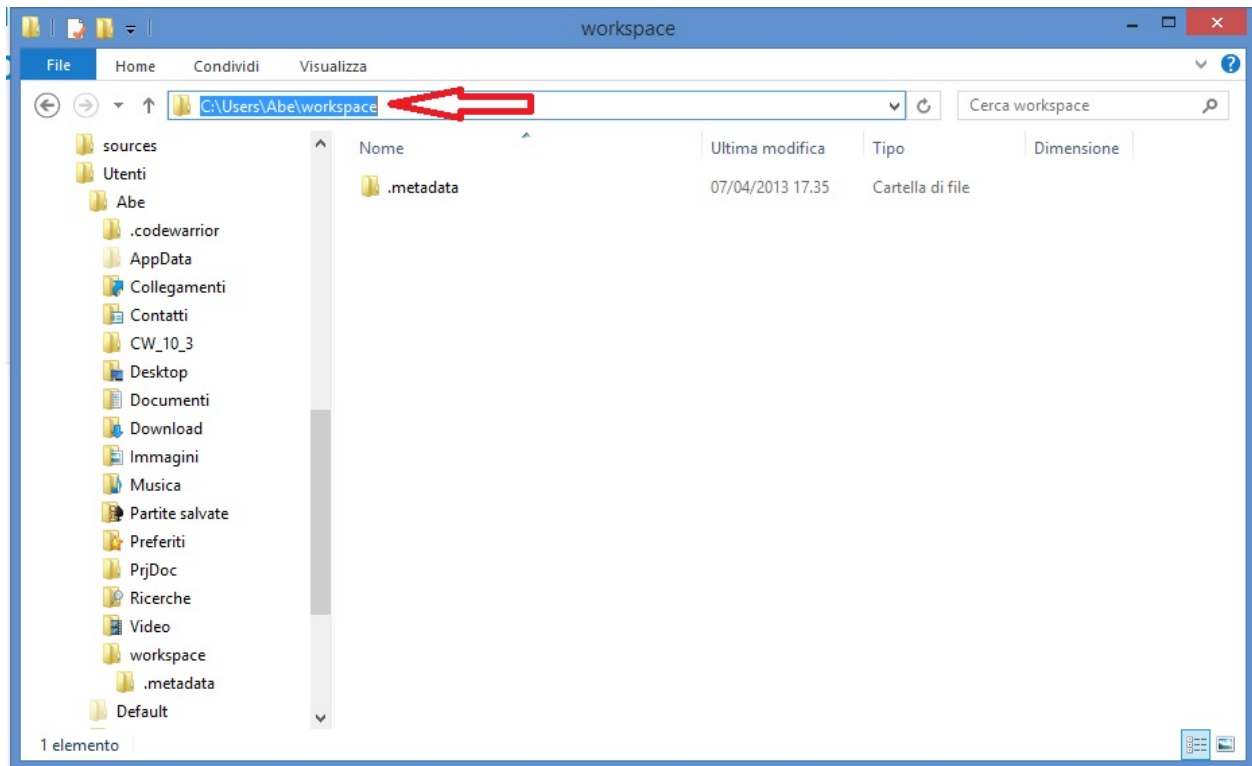
When setup ask for MCU type, select almost Kinetis as show below, then press NEXT button



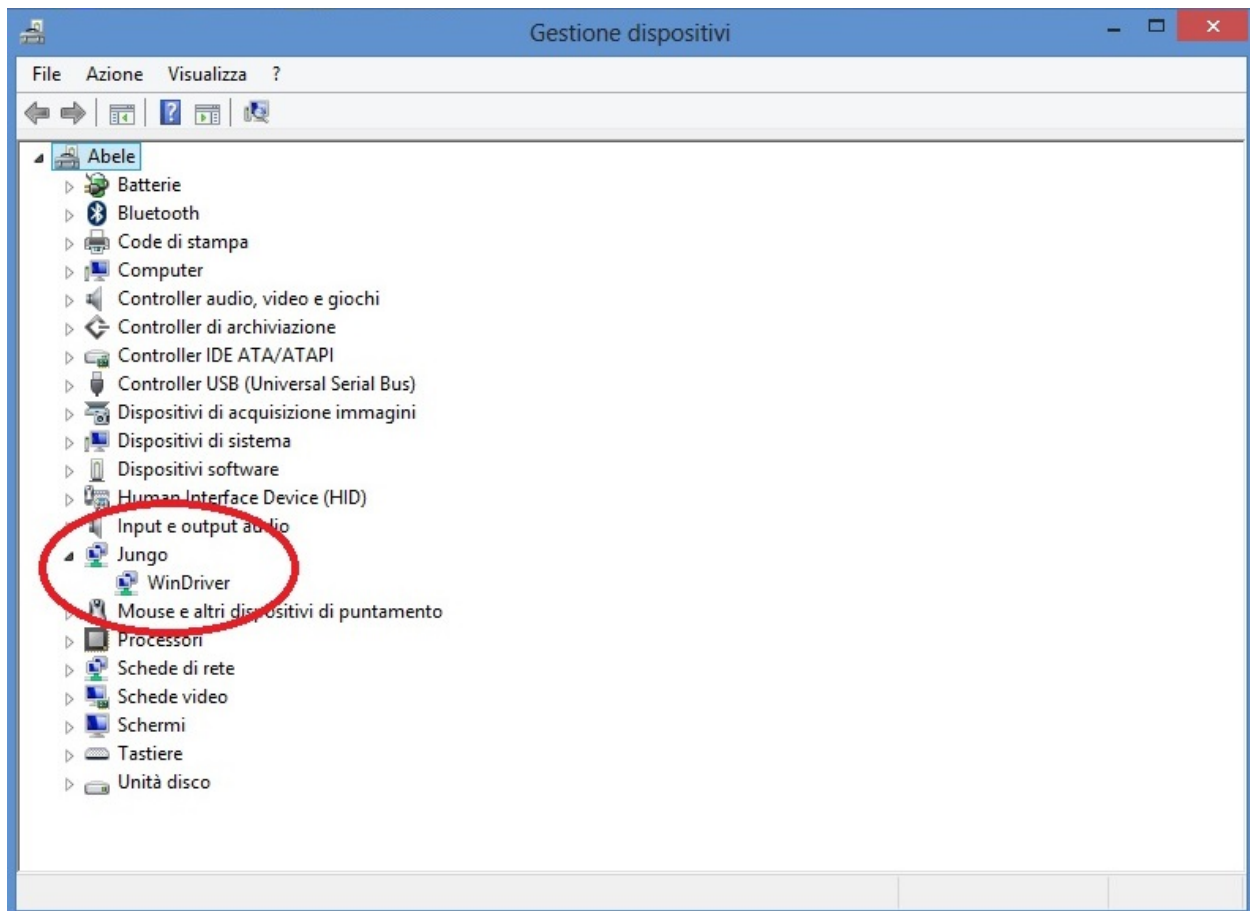
If you have Windows7 or Windows8 (32 or 64 bit) Codewarrior will install into “Freescale\CW MCU v10.3” folder on the root of your system HDD.



and create a default work folder named **workspace** in the path `C:\Users\your_user_name\workspace`



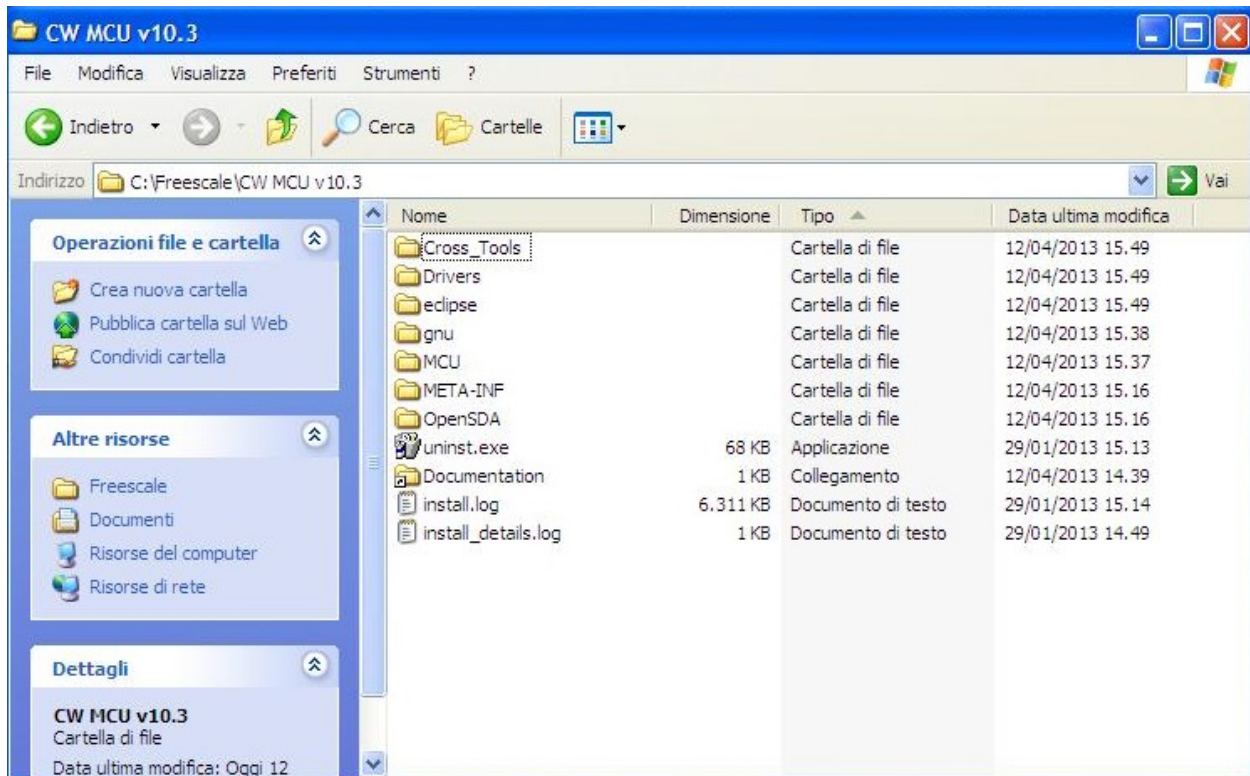
make sure that setup have been installed Jungo Driver. See your system configuration (right-click on Computer -> Properties -> Device Manager)
if you have any troubles about, read Codewarrior install Guide



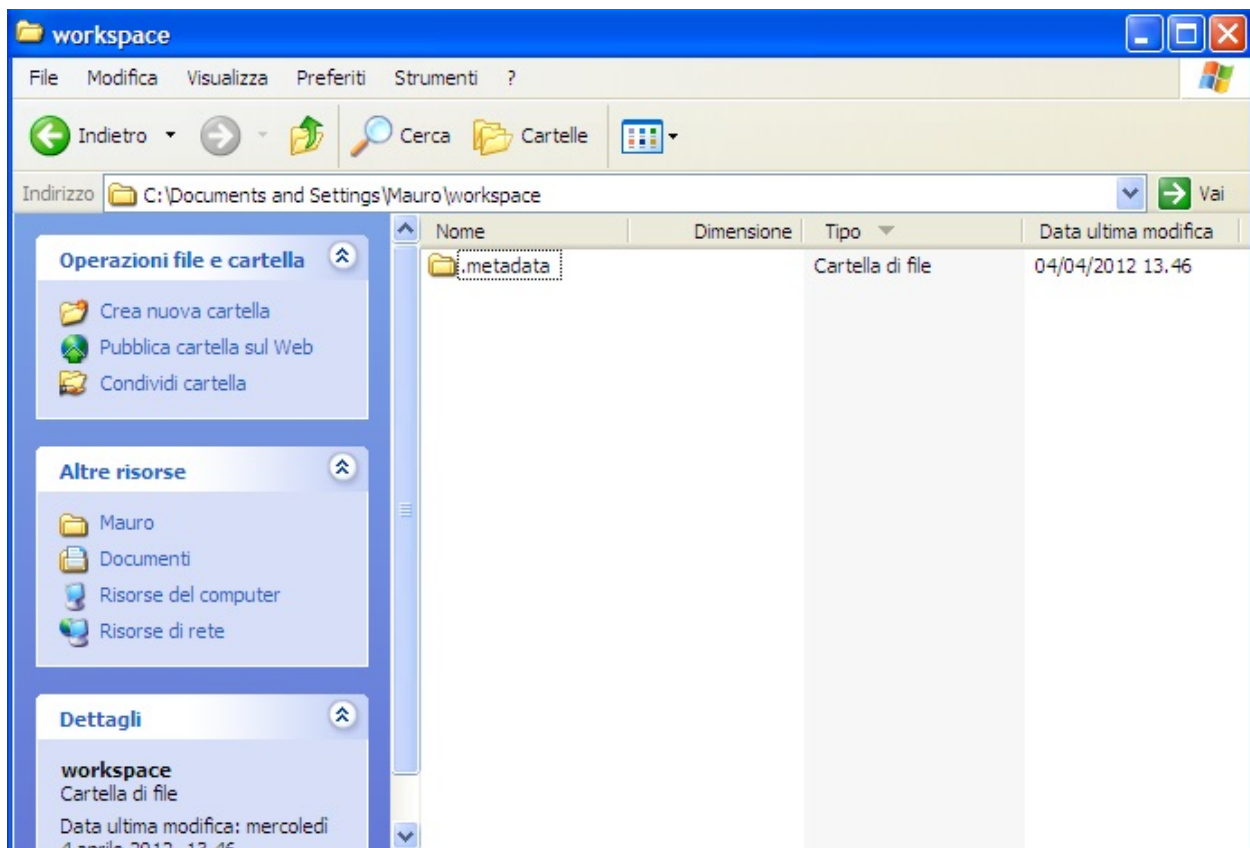
Codewarrior on WINXP

For WinXP, after installation, you have:

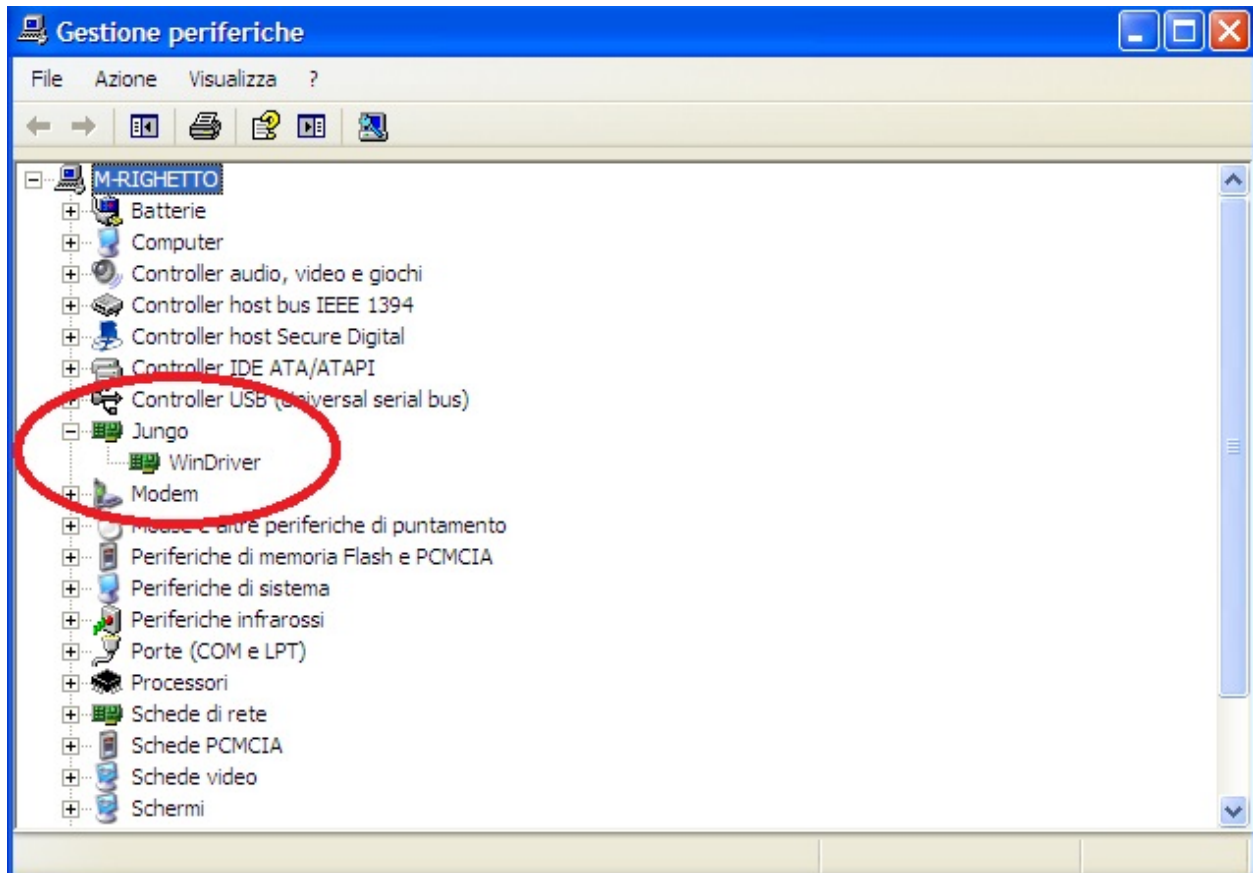
- installation folder



- default work folder



- Jungo driver:



Brookling Board firmware comes from original Maxim Maxim Zenboard Platform project revision 1.6, by using the file listed above.

Main project files from Maxim

- MaximPmod.c
- menu.c.
- maximDeviceSpecificUtilities.c
- platform.c
- utilities.c

and related include files

- MaximPmod.h
- menu.h
- maximDeviceSpecificUtilities.h
- platform.h
- utilities.h
- platform_config.h

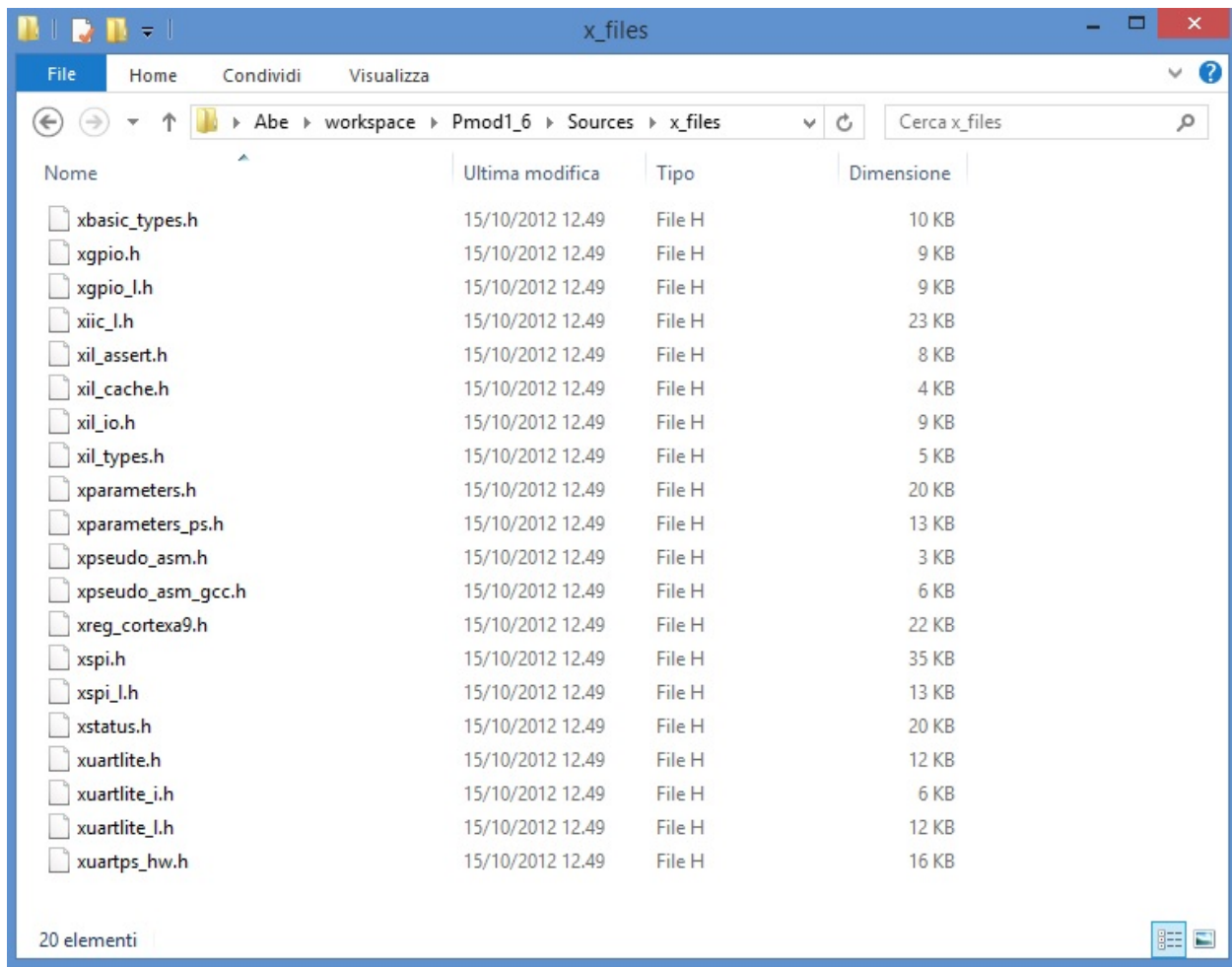
You can find all this file in the “Source” folder of the project

General include files

- xbasic_types.h

- xgpio.h
- xgpio_1.h
- xiic_1.h
- xil_assert.h
- xil_cache.h
- xil_io.h
- xil_types.h
- xparameters.h
- xparameters_ps.h
- xpseudo_asm.h
- xpseudo_asm_gcc.h
- xreg_cortex9.h
- xspi.h
- xspi_i.h
- xspi_1.h
- xstatus.h
- xuartlite.h
- xuartlite_i.h
- xuartlite_1.h
- xuartps_hw.h

You can find all this file in the “Source\x_files” folder of the project



Main Project files added

In source folder you find application specific files:

- ProcessorEspert.c (containing Main())
- Events.c
- driver.c (low-level function replacement)

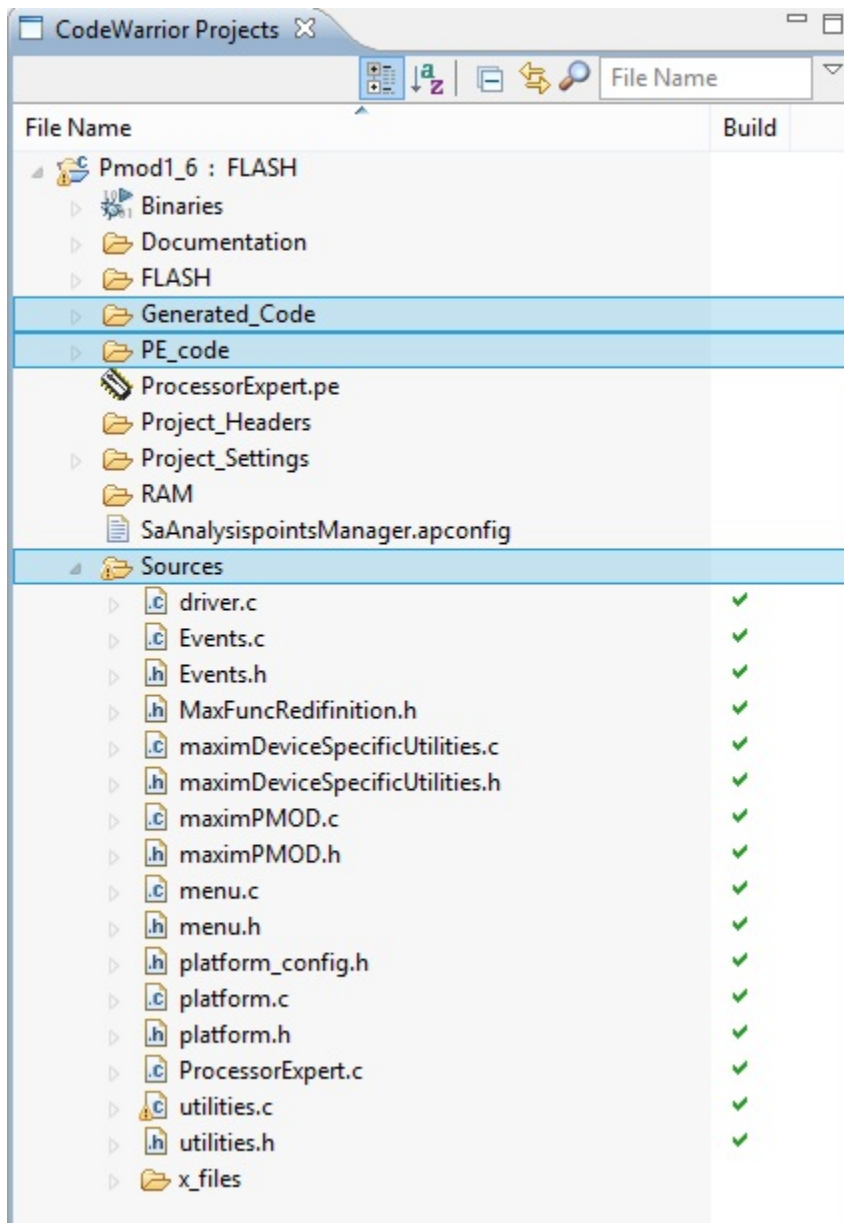
and include files

- MaxFuncRedefinition.h (start menu function redefinition)
- Events.h

This project is developed under Codewarrior 10.3 using Processor Expert tools. You can also find two folders, one named "Generated_Code" and second named "PE_code"

The first one contain auto-generated file that depend on Logical Device component inside Processor Expert Components, and may rebuild each occurrence (when a device settings modification has been made)

The second contains file one-time generated by Processor Expert and "frozen" in this folder. No modification can be invoked by Processor Expert.



Detailed documentation of firmware can be downloaded link

CHAPTER 3

Firmware changes

1 - added include file MaxFuncRedefinition.h at the top of MaximPmod.c file. This file must be the first to be included in the list.

```
#include "MaxFuncRedefinition.h" <----

#include <stdio.h>
#include "platform.h"
#include "menu.h"
#include "utilities.h"
#include "maximDeviceSpecificUtilities.h"
#include "maximPMOD.h"

#define MAJOR_REVISION 1
#define MINOR_REVISION 6
```

2 - renamed `main()` function inside MaximPmod.c file with new name `main_pmod()`.

```
int main_pmod() <----
/**
 * \brief      Main() function for Analog Essentials example program.
 * \par       Details
 *             This function allows you to set and initializes the FPGA and hardware,
↳which will appear in the main menu by
             HyperTerminal, which will send the demo of individual programs to the
↳basic module.
 *
 * \param      None
 *
 * \retval     Always TRUE
 */
{
    // Variables for the main() function
    u8 uchInput=0;
    int nMenuState=0;
```

```
int i=0;
char tempString[256];
```

3 - commented function **led_knight_rider** inside **MaximPmod.c** file to obtain application fast start.

```
// Toggle the LEDs so that the user knows the board is awake
XGpio_Initialize(&g_xGpioLed, XPAR_AXI_GPIO_LED_DEVICE_ID);
XGpio_SetDataDirection(&g_xGpioLed, 1, 0x00000000); // Set the LED peripheral
↳to outputs
//      led_knight_rider(&g_xGpioLed,2);      <----
```

4 - changed costant definition **ABOUT_ONE_SECOND** inside **MaximPmod.h** file as follow:

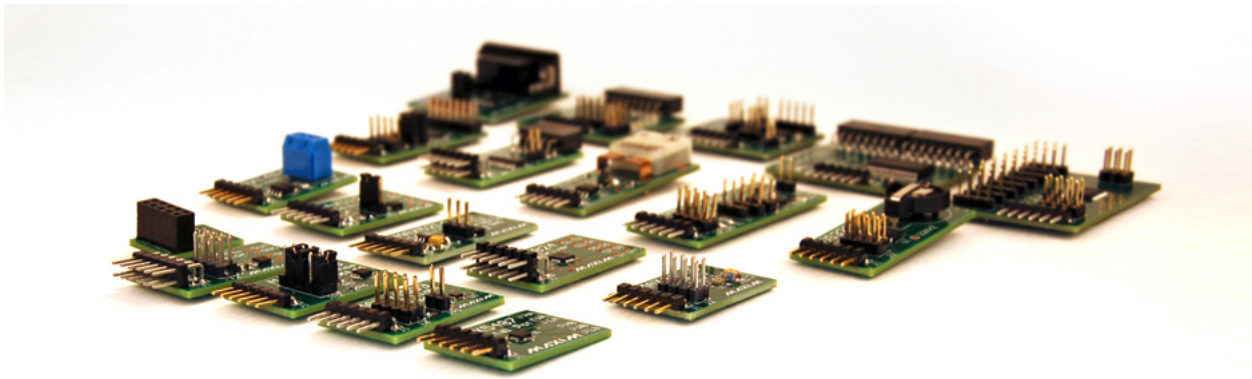
```
#define ABOUT_ONE_SECOND 74067512/8/3      <----
//#define ABOUT_ONE_SECOND 74067512      //!< approx 1 second delay when used as
↳argument with function delay(numberCyclesToDelay)
// Update this if uBlaze/Zynq CPU core frequency is changed, or if the external
↳memory timing changes.
// Although emprirically tested to 1.0000003 seconds, it is not meant to be used for
↳precise timing purposes
```

NOTE: All these changes are tested on revision 1.6 of Maxim project files and need to be checked on further new revisions

CHAPTER 4

More about Pmod

Maxim Analog Essential Collection is a collection of plug-in peripheral modules (Pmod) You can find more informations visiting [Maxim Analog Essential Collection](#) site



Important notice

At the date of issue of this review, Maxim Zenboard Platform Project files are available on version 1.6, and don't support MAX14850 Pmod module. As a result this version, that use original files from Maxim project, is not able to emulate this device.



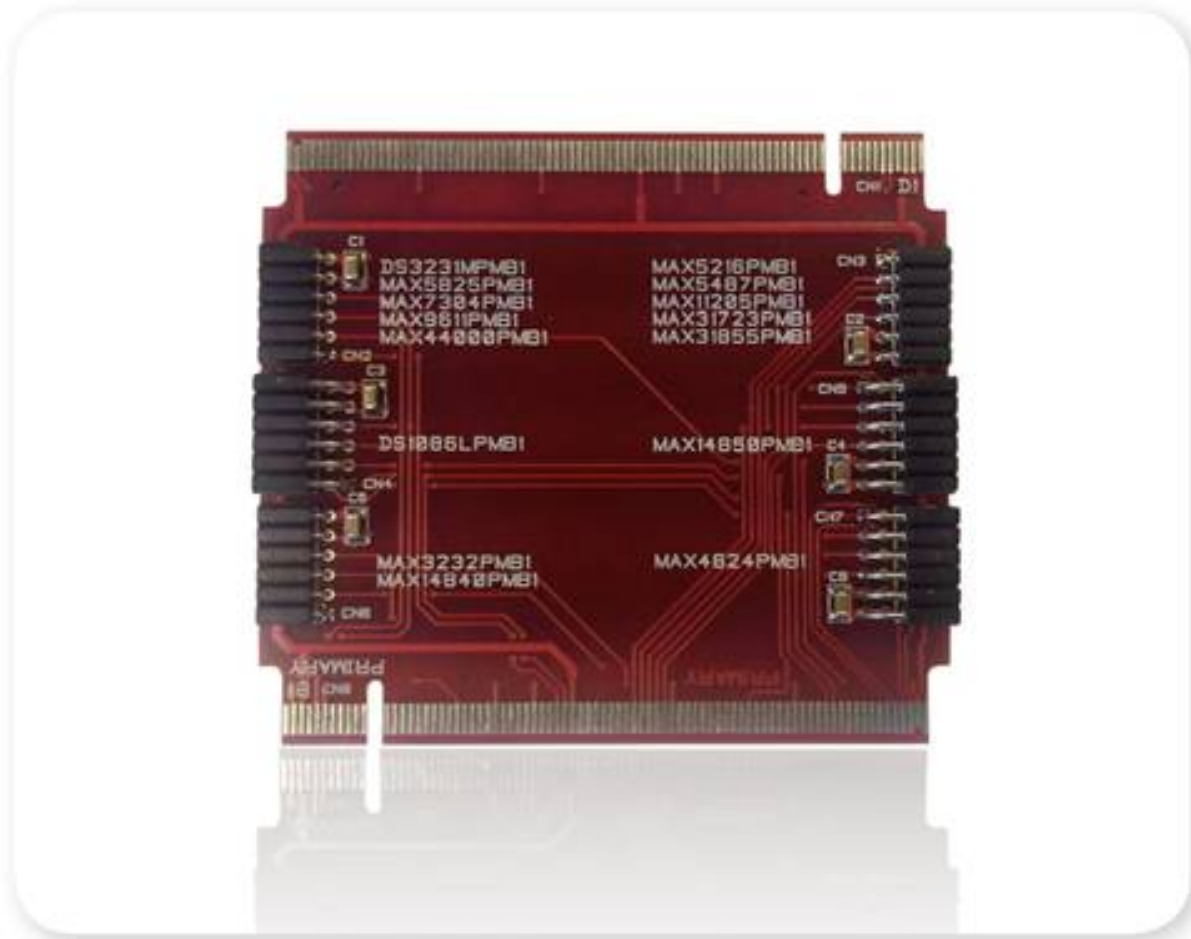
Emulation of MAX3232

This device is a RS232 converter, and require 2 serial channel (each one connected to terminal software) for full test. The first one is used for commands and the second one must be connected, for complete testing purpose, to MAX3232 Pmod serial connector (by standard modem cable).



Hardware requirements

- Tower system for Kinetis K70F120M (with TWR-SER expansion)
- Mini USB type-B cable
- Silica BrooklynBoard
- PC with at least one RS232 serial port and terminal software (two serial port for MAX3232 emulation)
- RS232 DB9 serial cable (modem type)
- Maxim Analog Essential Collection

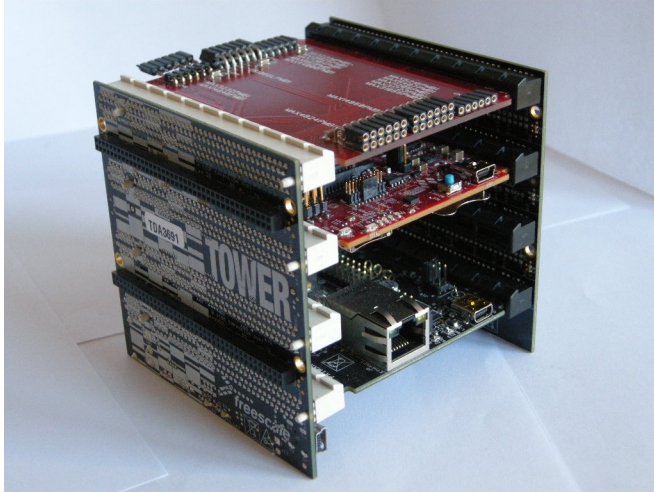


Software requirements

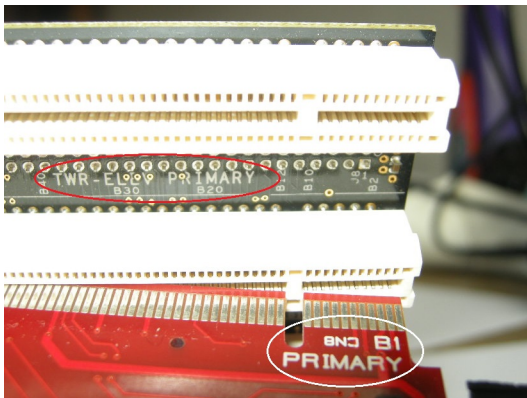
- CodeWarrior MCU v10.3 Special Edition ([download here](#)).
- Brooklyn Board application firmware for TWR-K70F120M system ([download here](#))

Hardware setup

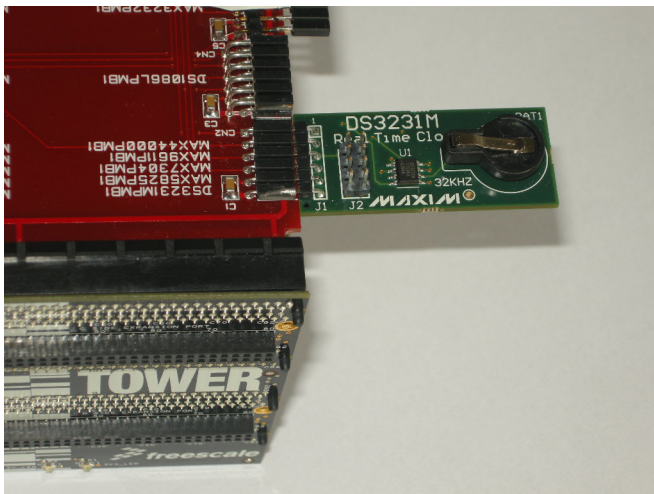
- Assemble tower system TWR-K70F120M and Brooklyn Board as in figure below.



Don't care slot position, but be careful to connect Primary and Secondary connector properly. Take care at reference signed near PCI board connectors.



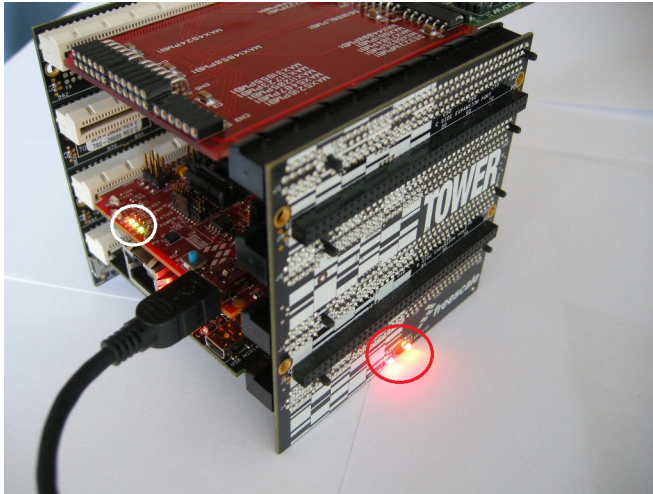
- Plug a Pmod Device (i.e. DS3231M Real Time Clock) inside properly connector.



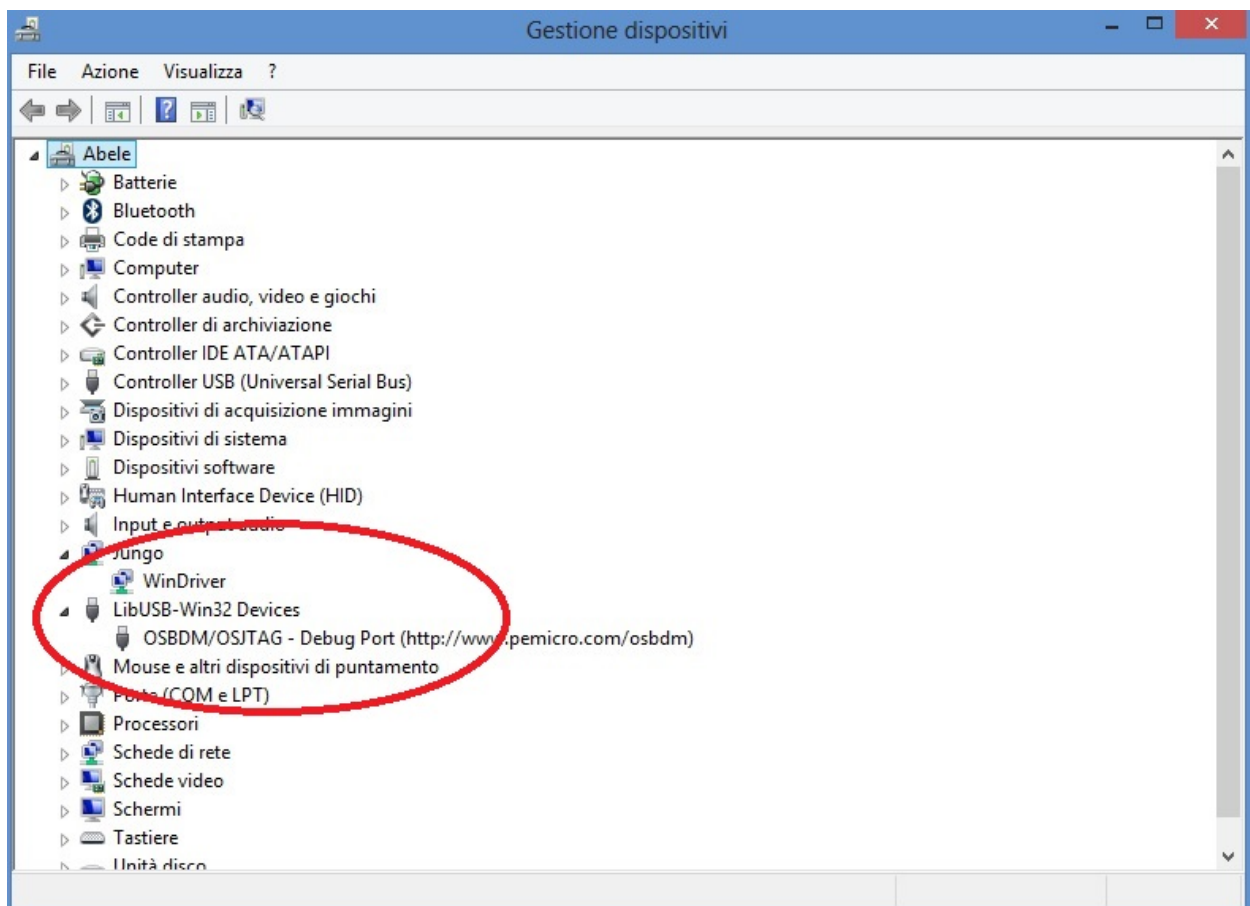
→ Be careful to see device reference next to connector. Each connector is designed for one or more devices and

will only accept dedicated modules.

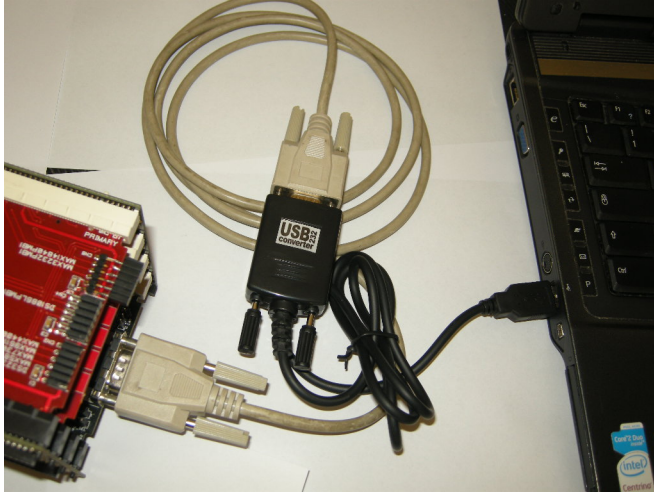
- Plug Mini USB type-B cable into Cpu Board plug and connect to PC with Codewarrior. TWR power led will on



- If you see device tab, you will find OSBDM/OSJTAG debug port



- plug the standard serial DB9 cable into serial connector on Tower System
- connect serial cable to terminal PC (equipped with terminal SW)



- On your terminal PC setup COMx parameter:

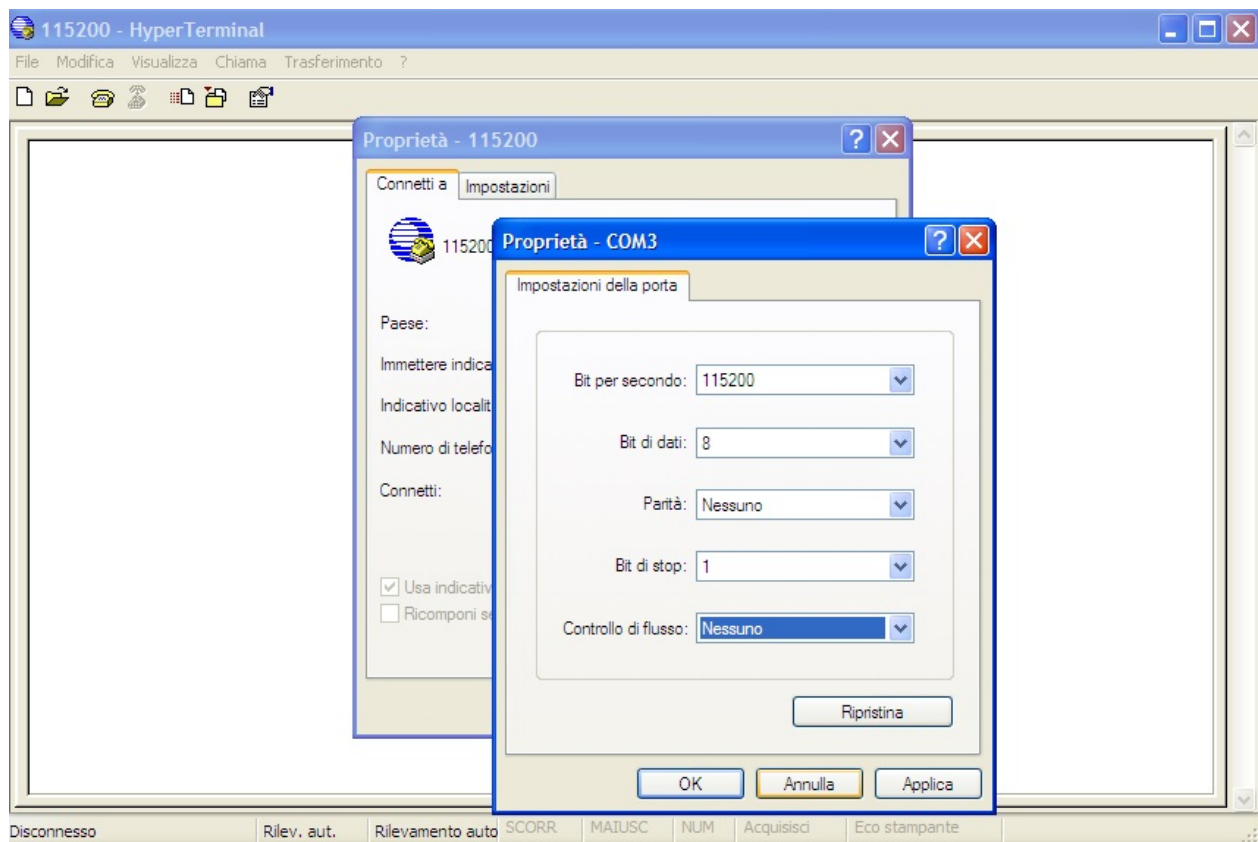
speed = 115200 baud

data with = 8

parity = none

stop bit = 1

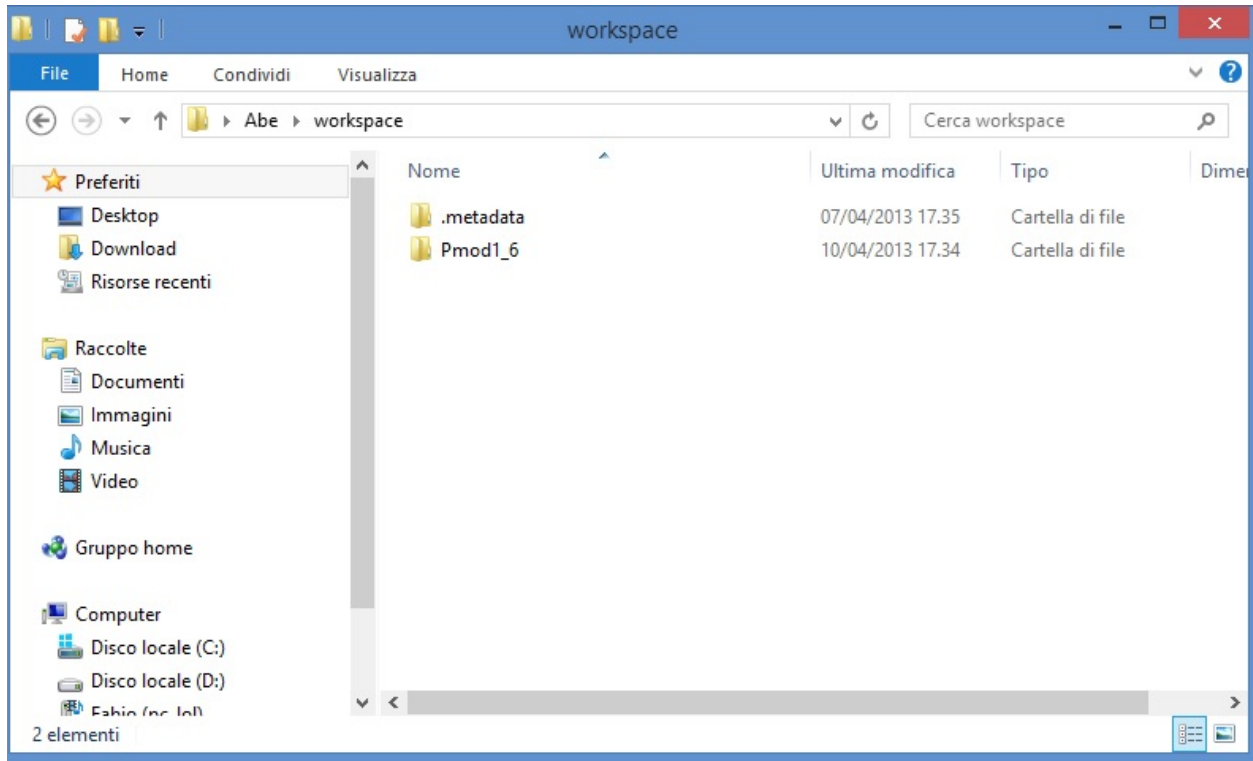
flow control = none



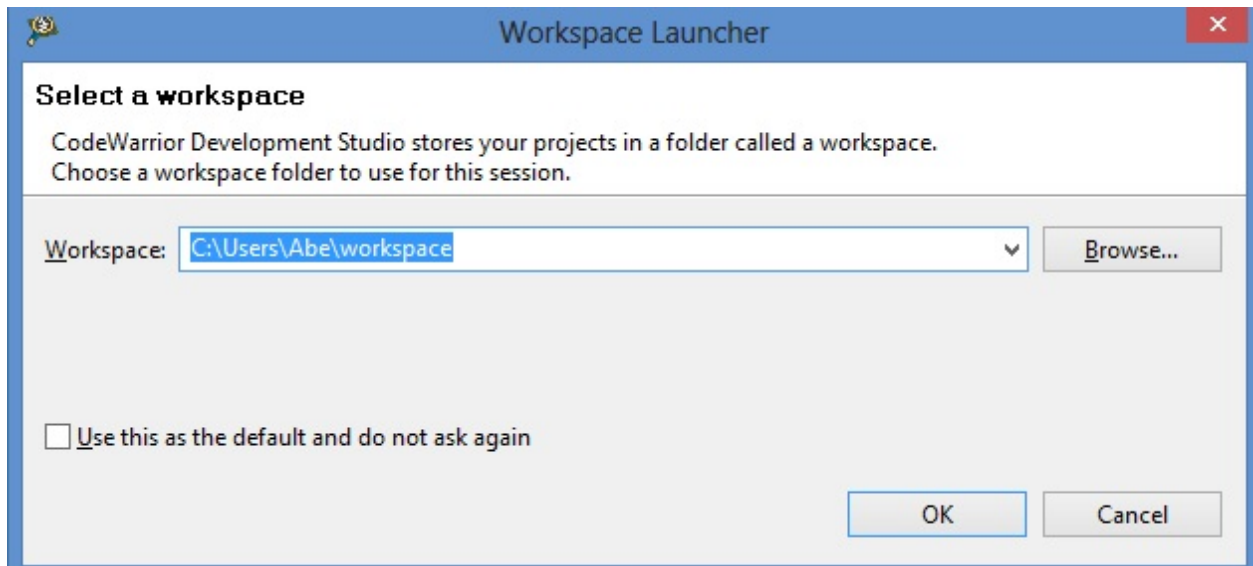
Now you are ready for install FW project.

Brooklyn Board FW setup

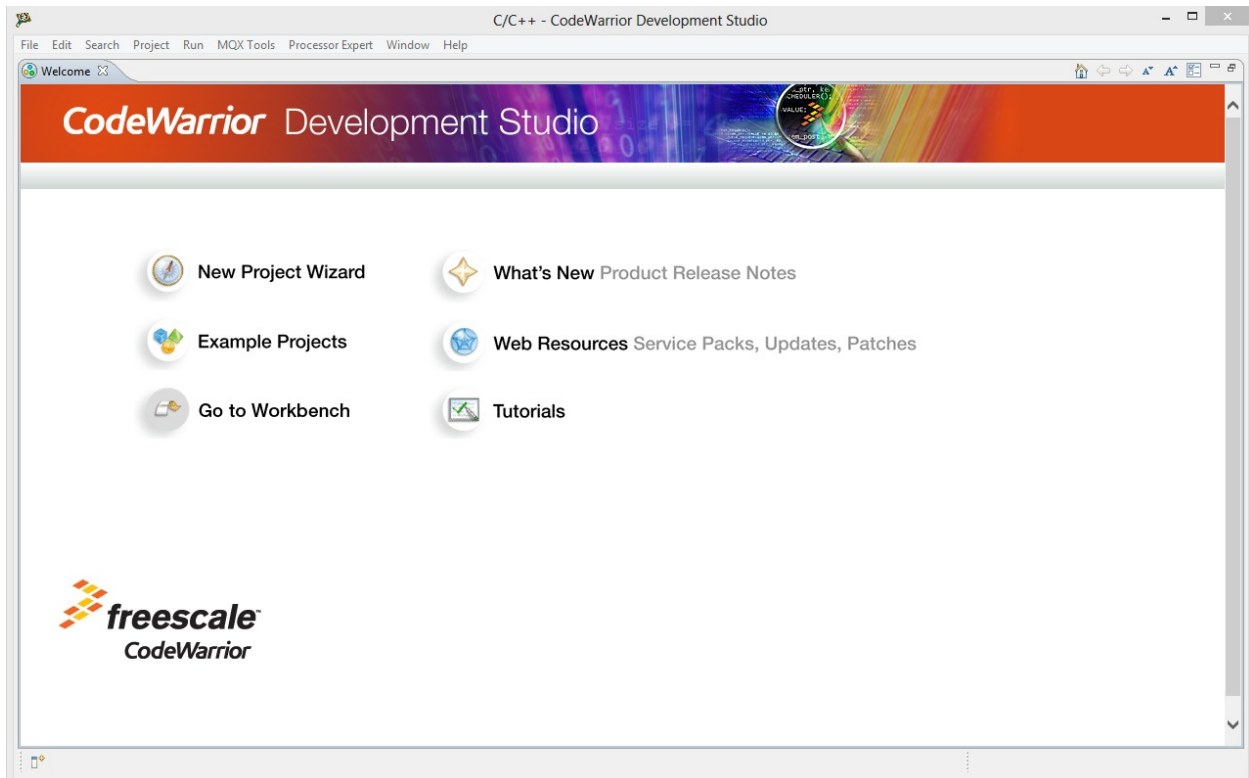
- Extract from Pmod1_6.zip the folder **Pmod1_6** and place it into Codewarrior default workspace



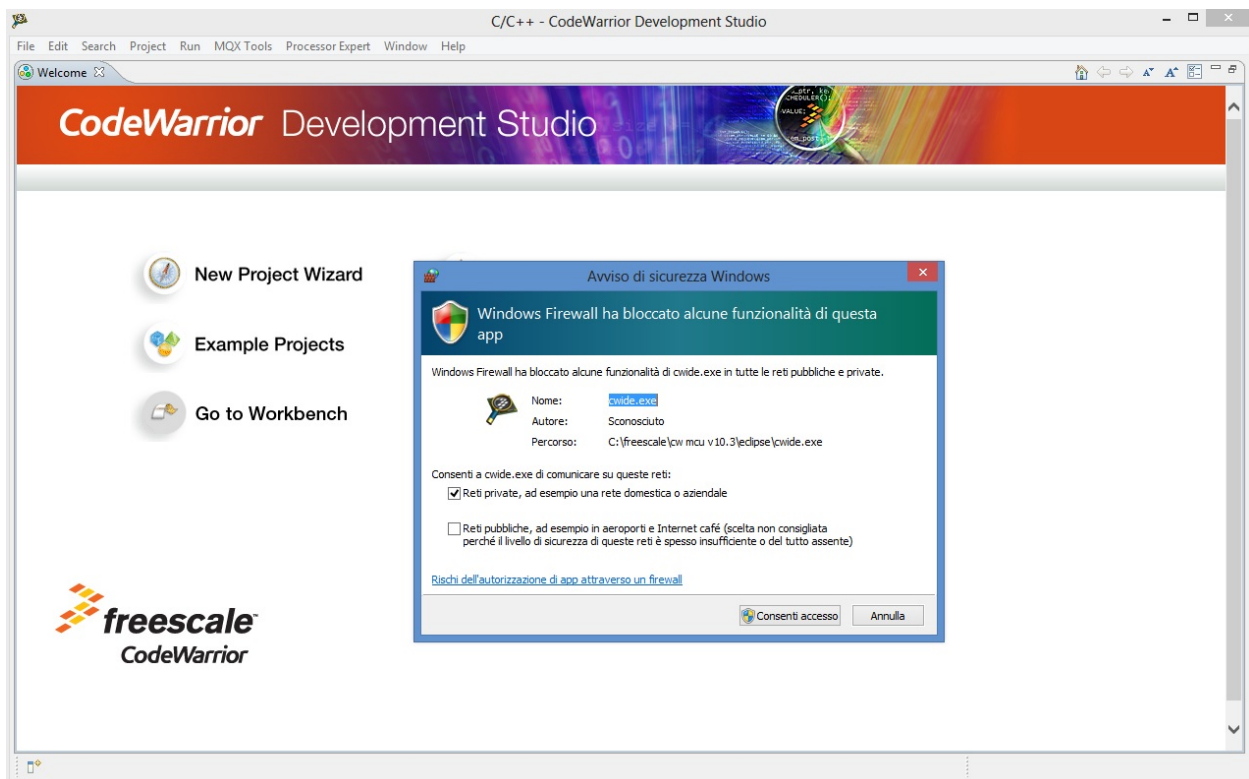
- start Codewarrior. Select “workspace” as in default window and click OK.



Now we could see the welcome window of Codewarrior Development Suite

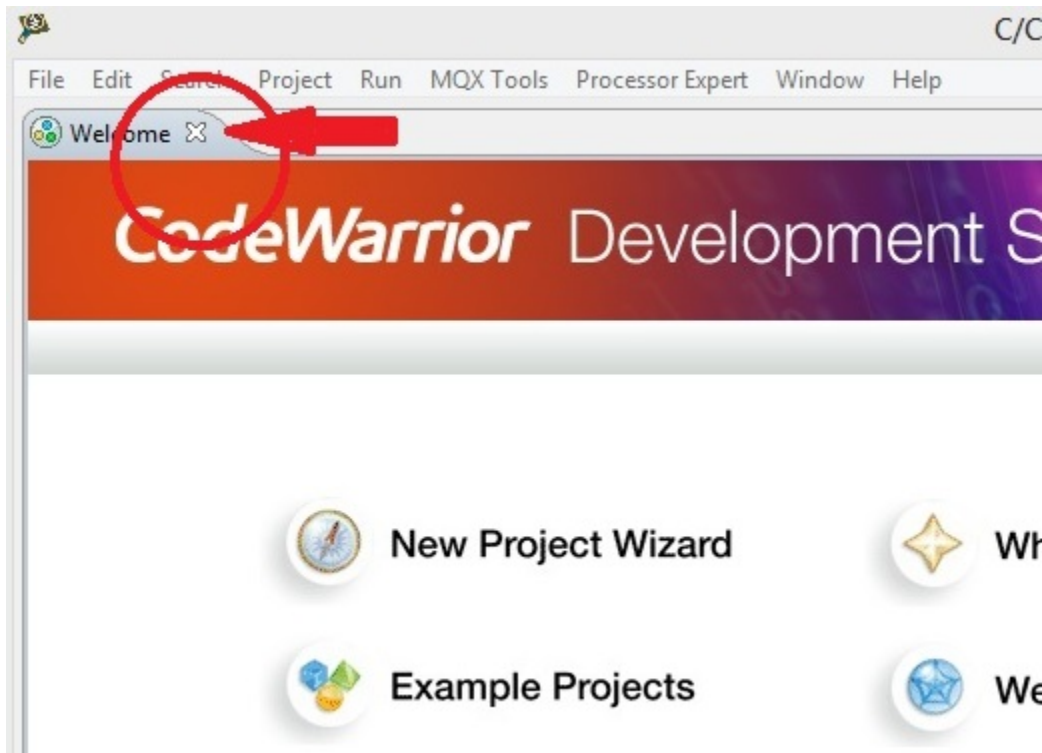


maybe will open firewall popup as below

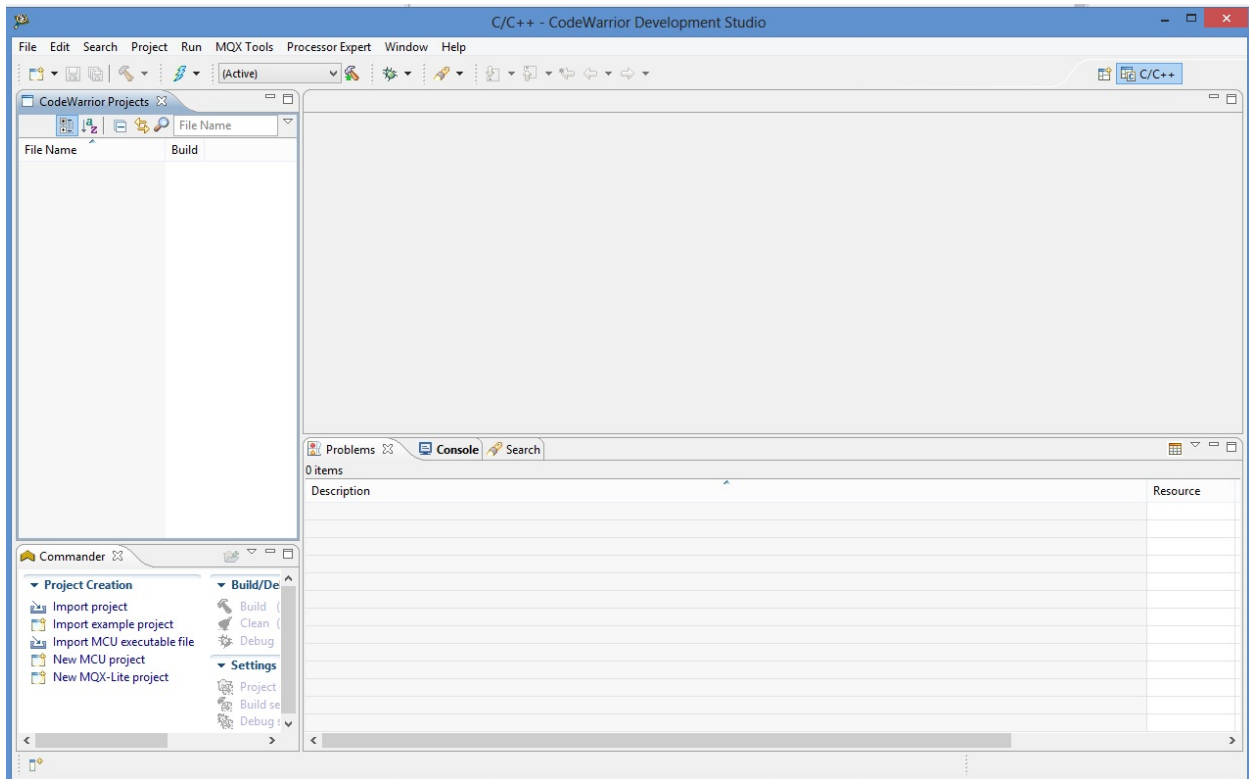


if yes, left-click on **enable access** and proceed

- close the welcome window by clicking 'X' in the Welcome tab



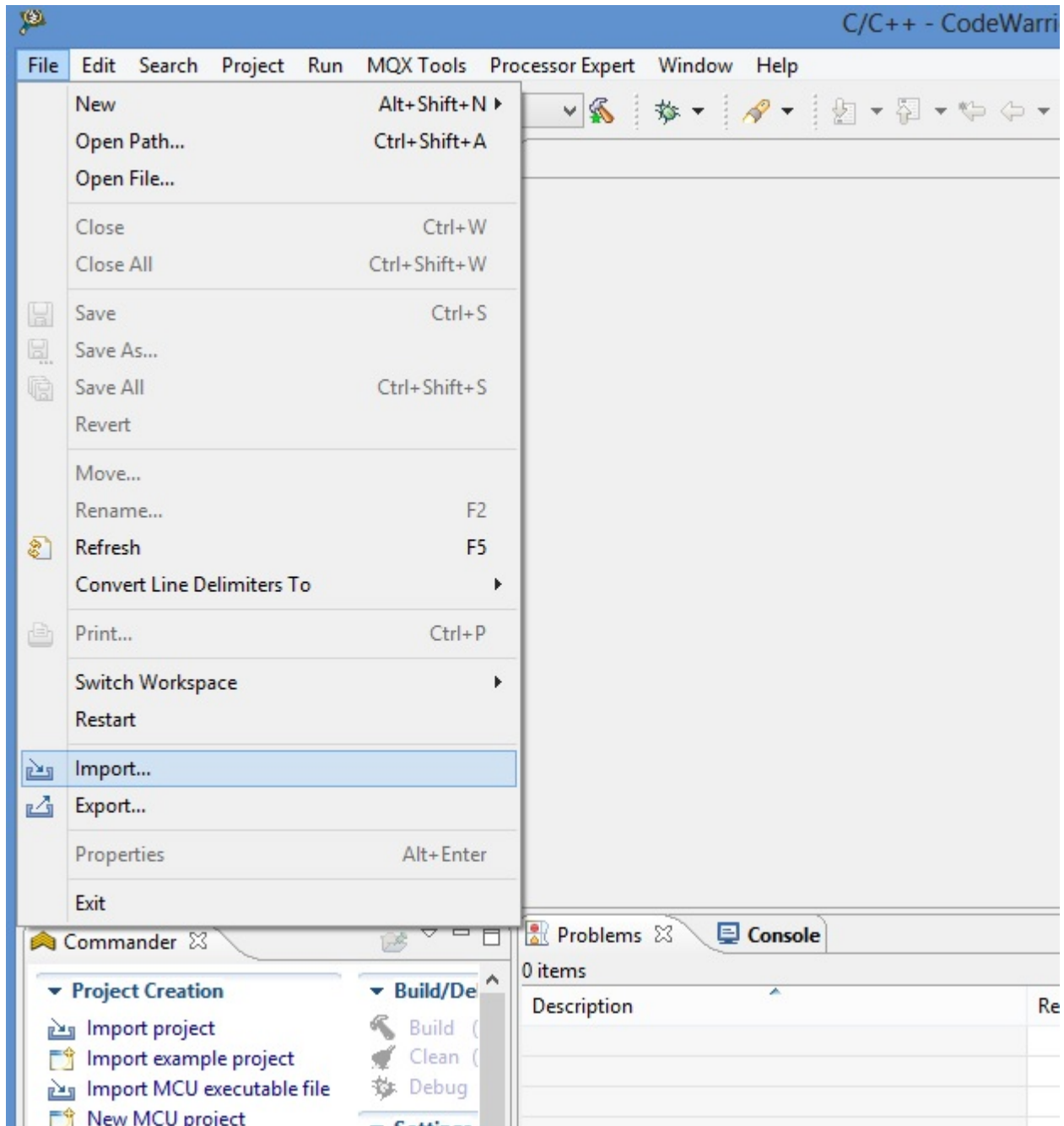
Now we can see the Codewarrior main window



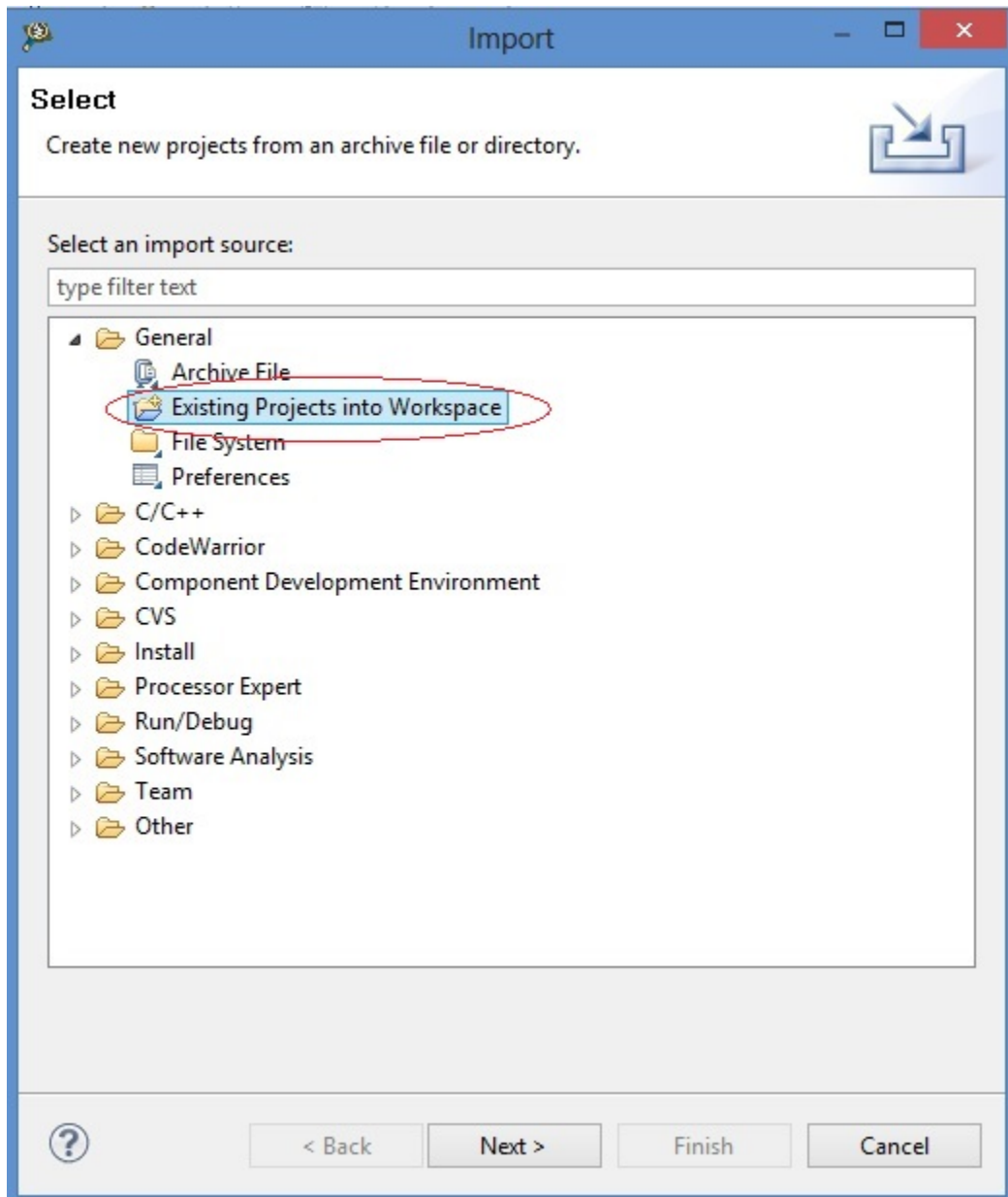
Codewarrior is ready to import the project

Pmod FIRMWARE IMPORT

- Select File → Import and click

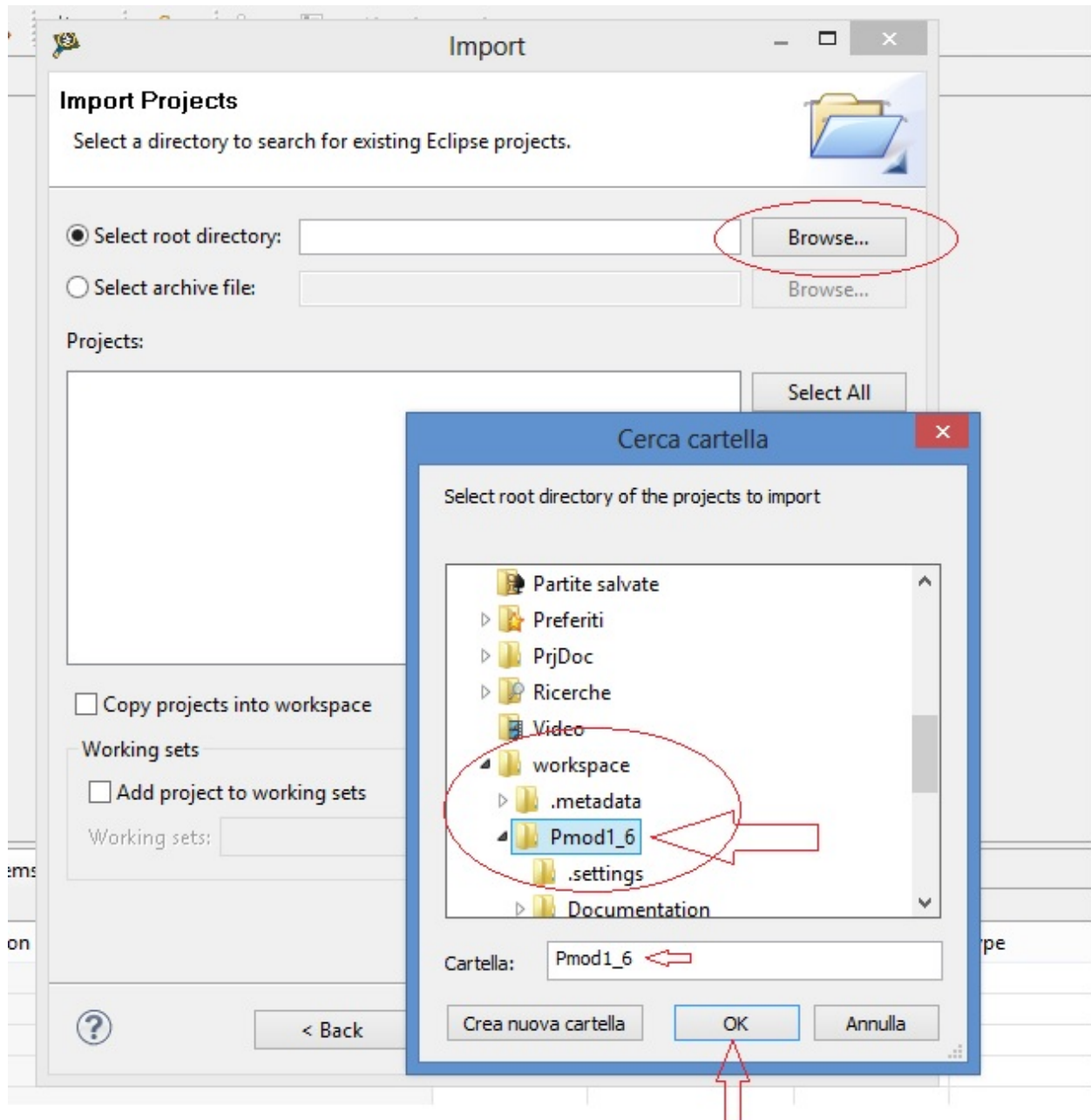


- in the next tab select “Existing Project into Workspace” and click “NEXT”

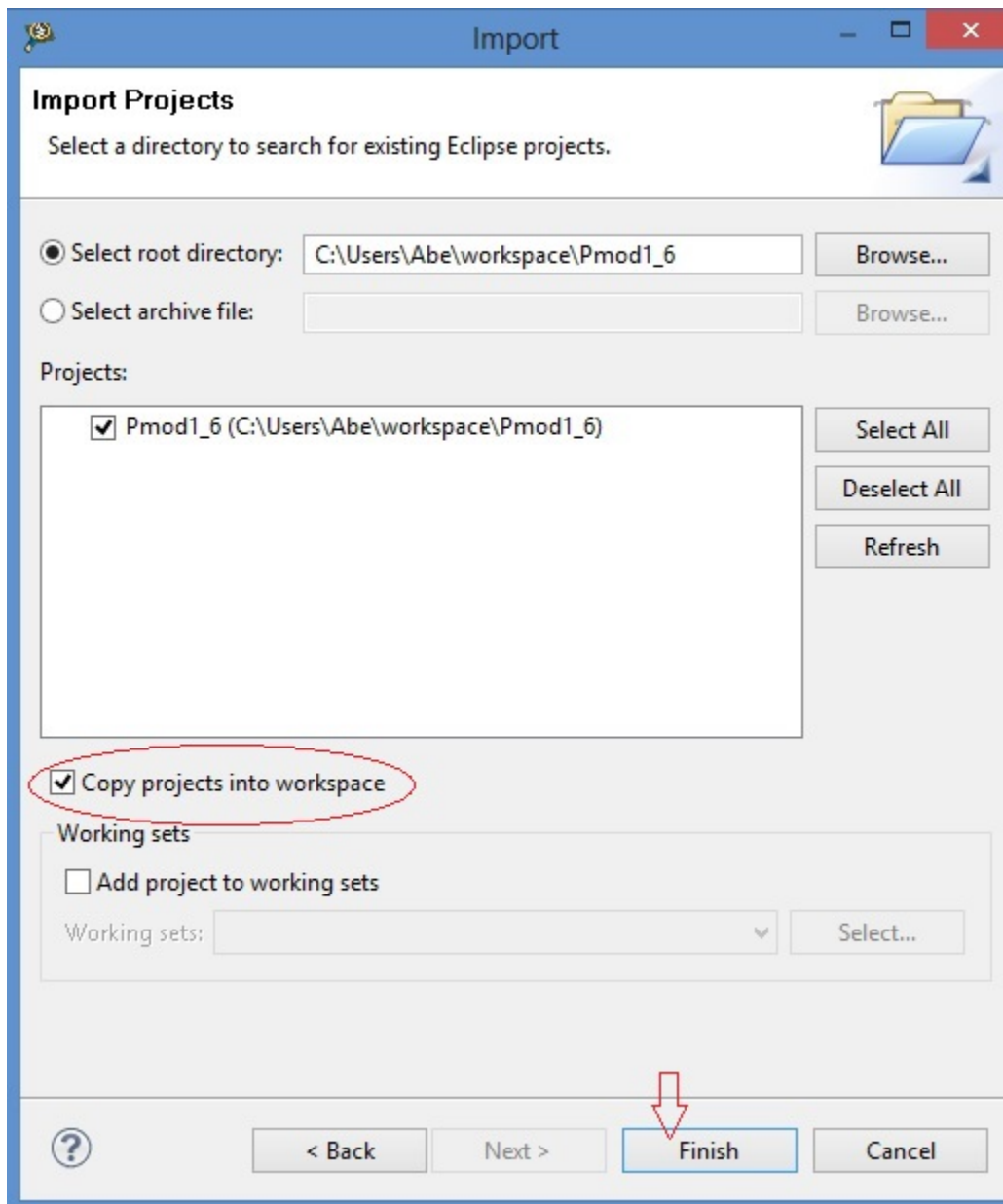


- in the next window make the following step

- 1 - click on **Browse** button.
- 2 - select folder "Pmod1_6" as below.
- 3 - click on OK button.

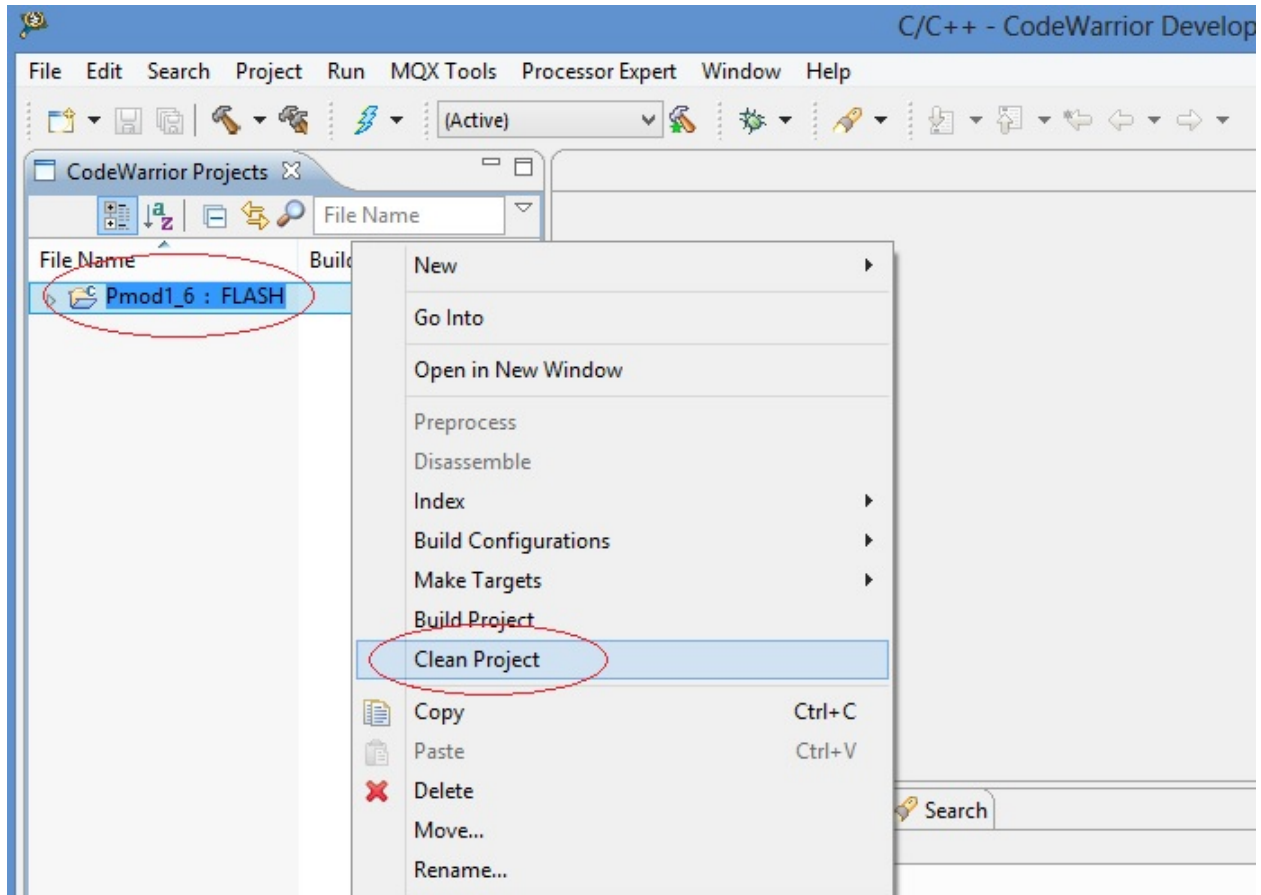


- select checkbox “Pmod1_6(C:\User\ *my_foder_name* \workspace\Pmod1_6) and “Copy projects into workspace”
- click “Finish”

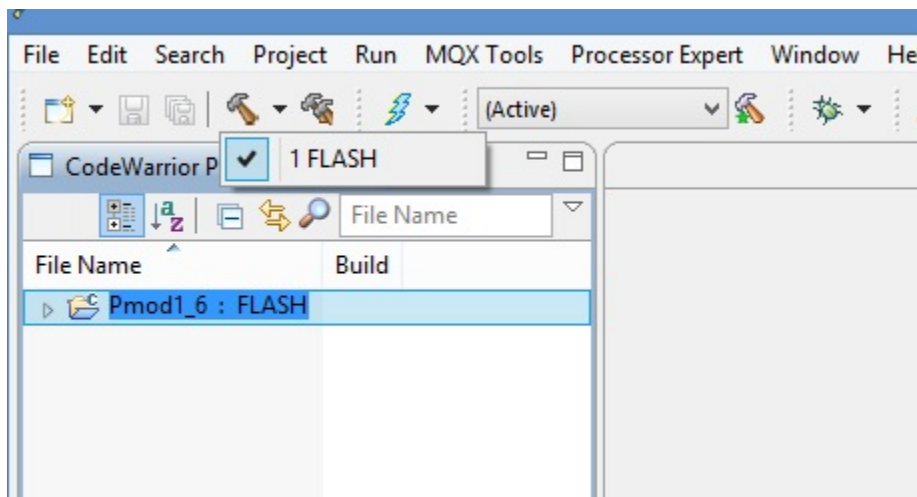


How to build Brooklyn Board FW

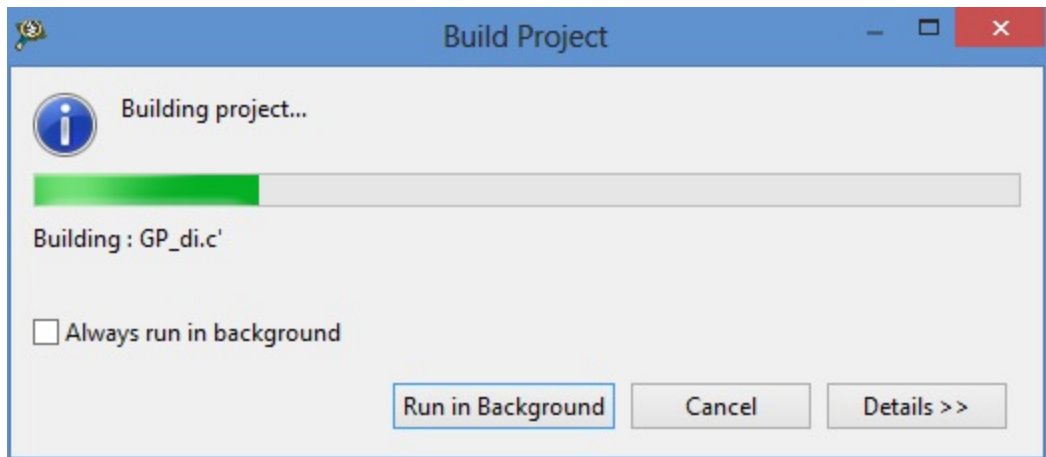
- see Codewarrior Project tab and select the project “Pmod1_6”, right-click over, select “Clean Project” and click



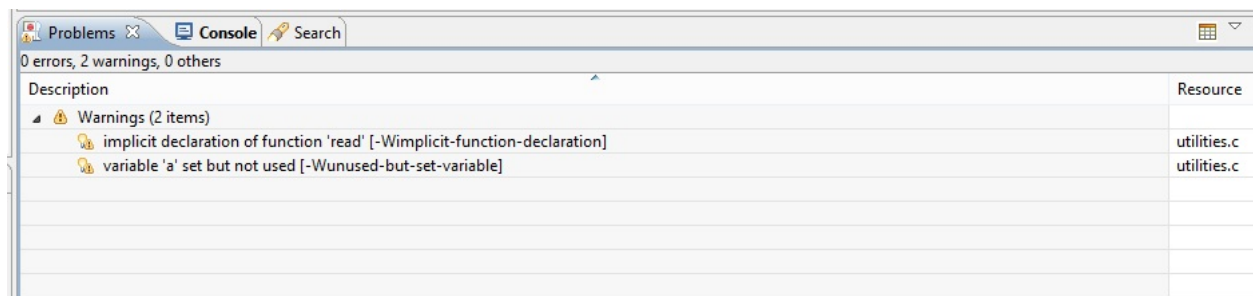
when process finish, see at hammer icon and click right arrow: in the tab you can see “1 FLASH” checked



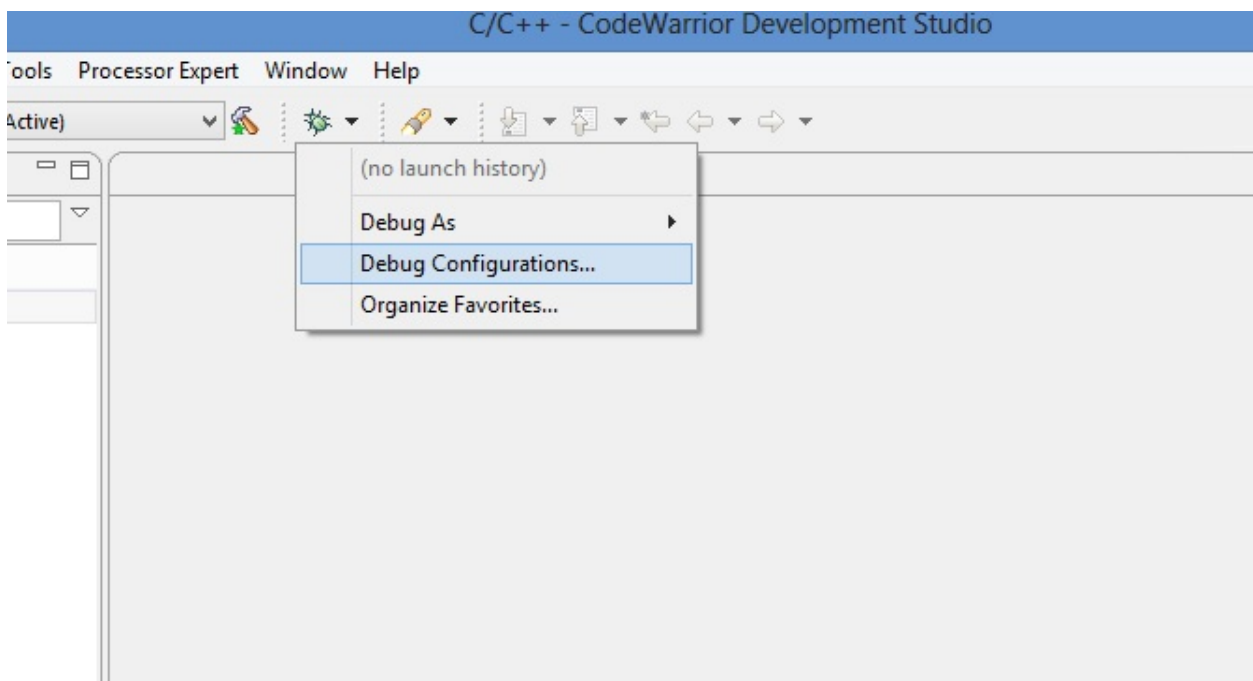
now click single-hammer icon to build entire project



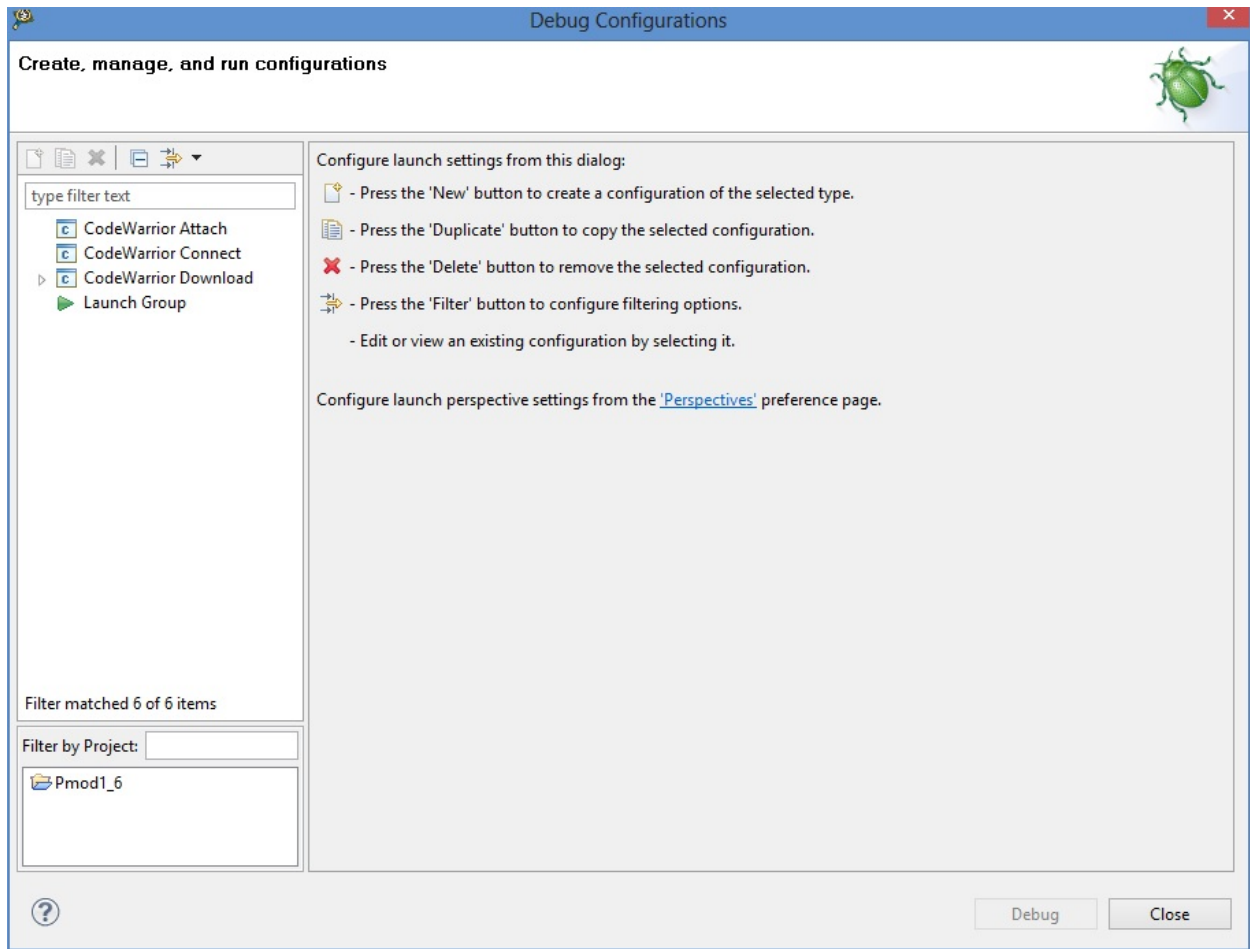
See the “problems” tab. There are 2 warnings derived from original project. They have no functionality effects.



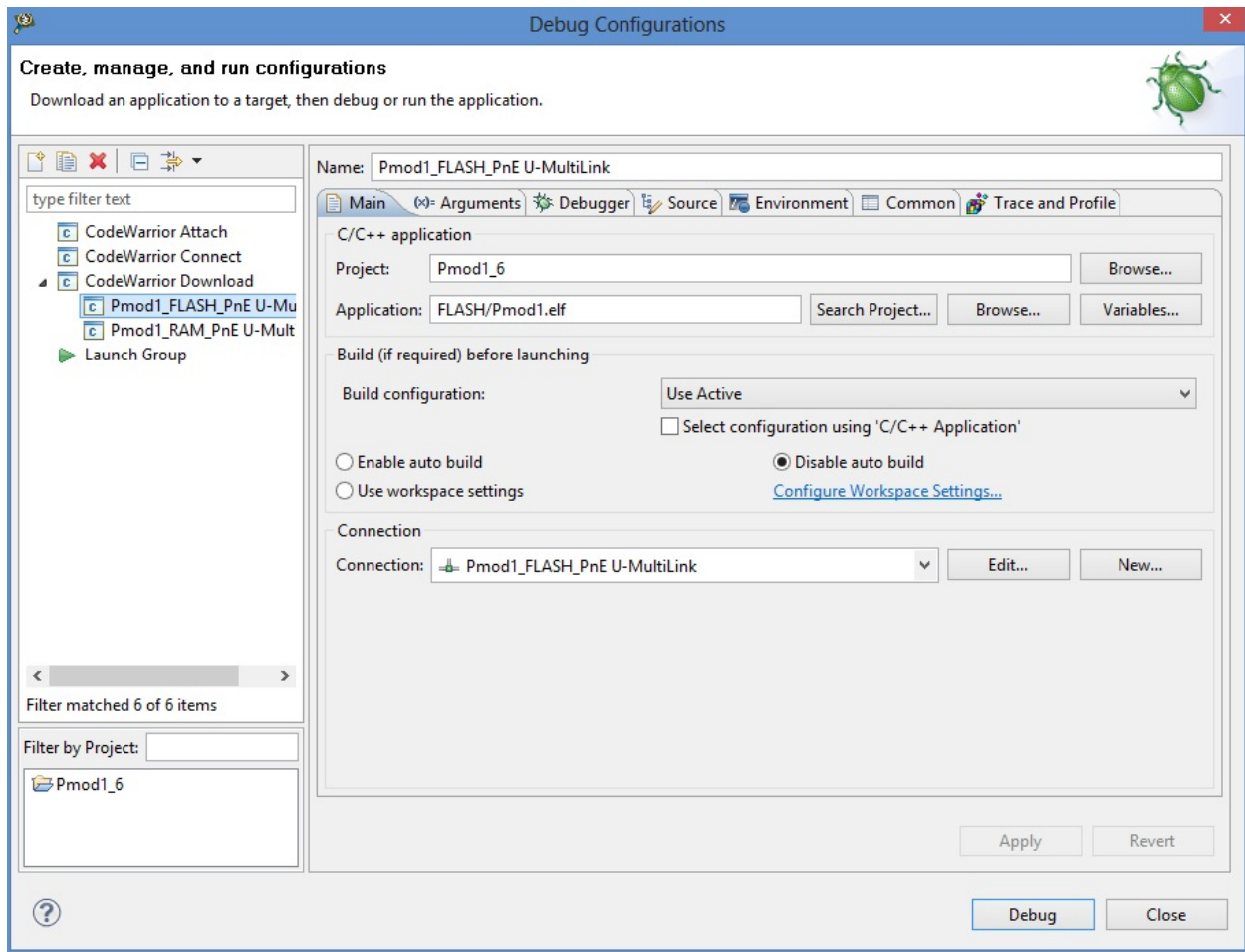
see the bug icon and click right arrow, select “Debug configurations” and click



Debug Configurations tab will open



expand Codewarrior Download, select “Pmod1_FLASH_PnE U-Multilink” and click. Now we see



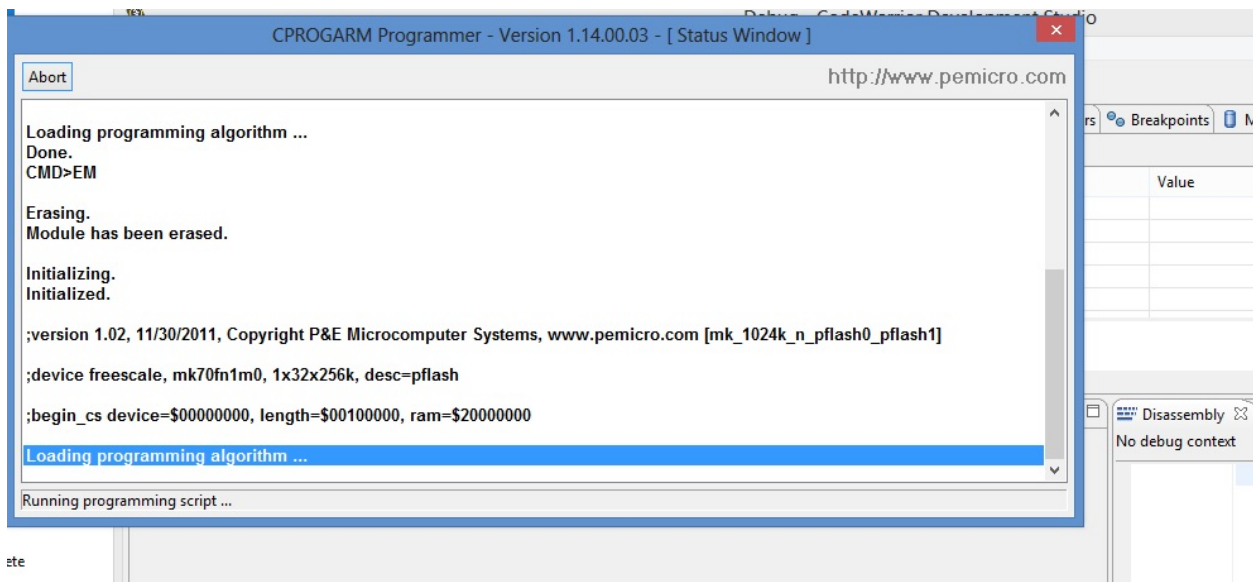
click on “Debug” button and wait

maybe will open firewall popup as below

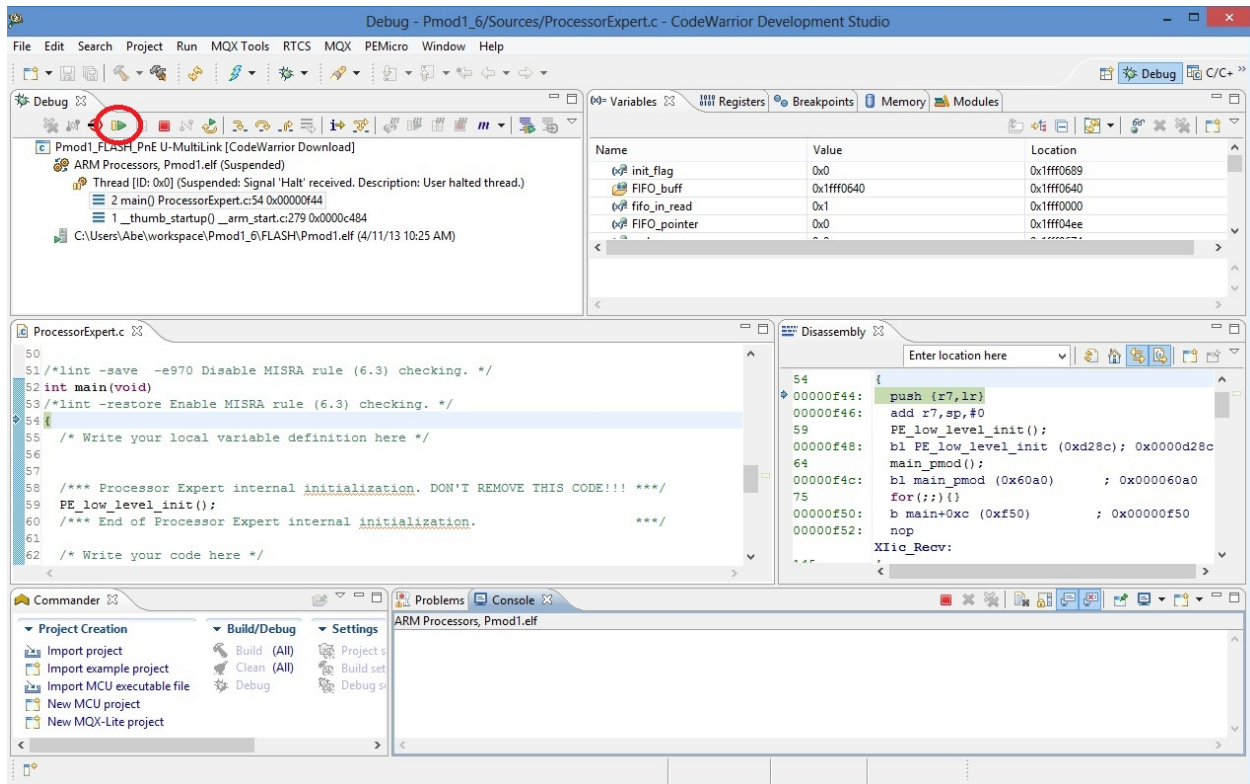


*if yes, left-click on **enable access** and proceed*

during firmware download this tab will open



and when download finish you see the main debug windows of Codewarrior



to start program you can press “F8” or click on Icon red-circled in image above

NOTE: for full Codewarrior functionality please refer to Freescale Official Guide

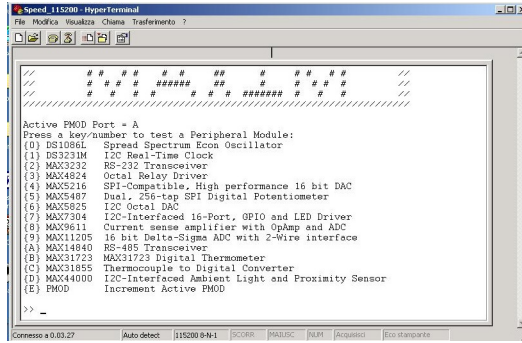
[download here Codewarrior Guide](#)

Running Brooklyn Board FW

When you start program, in terminal window you can see for few seconds this screen



and after you can see the main menu



Now select device menu (typing selection key in the terminal window) and follow menu option to test device.

It is strongly recommended to change or insert Pmod Modules when Tower System is off (without power).

Then, turn off the power by disconnecting the Mini USB B-type cable, remove device (if present) and insert new module in properly connector.

Turn on the power by plug the Mini USB B-type cable. The program will restart. Follow same steps used before to test new device

We also suggest you to see documentation [Maxim Pmod-Compatible Plug-In Peripheral Modules](#) for any specific further detail.

- search

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MaxFiles, 8