

<<Preliminary Document>>

R-CAR Series

OpenCV on ARM processors

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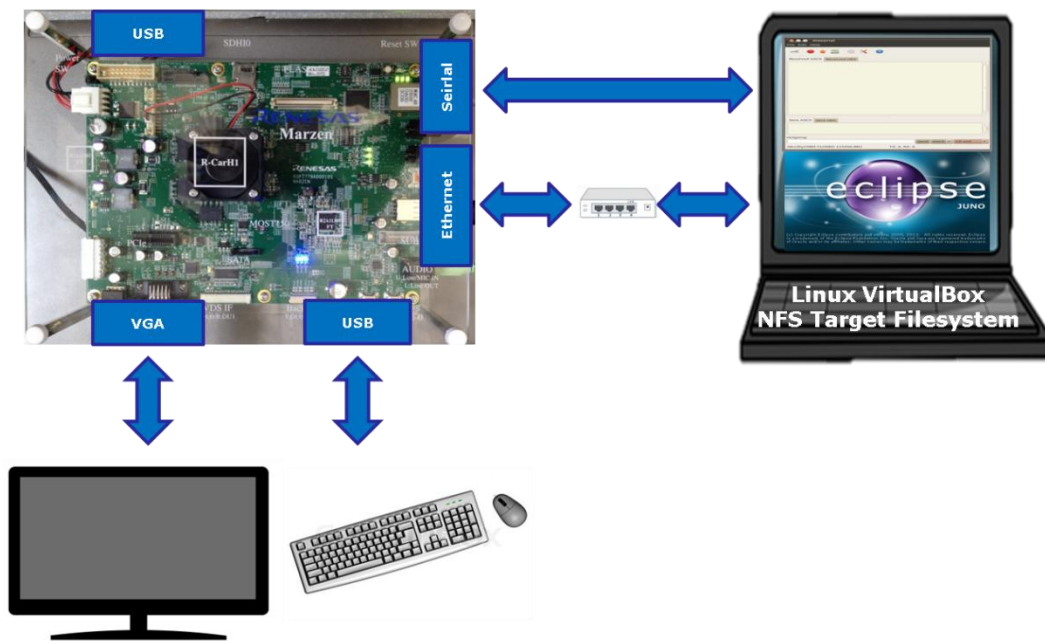
Chapter 1 Set-up

1.1 Recommended platform

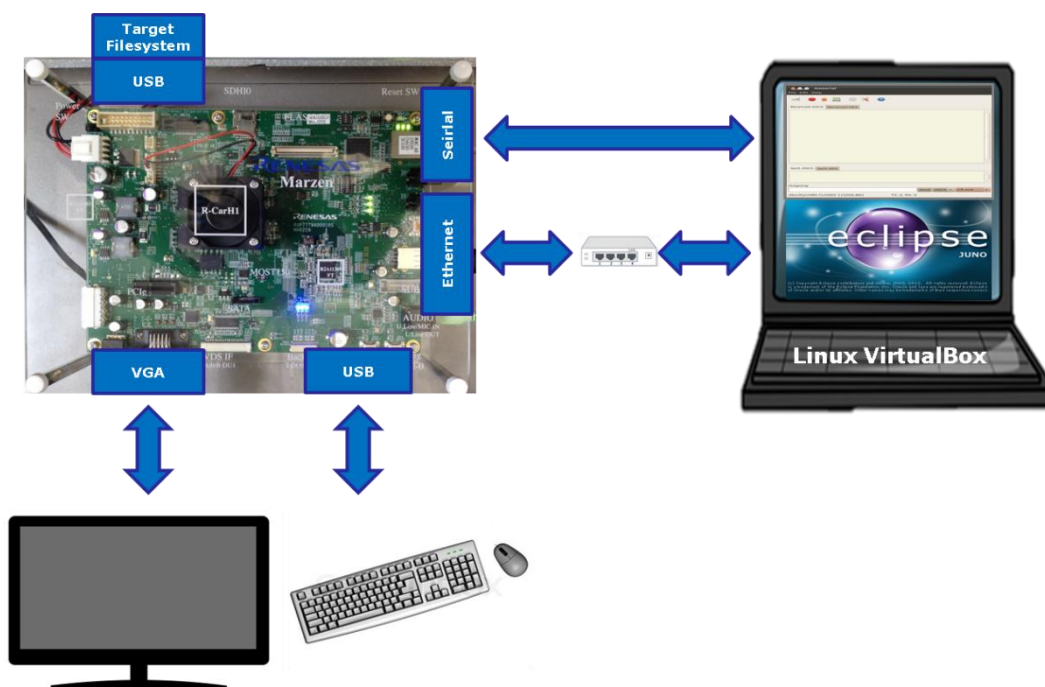
There are two ways to start the board. The target filesystem can be stored on:

- Linux PC using NFS protocol for development phase
- USB key for demonstration phase

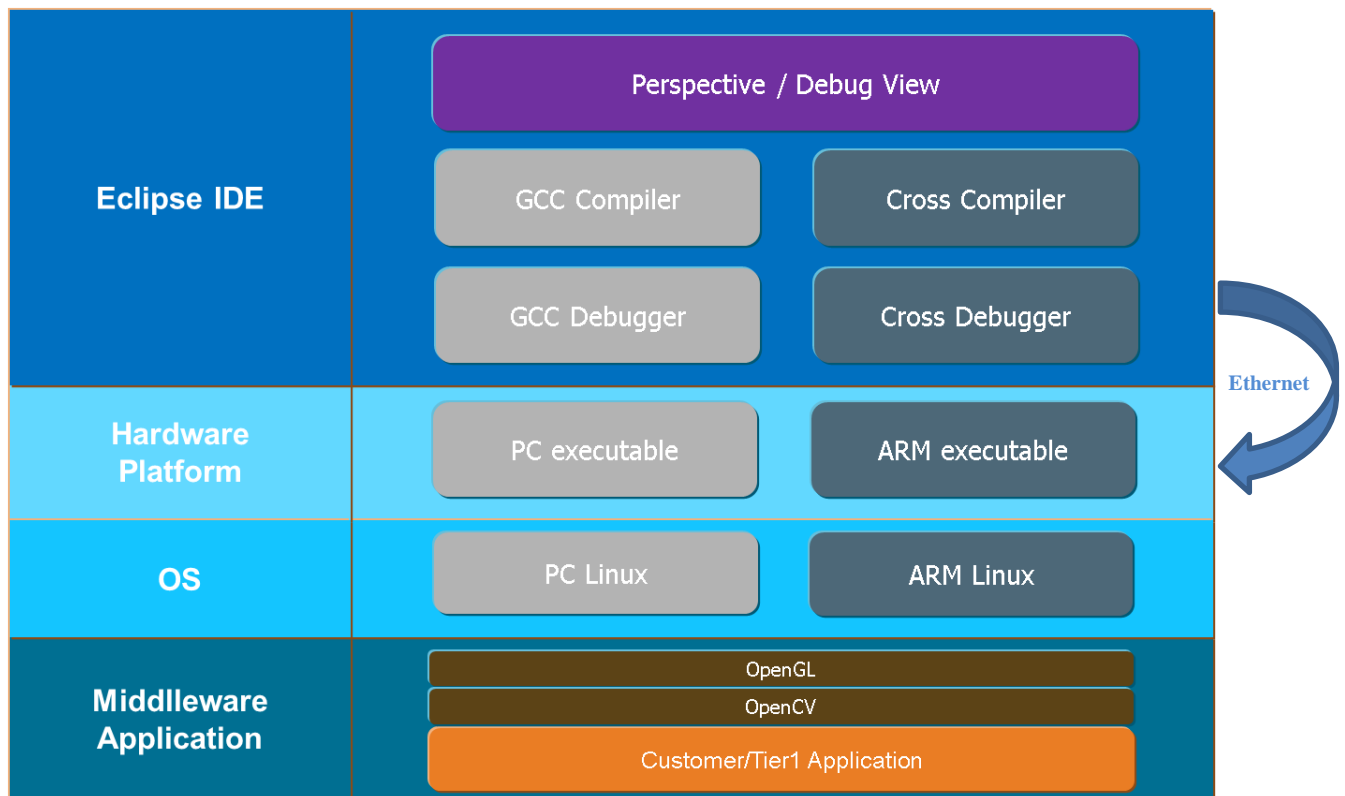
1.1.1 Target Filesystem running on Linux PC



1.1.2 Target Filesystem running on USB key



1.2 Compilation and debugging



1.3 Required systems

Remark : the installation is only necessary if you do not use the Ubuntu Virtual Machine Image delivered by Renesas.

1.3.1 10.04 Ubuntu Virtual machine image on Windows PC provided by Renesas

Install the latest Oracle's Virtual Box <https://www.virtualbox.org/>

Import the Ubuntu Virtual machine image with the below installed packages:

1/ PC related:

- Linux Ubuntu 10.04 for PC
- make, cmake, cmake-gui for PC
- eclipse and java
 - cross compiler plugin
 - C/C++ RTE plugin
- Compiled OpenCV library for PC

2/ ARM related

- CodeSourcery ARM Cross toolchain on PC:
 - arm-none-linux-gnueabi-gcc
 - arm-none-linux-gnueabi-g++
 - arm-none-linux-gnueabi-gdb
 - cross compiled OpenCV library for ARM required for dynamic link

- Marzen target filesystem at /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde
 - linux kernel for ARM
 - make, cmake, cmake-gui for ARM
 - gdb and gdbserver for remote debugging
 - on target compiled OpenCV for ARM

1.3.2 Ubuntu 10.04 Linux PC

Follow the [Linux package installation](#) procedure.

1.3.3 Login

Virtual machine:

- User : rcar
- Root password : +rcar1

Marzen board:

- User : renesas
- Root password : temppwd

By default, keyboard layout for both systems is French.

To modify the layout:

- Virtual machine: System->Preferences->Keyboard
- Marzen board:
 - If accessing from Marzen :
 - `sudo leafpad /etc/default/keyboard`
 - If accessing from Virtual Machine :
 - `sudo gedit /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde/etc/default/keyboard`
 - Modify `XKBLAYOUT` from "fr" to "us"
`XKBMODEL="pc105"`
`XKBLAYOUT="fr"`
`XKBVARIANT=""`
`XKBOPTIONS=""`

In order to start the Marzen board with a filesystem installed on PC via Ethernet; you need to configure a NFS server:

- apt-get install nfs-kernel-server
- gedit /etc/exports

Add a line like below according to your network configuration:

- /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde
172.29.0.0/16(rw,no_root_squash,sync,no_subtree_check)

Restart NFS after any changes with:

- /etc/init.d/nfs-kernel-server restart
- gedit /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde/etc/netwrk/interface

If you have use different IP address and network parameters for your Marzen board, modify the below figures in the “interface” file:

- address 172.29.33.91
- netmask 255.255.255.0
- gateway 172.29.33.254

1.6 USB Filesystem configuration

This step enables to start the file system from USB key and not via Ethernet.

A 8GB USB stick is used in the following example.

Format and make ext3 file system on USB disk

Plug in USB stick on Ubuntu Desktop

Select the USB device from System -> Administration -> Disk Utility, then in Volumes option:

- Unmount Volume
- Format Volume
 - Type: Ext3 (kernel supports ext3)
 - Name: any name, e.g. usbExt3
 - Unselect "Take ownership of filesystem"
 - Format

After Format is done, re-mount the volume by clicking on:

- Mount Volume

Now, the USB (ext3) will be mounted as /media/usbExt3

- cd /media/usbExt3
- sudo tar xfvp /exports/marzen/marzen_fs_u1104lxde.tar
- sync

Move file system to usb root folder:

- `cd xxx` (the folder name after above tar)
- `sudo mv * ../`

Remove empty folder

- `cd ../`
- `sudo rm -rf xxx`

Remove USB

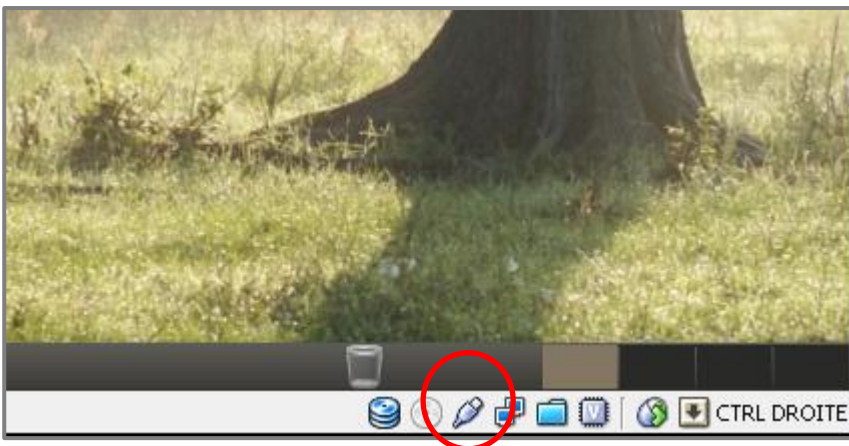
- `umount /media/usbExt3`

Now, the USB Ubuntu lxde file system is ready.

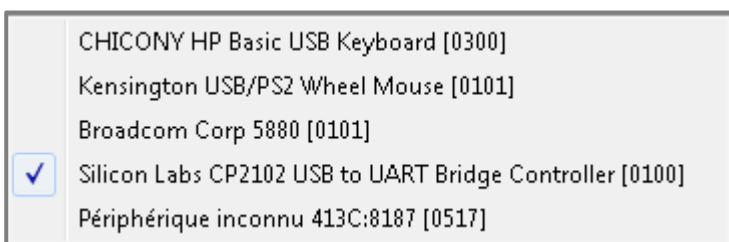
1.7 Booting Marzen board

1.7.1 Serial terminal setting

If using Virtual Box, right click on the usb icon :



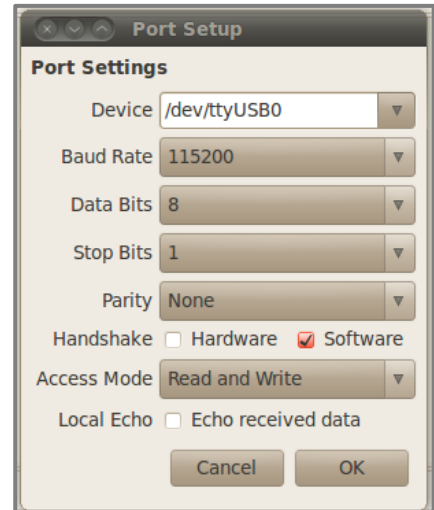
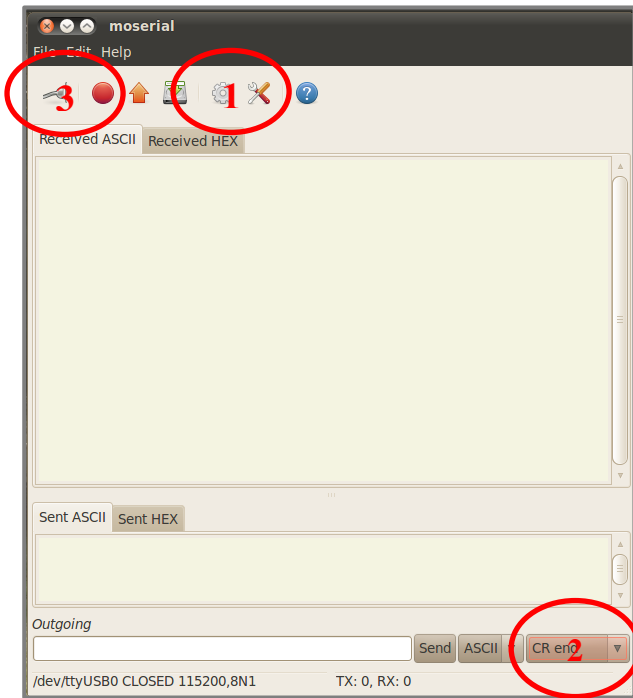
Then select the Silicon Labs device :



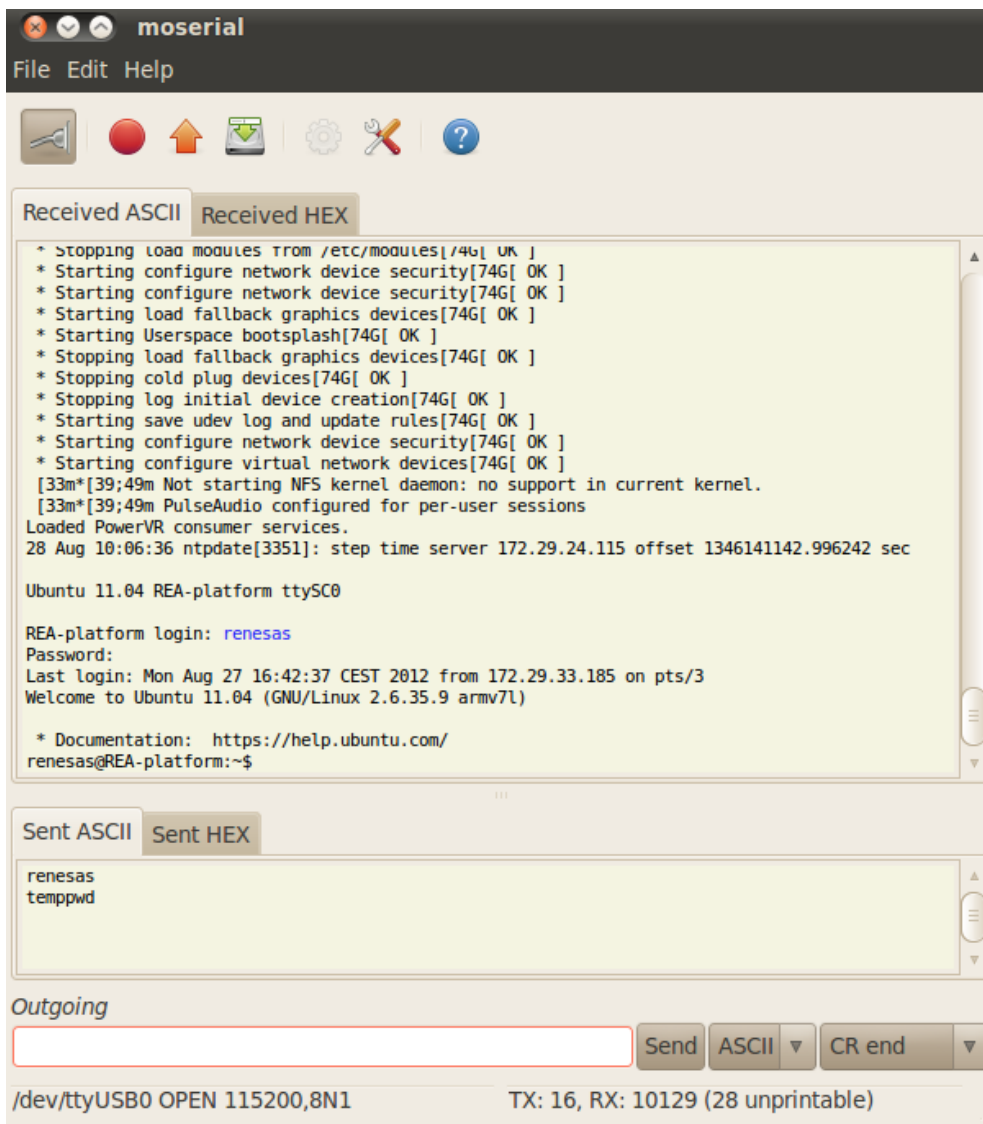
Open a serial terminal from the menu : Applications->Accessories->moserial Terminal

Click on Port Setup icon and configure as follow. Device name can be different depending on your machine.

Select CR end at the bottom right part then connect the device



Restart the board. If the booting is successful, you should get the below message.



The screenshot shows a terminal window titled "moserial" with a menu bar (File, Edit, Help) and a toolbar. The main area is split into "Received ASCII" and "Received HEX" tabs. The "Received ASCII" tab displays the following boot sequence:

```
* Stopping load modules from /etc/modules[74G[ OK ]
* Starting configure network device security[74G[ OK ]
* Starting configure network device security[74G[ OK ]
* Starting load fallback graphics devices[74G[ OK ]
* Starting Userspace bootsplash[74G[ OK ]
* Stopping load fallback graphics devices[74G[ OK ]
* Stopping cold plug devices[74G[ OK ]
* Stopping log initial device creation[74G[ OK ]
* Starting save udev log and update rules[74G[ OK ]
* Starting configure network device security[74G[ OK ]
* Starting configure virtual network devices[74G[ OK ]
[33m*[39;49m Not starting NFS kernel daemon: no support in current kernel.
[33m*[39;49m PulseAudio configured for per-user sessions
Loaded PowerVR consumer services.
28 Aug 10:06:36 ntpdate[3351]: step time server 172.29.24.115 offset 1346141142.996242 sec

Ubuntu 11.04 REA-platform ttySC0

REAs-platform login: renesas
Password:
Last login: Mon Aug 27 16:42:37 CEST 2012 from 172.29.33.185 on pts/3
Welcome to Ubuntu 11.04 (GNU/Linux 2.6.35.9 armv7l)

* Documentation: https://help.ubuntu.com/
renesas@REA-platform:~$
```

The "Sent ASCII" tab shows the user input:

```
renesas
temppwd
```

At the bottom, the "Outgoing" section has an empty text input field and buttons for "Send", "ASCII", and "CR end". The status bar at the bottom indicates the device path and data flow: "/dev/ttyUSB0 OPEN 115200,8N1 TX: 16, RX: 10129 (28 unprintable)".

Enter the login: renesas

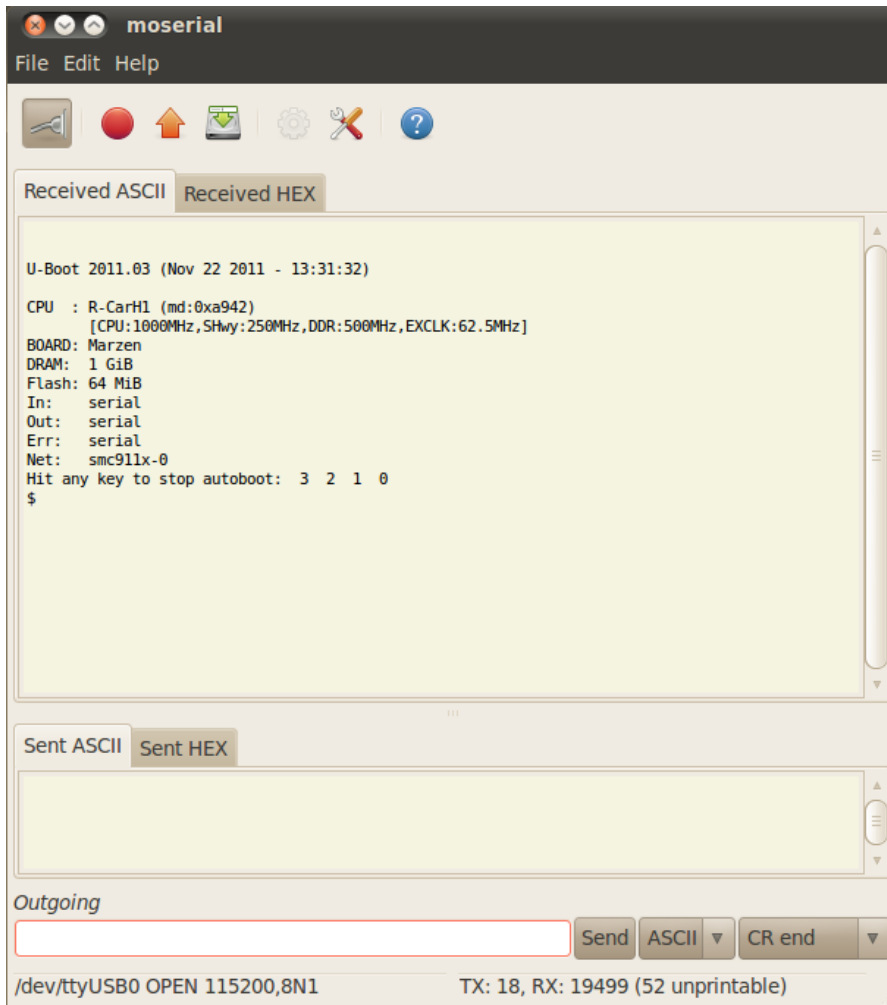
Enter the password : temppwd

Now you are logged to the marzen board.

1.7.2 Selecting booting mode

By default, the board will boot from NFS filesystem. If you want switch between USB or NSF mode, please follow the below procedure.

Once the terminal is connected, restart the board. Within the 3 first seconds, press enter.



Type “printenv” to know your booting parameters : “bootargs” will inform if you start from NFS or USB filesystem.

If you want to change, type as follow:

- From USB FS :
 - o setenv bootargs console=ttySC0,115200 rootwait rw noinitrd root=/dev/sda
- From NFS FS :
 - o setenv bootargs console=ttySC0,115200 earlyprintk=sh-sci.0,115200 mem=768M root=/dev/nfs nfsroot=172.29.33.185:/home/rcar/linux/rootfs/marzen_ubuntu1104_lxdev ip=172.29.33.91:172.29.33.185:172.29.33.254

Then save with “saveenv”

Start with “run bootcmd” and log in.

1.8 Linux package installation

This step is required if you do not use the Ubuntu Virtual Machine Image delivered by Renesas.

1.8.1 ARM cross compiler

Download from [Mentor Sourcery](http://www.mentor.com/sourceforge) and install in /opt/arm-2010q1.

Make sure that the PATH contains the binary folder:

- echo \$PATH

If not, add to the PATH

- export PATH=\$PATH:/opt/arm-2010q1/bin

In terminal, the cross compiler shall be recognized

- arm-none-linux-gnueabi-g++

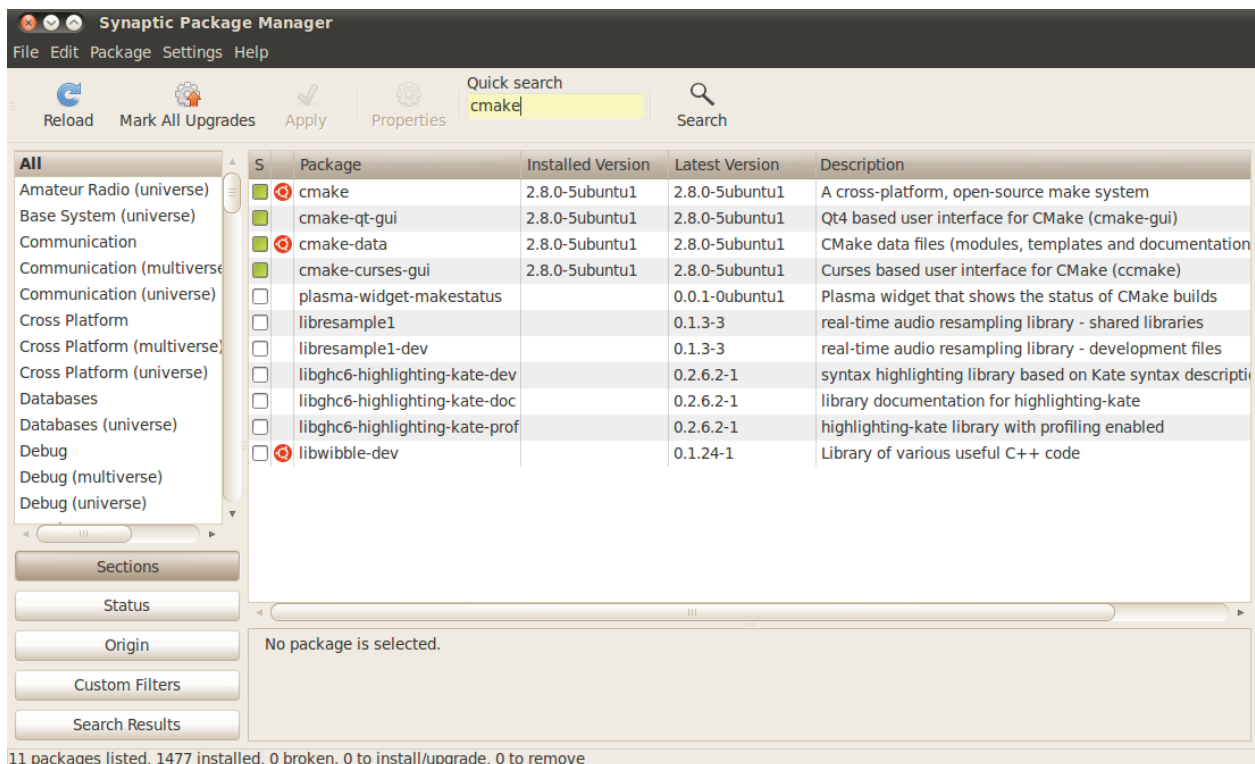
In order to be compatible with Eclipse plugins for cross compilation do the following:

- cd /opt/arm-2010q1/bin
- duplicate all the files
- modify the name of the copied files from “arm-none-linux-gnueabi-xxx” to “arm-none-eabi-xxx”

1.8.2 CMake : Cross Platform Make

Download Cmake with Synaptic Package Manager

- Open System -> Administration -> Synaptic Package Manager



Type in “Quick Search” : cmake

Select cmake, cmake-qt-gui, cmake-curses-gui, cmake-data for installation and click on “Apply” icon.

1.8.3 Java

Sun Java is required for Eclipse.

See [askubuntu](#) for help.

Download [Java JDK](#) by selecting “jdk-7u6-linux-i586.tar.gz” package.

Uncompress

- `tar -xvf jdk-7u6-linux-i586.tar.gz`

Move to /usr/lib

- `sudo mv ./jdk1.7.0_06 /usr/lib/jvm/jdk1.7.0`

Install java

- `sudo update-alternatives --install "/usr/bin/java" "java" "/usr/lib/jvm/jdk1.7.0/bin/java" 1`
- `sudo update-alternatives --install "/usr/bin/javac" "javac" "/usr/lib/jvm/jdk1.7.0/bin/javac" 1`
- `sudo update-alternatives --install "/usr/bin/javaws" "javaws" "/usr/lib/jvm/jdk1.7.0/bin/javaws" 1`
- `sudo update-alternatives --config java`
- Message is as below

There are 2 choices for the alternative java (providing /usr/bin/java).

Selection	Path	Priority	Status
0	/usr/lib/jvm/java-6-openjdk/jre/bin/java	1061	auto mode
1	/usr/lib/jvm/java-6-openjdk/jre/bin/java	1061	manual mode
* 2	/usr/lib/jvm/jdk1.7.0/bin/java	1	manual mode

Press enter to keep the current choice[], or type selection number:*

- Select number corresponding to jdk1.7.0.

Check java version

- `java -version`

java version "1.7.0_06"

Java(TM) SE Runtime Environment (build 1.7.0_06-b24)

Java HotSpot(TM) Client VM (build 23.2-b09, mixed mode)

Do the same for javac and javaws

- `sudo update-alternatives --config javac`
- `sudo update-alternatives --config javaws`

1.8.4 Eclipse

See [Ubuntu Eclipse](#) for help.

Download [Eclipse](#)

And install

- `tar -zxvf eclipse-SDK-3.4.1-linux-gtk.tar.gz && mv eclipse ~/opt`

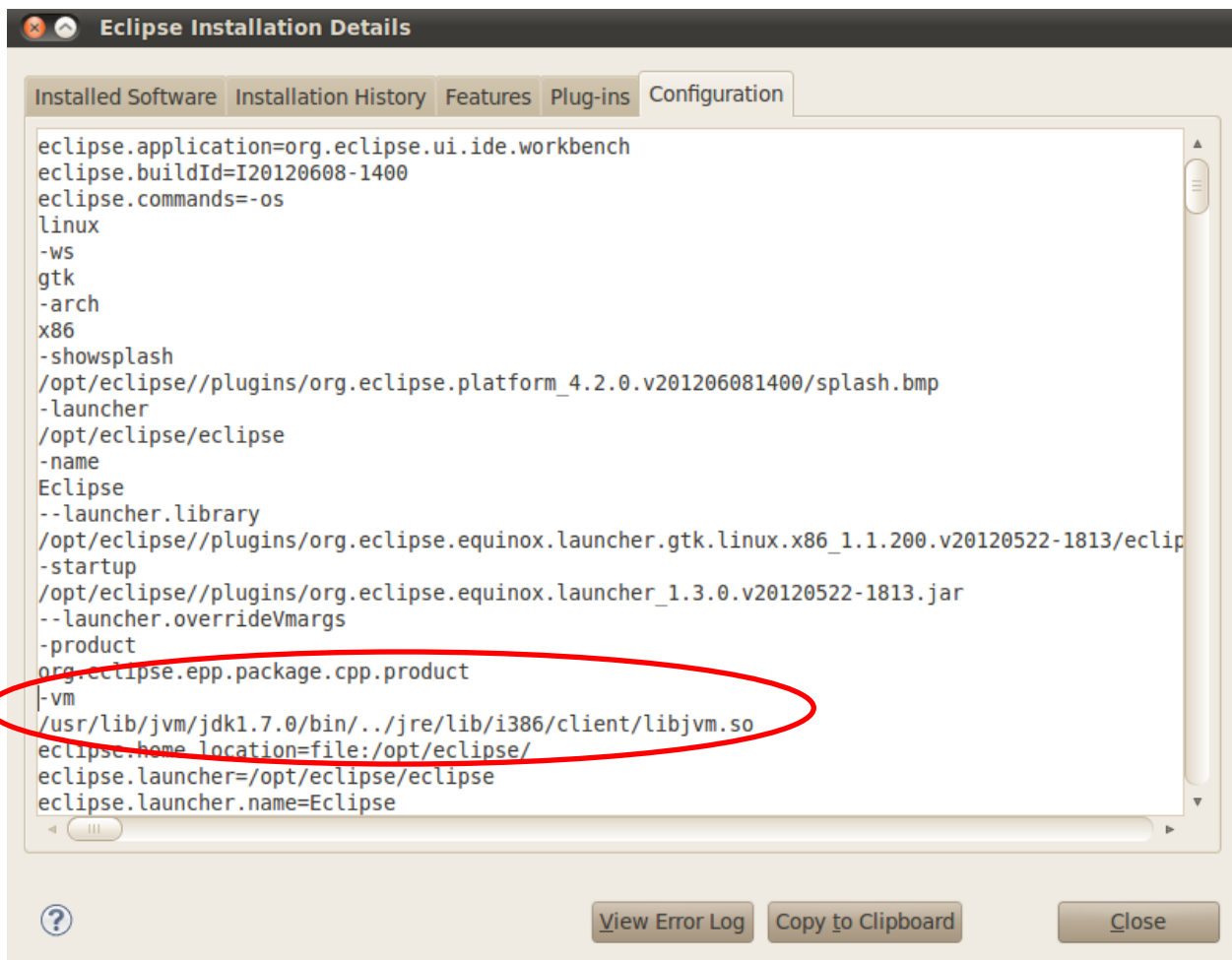
Create desktop shortcut

- right click on the desktop -> create launcher
 - Name : Eclipse
 - Command : `/opt/eclipse/eclipse`

Launch eclipse and select a workspace as e.g.: `/home/rcar/workspace`

Make sure that eclipse uses the correct java version : help -> About Eclipse -> Installations Details -> Configuration

Scroll down to reach `-vm` option and check that `jdk1.7.0` is selected.



1.8.5 More Eclipse plugins

Set up Internet access to Eclipse: Window->Preferences->General->Network Connections

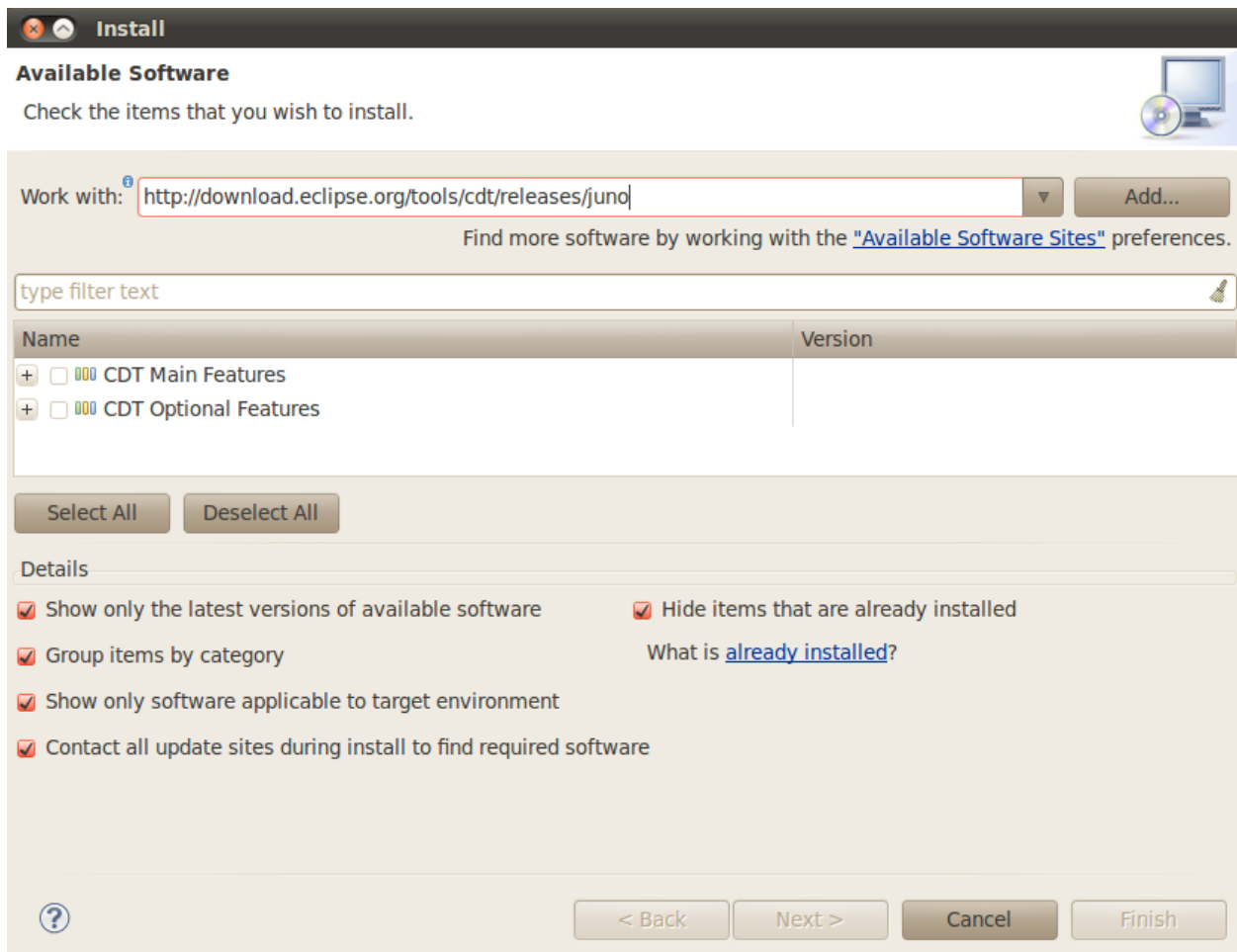
Update and add Eclipse plugins: Help->Install New Software

→ Install latest CDT plugins:

<http://download.eclipse.org/tools/cdt/releases/juno>

→ Install CDT GNU Cross Development Tools plugins

<http://sourceforge.net/projects/gnuarmeclipse/files>



Chapter 2 OpenCV

2.1 Build libraries

Download [OpenCV-2.4.2](#) and copy at /home/rcar

- cd /home/rcar

Unzip

- sudo tar -xvf OpenCV-2.4.2.tar.bz2

2.1.1 GNU compilation

2.1.1.1 Linux PC

Open System->Administration->Synaptic Package Manager and check if libpng, libjpeg, zlib and libgtk are installed, otherwise install them

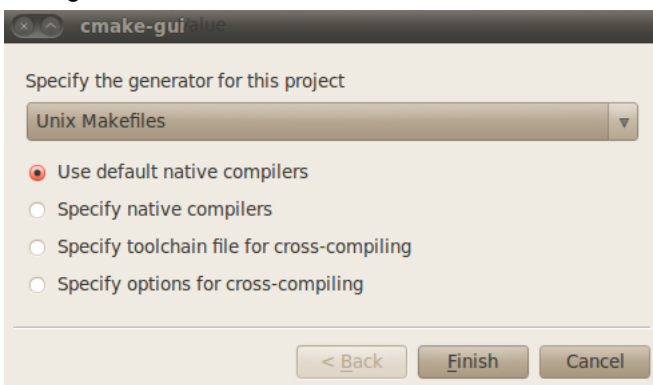
Start cmake-gui, in terminal type

- cd OpenCV-2.4.2
- mkdir build
- cmake-gui ./

Change Simple View to Advanced View and click Configure



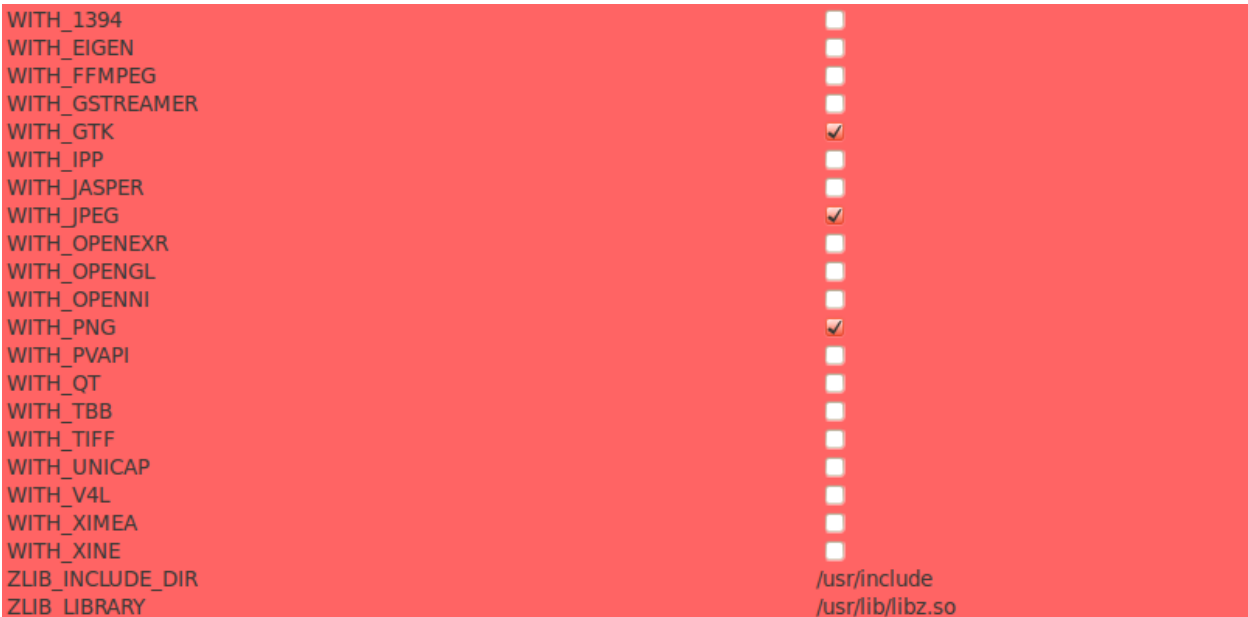
Configure as below and click Finish :



Select and fill in as below :

Name	Value
BIBTEX_COMPILER	BIBTEX_COMPILER-NOTFOUND
BUILD_DOCS	<input type="checkbox"/>
BUILD_EXAMPLES	<input checked="" type="checkbox"/>
BUILD_JASPER	<input type="checkbox"/>
BUILD_JPEG	<input checked="" type="checkbox"/>
BUILD_PACKAGE	<input checked="" type="checkbox"/>
BUILD_PERF_TESTS	<input checked="" type="checkbox"/>
BUILD_PNG	<input checked="" type="checkbox"/>
BUILD_SHARED_LIBS	<input checked="" type="checkbox"/>
BUILD_TESTS	<input checked="" type="checkbox"/>
BUILD_TIFF	<input type="checkbox"/>
BUILD_WITH_DEBUG_INFO	<input checked="" type="checkbox"/>
BUILD_ZLIB	<input checked="" type="checkbox"/>
BUILD_opencv_calib3d	<input checked="" type="checkbox"/>
BUILD_opencv_contrib	<input checked="" type="checkbox"/>
BUILD_opencv_core	<input checked="" type="checkbox"/>
BUILD_opencv_features2d	<input checked="" type="checkbox"/>
BUILD_opencv_flann	<input checked="" type="checkbox"/>
BUILD_opencv_gpu	<input checked="" type="checkbox"/>
BUILD_opencv_highgui	<input checked="" type="checkbox"/>
BUILD_opencv_imgproc	<input checked="" type="checkbox"/>
BUILD_opencv_legacy	<input checked="" type="checkbox"/>
BUILD_opencv_ml	<input checked="" type="checkbox"/>
BUILD_opencv_nonfree	<input checked="" type="checkbox"/>
BUILD_opencv_objdetect	<input checked="" type="checkbox"/>
BUILD_opencv_photo	<input checked="" type="checkbox"/>
BUILD_opencv_stitching	<input checked="" type="checkbox"/>
BUILD_opencv_ts	<input checked="" type="checkbox"/>
BUILD_opencv_video	<input checked="" type="checkbox"/>
BUILD_opencv_videostab	<input checked="" type="checkbox"/>
CMAKE_AR	/usr/bin/ar
CMAKE_BUILD_TYPE	Release
CMAKE_COLOR_MAKEFILE	<input checked="" type="checkbox"/>
CMAKE_CONFIGURATION_TYPES	Debug;Release
CMAKE_CXX_COMPILER	/usr/bin/g++
CMAKE_CXX_FLAGS	
CMAKE_CXX_FLAGS_DEBUG	-g
CMAKE_CXX_FLAGS_MINSIZEREL	-Os -DNDEBUG
CMAKE_CXX_FLAGS_RELEASE	-O3 -DNDEBUG
CMAKE_CXX_FLAGS_RELWITHDEBINFO	-O2 -g
CMAKE_C_COMPILER	/usr/bin/gcc
CMAKE_C_FLAGS	
CMAKE_C_FLAGS_DEBUG	-g
CMAKE_C_FLAGS_MINSIZEREL	-Os -DNDEBUG
CMAKE_C_FLAGS_RELEASE	-O3 -DNDEBUG
CMAKE_C_FLAGS_RELWITHDEBINFO	-O2 -g
CMAKE_EXE_LINKER_FLAGS	-lpthread -lrt
CMAKE_EXE_LINKER_FLAGS_DEBUG	
CMAKE_EXE_LINKER_FLAGS_MINSIZEREL	
CMAKE_EXE_LINKER_FLAGS_RELEASE	
CMAKE_EXE_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_INSTALL_PREFIX	/usr/local
CMAKE_LINKER	/usr/bin/ld
CMAKE_MAKE_PROGRAM	/usr/bin/make
CMAKE_MODULE_LINKER_FLAGS	
CMAKE_MODULE_LINKER_FLAGS_DEBUG	
CMAKE_MODULE_LINKER_FLAGS_MINSIZEREL	
CMAKE_MODULE_LINKER_FLAGS_RELEASE	
CMAKE_MODULE_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_NM	/usr/bin/nm
CMAKE_OBJCOPY	/usr/bin/objcopy
CMAKE_OBJDUMP	/usr/bin/objdump
CMAKE_RANLIB	/usr/bin/ranlib

CMAKE_SHARED_LINKER_FLAGS	
CMAKE_SHARED_LINKER_FLAGS_DEBUG	
CMAKE_SHARED_LINKER_FLAGS_MINSIZEREL	
CMAKE_SHARED_LINKER_FLAGS_RELEASE	
CMAKE_SHARED_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_SKIP_RPATH	<input type="checkbox"/>
CMAKE_STRIP	<input type="checkbox"/> /usr/bin/strip
CMAKE_USE_RELATIVE_PATHS	<input type="checkbox"/>
CMAKE_VERBOSE	<input type="checkbox"/>
CMAKE_VERBOSE_MAKEFILE	<input type="checkbox"/>
DVIPDF_CONVERTER	<input type="checkbox"/> /usr/bin/dvipdf
DVIPS_CONVERTER	<input type="checkbox"/> DVIPS_CONVERTER-NOTFOUND
EIGEN_INCLUDE_PATH	<input type="checkbox"/> EIGEN_INCLUDE_PATH-NOTFOUND
ENABLE_FAST_MATH	<input type="checkbox"/>
ENABLE_NOISY_WARNINGS	<input type="checkbox"/>
ENABLE_OMIT_FRAME_POINTER	<input checked="" type="checkbox"/>
ENABLE_PRECOMPILED_HEADERS	<input checked="" type="checkbox"/>
ENABLE_PROFILING	<input type="checkbox"/>
ENABLE_SSE	<input type="checkbox"/>
ENABLE_SSE2	<input type="checkbox"/>
ENABLE_SSE3	<input type="checkbox"/>
ENABLE_SSE41	<input type="checkbox"/>
ENABLE_SSE42	<input type="checkbox"/>
ENABLE_SSSE3	<input type="checkbox"/>
EXECUTABLE_OUTPUT_PATH	<input type="checkbox"/> /home/rcar/OpenCV-2.4.2/build/bin
INSTALL_C_EXAMPLES	<input type="checkbox"/>
INSTALL_PYTHON_EXAMPLES	<input type="checkbox"/>
INSTALL_TO_MANGLED_PATHS	<input type="checkbox"/>
JPEG_INCLUDE_DIR	<input type="checkbox"/> /usr/include
JPEG_LIBRARY	<input type="checkbox"/> /usr/lib/libjpeg.so
LATEX2HTML_CONVERTER	<input type="checkbox"/> LATEX2HTML_CONVERTER-NOTFOUND
LATEX_COMPILER	<input type="checkbox"/> LATEX_COMPILER-NOTFOUND
MAKEINDEX_COMPILER	<input type="checkbox"/> MAKEINDEX_COMPILER-NOTFOUND
OPENCV_CAN_BREAK_BINARY_COMPATIBILITY	<input type="checkbox"/>
OPENCV_CONFIG_FILE_INCLUDE_DIR	<input type="checkbox"/> /home/rcar/OpenCV-2.4.2/build
OPENCV_WARNINGS_ARE_ERRORS	<input type="checkbox"/>
OPENEXR_HALF_LIBRARY	<input type="checkbox"/> OPENEXR_HALF_LIBRARY-NOTFOUND
OPENEXR_IEX_LIBRARY	<input type="checkbox"/> OPENEXR_IEX_LIBRARY-NOTFOUND
OPENEXR_ILMIMF_LIBRARY	<input type="checkbox"/> OPENEXR_ILMIMF_LIBRARY-NOTFOUND
OPENEXR_ILMTHREAD_LIBRARY	<input type="checkbox"/> OPENEXR_ILMTHREAD_LIBRARY-NOTFO...
OPENEXR_IMATH_LIBRARY	<input type="checkbox"/> OPENEXR_IMATH_LIBRARY-NOTFOUND
OPENEXR_INCLUDE_PATH	<input type="checkbox"/> OPENEXR_INCLUDE_PATH-NOTFOUND
PDFLATEX_COMPILER	<input type="checkbox"/> PDFLATEX_COMPILER-NOTFOUND
PKG_CONFIG_EXECUTABLE	<input type="checkbox"/> /usr/bin/pkg-config
PNG_LIBRARY	<input type="checkbox"/> /usr/lib/libpng.so
PNG_PNG_INCLUDE_DIR	<input type="checkbox"/> /usr/include
PS2PDF_CONVERTER	<input type="checkbox"/> /usr/bin/ps2pdf14
PVAPI_INCLUDE_PATH	<input type="checkbox"/> PVAPI_INCLUDE_PATH-NOTFOUND
PYTHON_EXECUTABLE	<input type="checkbox"/> /usr/bin/python2.6
PYTHON_INCLUDE_DIR	<input type="checkbox"/> PYTHON_INCLUDE_DIR-NOTFOUND
PYTHON_LIBRARY	<input type="checkbox"/> PYTHON_LIBRARY-NOTFOUND
PYTHON_PACKAGES_PATH	<input type="checkbox"/> lib/python2.6/dist-packages
SVNVERSION_PATH	<input type="checkbox"/> SVNVERSION_PATH-NOTFOUND



Click on Configure and Generate. The result is as follow:

```

Detected version of GNU GCC: 44 (404)
Could NOT find PythonLibs (missing: PYTHON_LIBRARIES PYTHON_INCLUDE_DIRS)

General configuration for OpenCV 2.4.2 =====

Platform:
Host:           Linux 2.6.32-38-generic i686
CMake:          2.8.0
CMake generator: Unix Makefiles
CMake build tool: /usr/bin/make
Configuration:  Release

C/C++:
Built as dynamic libs?: YES
C++ Compiler:   /usr/bin/g++ (ver 4.4.3)
C++ flags (Release): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -march=i686 -fomit-frame-pointer -mfpmath=387 -ffunction-sections -O3 -DNDEBUG -DNDEBUG
C++ flags (Debug): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -march=i686 -fomit-frame-pointer -mfpmath=387 -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3
C Compiler:     /usr/bin/gcc
C flags (Release): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -march=i686 -fomit-frame-pointer -mfpmath=387 -ffunction-sections -O3 -DNDEBUG -DNDEBUG
C flags (Debug): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -march=i686 -fomit-frame-pointer -mfpmath=387 -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3

```

Linker flags (Release):

Linker flags (Debug):

Precompiled headers: YES

OpenCV modules:

To be built: core imgproc flann highgui features2d calib3d ml video objdetect contrib nonfree
gpu legacy photo stitching ts videostab

Disabled: -

Disabled by dependency: -

Unavailable: androidcamera java python world

GUI:

QT 4.x: NO

GTK+ 2.x: YES (ver 2.20.1)

GThread : YES (ver 2.24.1)

GtkGLExt: NO

OpenGL support: NO

Media I/O:

ZLib: build (ver 1.2.6)

JPEG: build (ver 62)

PNG: build (ver 1.5.9)

TIFF: NO

JPEG 2000: NO

OpenEXR: NO

Video I/O:

DC1394 1.x: NO

DC1394 2.x: NO

FFMPEG: NO

codec: NO

format: NO

util: NO

swscale: NO

gentoo-style: NO

GStreamer: NO

OpenNI: NO

OpenNI PrimeSensor Modules: NO

PvAPI: NO

UniCap: NO

UniCap ucil: NO

V4L/V4L2: NO/NO

XIMEA: NO

Xine: NO

Other third-party libraries:

Use IPP: NO

Use TBB: NO

Use Eigen: NO

*Python:**Interpreter:* */usr/bin/python2.6 (ver 2.6.5)**Tests and samples:**Tests:* *YES**Performance tests:* *YES**Examples:* *YES**Install path:* */usr/local**cvconfig.h is in:* */home/rcar/OpenCV-2.4.2/build**Configuring done**Generating done*

Quit CMake

In terminal

- `cd build`
- `make`
- `sudo make install`

Verify in `/usr/local/`

- “include” folder contains opencv files
- “lib” contain opencv files

Copy all opencv library files from `/usr/local/lib` to `/usr/lib`

Launch an executable, in terminal

- `cd /home/rcar/OpenCV-2.4.2/build/bin`

Execute a binary

- `./image /home/rcar/OpenCV-2.4.2/samples/cpp/lena.jpg`

The below image shall be displayed:



2.1.1.2 Marzen Board

Using Marzen desktop environment, the same procedure is repeated to build OpenCV on the target. Only home folder is changed from “/home/rcar” to “home/renesas”.

This compilation on target is necessary because the obtained OpenCV libraries contain correct link to dynamic libraries on target. Indeed, the cross compilation cannot link to some target dynamic libraries like “gtk”.

```

CMAKE_AR /usr/bin/ar
CMAKE_BUILD_TYPE Release
CMAKE_COLOR_MAKEFILE 
CMAKE_CONFIGURATION_TYPES Debug;Release
CMAKE_CXX_COMPILER /usr/bin/g++
CMAKE_CXX_FLAGS -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon
CMAKE_CXX_FLAGS_DEBUG -g
CMAKE_CXX_FLAGS_MINSIZEREL -Os -DNDEBUG
CMAKE_CXX_FLAGS_RELEASE -O3 -DNDEBUG
CMAKE_CXX_FLAGS_RELWITHDEBINFO -O2 -g
CMAKE_C_COMPILER /usr/bin/gcc
CMAKE_C_FLAGS -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon
CMAKE_C_FLAGS_DEBUG -g
CMAKE_C_FLAGS_MINSIZEREL -Os -DNDEBUG
CMAKE_C_FLAGS_RELEASE -O3 -DNDEBUG
CMAKE_C_FLAGS_RELWITHDEBINFO -O2 -g
CMAKE_EXE_LINKER_FLAGS -lpthread -lrt
CMAKE_EXE_LINKER_FLAGS_DEBUG
CMAKE_EXE_LINKER_FLAGS_MINSIZEREL
CMAKE_EXE_LINKER_FLAGS_RELEASE
CMAKE_EXE_LINKER_FLAGS_RELWITHDE...
CMAKE_INSTALL_PREFIX /usr/local
CMAKE_LINKER /usr/bin/ld
CMAKE_MAKE_PROGRAM /usr/bin/make
CMAKE_MODULE_LINKER_FLAGS
CMAKE_MODULE_LINKER_FLAGS_DEBUG
CMAKE_MODULE_LINKER_FLAGS_MINSIZ...
CMAKE_MODULE_LINKER_FLAGS_RELEASE
CMAKE_MODULE_LINKER_FLAGS_RELWIT...
CMAKE_NM /usr/bin/nm
CMAKE_OBJCOPY /usr/bin/objcopy
CMAKE_OBJDUMP /usr/bin/objdump
CMAKE_RANLIB /usr/bin/ranlib

```

The result is as follow:

```

Detected version of GNU GCC: 45 (405)
Looking for fseeko
Looking for fseeko - found
Looking for unistd.h
Looking for unistd.h - found
Looking for stdint.h
Looking for stdint.h - found
Looking for stddef.h
Looking for stddef.h - found
Check size of off64_t
Check size of off64_t - failed
Performing Test HAVE_C_WNO_ATTRIBUTES
Performing Test HAVE_C_WNO_ATTRIBUTES - Success
Performing Test HAVE_C_WNO_STRICT_PROTOTYPES
Performing Test HAVE_C_WNO_STRICT_PROTOTYPES - Success

```

Could NOT find PythonLibs (missing: PYTHON_INCLUDE_DIRS) (Required is at least version "2.7.1")

General configuration for OpenCV 2.4.2 =====

Platform:

Host: Linux 2.6.35.9 armv7l
 CMake: 2.8.3
 CMake generator: Unix Makefiles
 CMake build tool: /usr/bin/make
 Configuration: Release

C/C++:

Built as dynamic libs?: YES

C++ Compiler: /usr/bin/g++ (ver 4.5.2)

C++ flags (Release): -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -O3 -DNDEBUG -DNDEBUG

C++ flags (Debug): -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3

C Compiler: /usr/bin/gcc

C flags (Release): -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -O3 -DNDEBUG -DNDEBUG

C flags (Debug): -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3

Linker flags (Release):

Linker flags (Debug):

Precompiled headers: YES

OpenCV modules:

To be built: core imgproc flann highgui features2d calib3d ml video objdetect contrib nonfree gpu legacy photo stitching ts videostab

Disabled: -

Disabled by dependency: -

Unavailable: androidcamera java python world

GUI:

QT 4.x: NO

GTK+ 2.x: YES (ver 2.24.4)

GThread : YES (ver 2.28.6)

GtkGLExt: NO

OpenGL support: NO

Media I/O:

```
ZLib:                build (ver 1.2.6)
JPEG:                build (ver 62)
PNG:                 build (ver 1.5.9)
TIFF:                NO
JPEG 2000:           NO
OpenEXR:             NO

Video I/O:
DC1394 1.x:          NO
DC1394 2.x:          NO
FFMPEG:              NO
  codec:              NO
  format:             NO
  util:               NO
  swscale:            NO
  gentoo-style:       NO
GStreamer:           NO
OpenNI:              NO
OpenNI PrimeSensor Modules: NO
PvAPI:               NO
UniCap:              NO
UniCap ucil:         NO
V4L/V4L2:            NO/NO
XIMEA:               NO
Xine:                NO

Other third-party libraries:
Use TBB:              NO
Use Cuda:             NO
Use Eigen:            NO

Python:
Interpreter:          /usr/bin/python2.7 (ver 2.7.1)

Tests and samples:
Tests:                YES
Performance tests:    YES
Examples:             YES

Install path:         /usr/local

cvconfig.h is in:     /home/renesas/OpenCV-2.4.2/build
```

Configuring done

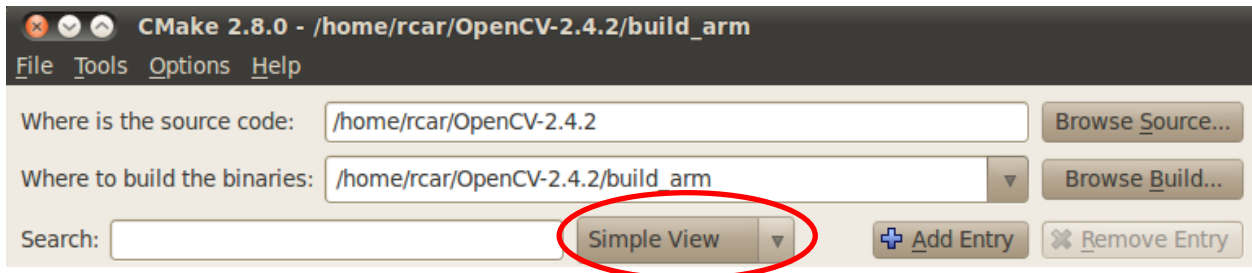
Generating done

2.1.2 Cross compilation

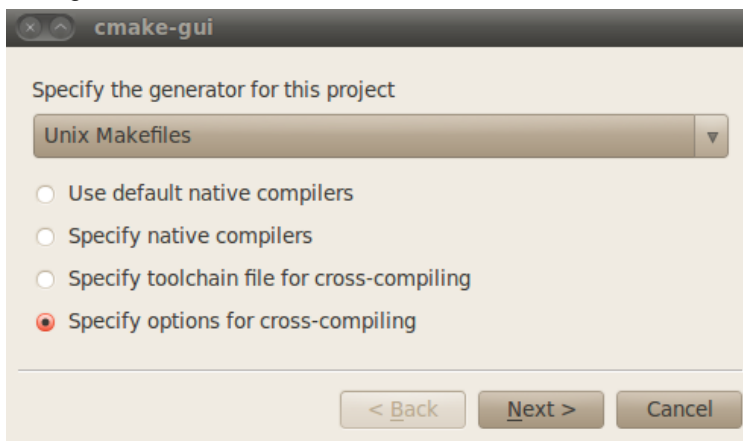
Start cmake-gui, in terminal type

- cd OpenCV-2.4.2
- mkdir build_arm
- cmake-gui ./

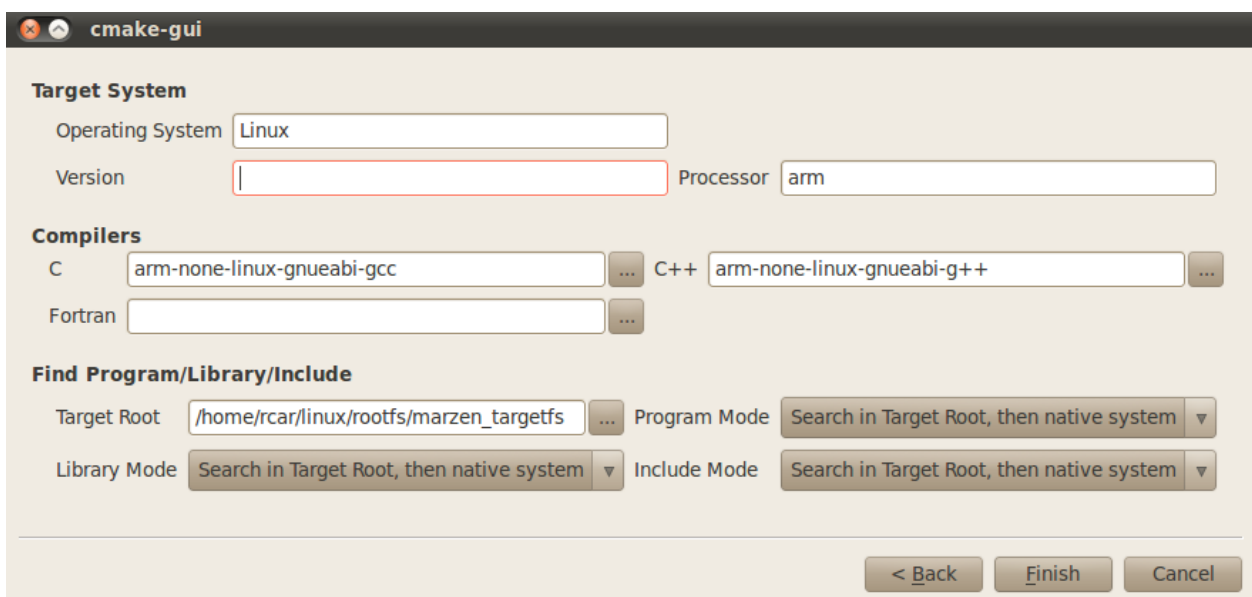
Change Simple View to Advanced View and click Configure



Configure as below and click Next



Fill in as below and Finish



Then Configure as follow

Name	Value
BIBTEX_COMPILER	BIBTEX_COMPILER-NOTFOUND
BUILD_DOCS	<input checked="" type="checkbox"/>
BUILD_EXAMPLES	<input checked="" type="checkbox"/>
BUILD_JASPER	<input type="checkbox"/>
BUILD_JPEG	<input checked="" type="checkbox"/>
BUILD_PACKAGE	<input checked="" type="checkbox"/>
BUILD_PERF_TESTS	<input checked="" type="checkbox"/>
BUILD_PNG	<input checked="" type="checkbox"/>
BUILD_SHARED_LIBS	<input checked="" type="checkbox"/>
BUILD_TESTS	<input checked="" type="checkbox"/>
BUILD_TIFF	<input type="checkbox"/>
BUILD_WITH_DEBUG_INFO	<input checked="" type="checkbox"/>
BUILD_ZLIB	<input checked="" type="checkbox"/>
BUILD_opencv_calib3d	<input checked="" type="checkbox"/>
BUILD_opencv_contrib	<input checked="" type="checkbox"/>
BUILD_opencv_core	<input checked="" type="checkbox"/>
BUILD_opencv_features2d	<input checked="" type="checkbox"/>
BUILD_opencv_flann	<input checked="" type="checkbox"/>
BUILD_opencv_gpu	<input checked="" type="checkbox"/>
BUILD_opencv_highgui	<input checked="" type="checkbox"/>
BUILD_opencv_imgproc	<input checked="" type="checkbox"/>
BUILD_opencv_legacy	<input checked="" type="checkbox"/>
BUILD_opencv_ml	<input checked="" type="checkbox"/>
BUILD_opencv_nonfree	<input checked="" type="checkbox"/>
BUILD_opencv_objdetect	<input checked="" type="checkbox"/>
BUILD_opencv_photo	<input checked="" type="checkbox"/>
BUILD_opencv_stitching	<input checked="" type="checkbox"/>
BUILD_opencv_ts	<input checked="" type="checkbox"/>
BUILD_opencv_video	<input checked="" type="checkbox"/>
BUILD_opencv_videostab	<input checked="" type="checkbox"/>
CMAKE_AR	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-ar
CMAKE_BUILD_TYPE	
CMAKE_COLOR_MAKEFILE	<input checked="" type="checkbox"/>
CMAKE_CONFIGURATION_TYPES	Debug;Release
CMAKE_CXX_COMPILER	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-g++
CMAKE_CXX_COMPILER_WITH_PATH	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-g++
CMAKE_CXX_FLAGS	
CMAKE_CXX_FLAGS_DEBUG	-g
CMAKE_CXX_FLAGS_MINSIZEREL	-Os -DNDEBUG
CMAKE_CXX_FLAGS_RELEASE	-O3 -DNDEBUG
CMAKE_CXX_FLAGS_RELWITHDEBINFO	-O2 -g
CMAKE_C_COMPILER	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-gcc
CMAKE_C_COMPILER_WITH_PATH	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-gcc
CMAKE_C_FLAGS	
CMAKE_C_FLAGS_DEBUG	-g
CMAKE_C_FLAGS_MINSIZEREL	-Os -DNDEBUG
CMAKE_C_FLAGS_RELEASE	-O3 -DNDEBUG
CMAKE_C_FLAGS_RELWITHDEBINFO	-O2 -g
CMAKE_EXE_LINKER_FLAGS	-lpthread -lrt
CMAKE_EXE_LINKER_FLAGS_DEBUG	
CMAKE_EXE_LINKER_FLAGS_MINSIZEREL	
CMAKE_EXE_LINKER_FLAGS_RELEASE	
CMAKE_EXE_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_FIND_ROOT_PATH	/home/rcar/linux/rootfs/marzen_targetfs
CMAKE_FIND_ROOT_PATH_MODE_INCLUDE	BOTH
CMAKE_FIND_ROOT_PATH_MODE_LIBRARY	BOTH
CMAKE_FIND_ROOT_PATH_MODE_PROGRAM	BOTH
CMAKE_INSTALL_PREFIX	/home/rcar/OpenCV-2.4.2/build_arm
CMAKE_LINKER	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-ld
CMAKE_MAKE_PROGRAM	/usr/bin/make

CMAKE_MODULE_LINKER_FLAGS	
CMAKE_MODULE_LINKER_FLAGS_DEBUG	
CMAKE_MODULE_LINKER_FLAGS_MINSIZEREL	
CMAKE_MODULE_LINKER_FLAGS_RELEASE	
CMAKE_MODULE_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_NM	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-nm
CMAKE_OBJCOPY	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-objcopy
CMAKE_OBJDUMP	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-objdump
CMAKE_RANLIB	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-ranlib
CMAKE_SHARED_LINKER_FLAGS	
CMAKE_SHARED_LINKER_FLAGS_DEBUG	
CMAKE_SHARED_LINKER_FLAGS_MINSIZEREL	
CMAKE_SHARED_LINKER_FLAGS_RELEASE	
CMAKE_SHARED_LINKER_FLAGS_RELWITHDEBINFO	
CMAKE_SKIP_RPATH	<input type="checkbox"/>
CMAKE_STRIP	/opt/arm-2010q1/bin/arm-none-linux-gnueabi-strip
CMAKE_SYSTEM_NAME	Linux
CMAKE_USE_RELATIVE_PATHS	<input type="checkbox"/>
CMAKE_VERBOSE	<input type="checkbox"/>
CMAKE_VERBOSE_MAKEFILE	<input type="checkbox"/>
DVIPDF_CONVERTER	/usr/bin/dvipdf
DVIPS_CONVERTER	DVIPS_CONVERTER-NOTFOUND
EIGEN_INCLUDE_PATH	EIGEN_INCLUDE_PATH-NOTFOUND
ENABLE_NOISY_WARNINGS	<input type="checkbox"/>
ENABLE_OMIT_FRAME_POINTER	<input checked="" type="checkbox"/>
ENABLE_PRECOMPILED_HEADERS	<input checked="" type="checkbox"/>
ENABLE_PROFILING	<input type="checkbox"/>
EXECUTABLE_OUTPUT_PATH	/home/rcar/OpenCV-2.4.2/build_arm/bin
INSTALL_C_EXAMPLES	<input type="checkbox"/>
INSTALL_PYTHON_EXAMPLES	<input type="checkbox"/>
INSTALL_TO_MANGLED_PATHS	<input type="checkbox"/>
LATEX2HTML_CONVERTER	LATEX2HTML_CONVERTER-NOTFOUND
LATEX_COMPILER	LATEX_COMPILER-NOTFOUND
MAKEINDEX_COMPILER	MAKEINDEX_COMPILER-NOTFOUND
OPENCV_CAN_BREAK_BINARY_COMPATIBILITY	<input type="checkbox"/>
OPENCV_CONFIG_FILE_INCLUDE_DIR	/home/rcar/OpenCV-2.4.2/build_arm
OPENCV_WARNINGS_ARE_ERRORS	<input type="checkbox"/>
OPENEXR_HALF_LIBRARY	OPENEXR_HALF_LIBRARY-NOTFOUND
OPENEXR_IEX_LIBRARY	OPENEXR_IEX_LIBRARY-NOTFOUND
OPENEXR_ILMIMF_LIBRARY	OPENEXR_ILMIMF_LIBRARY-NOTFOUND
OPENEXR_ILMTHREAD_LIBRARY	OPENEXR_ILMTHREAD_LIBRARY-NOTFOUND
OPENEXR_IMATH_LIBRARY	OPENEXR_IMATH_LIBRARY-NOTFOUND
OPENEXR_INCLUDE_PATH	OPENEXR_INCLUDE_PATH-NOTFOUND
PDFLATEX_COMPILER	PDFLATEX_COMPILER-NOTFOUND
PKG_CONFIG_EXECUTABLE	/home/rcar/linux/rootfs/marzen_targetfs/usr/bin/pkg-c...
PS2PDF_CONVERTER	/usr/bin/ps2pdf14
PVAPI_INCLUDE_PATH	PVAPI_INCLUDE_PATH-NOTFOUND
PYTHON_EXECUTABLE	/usr/bin/python2.6
PYTHON_INCLUDE_DIR	PYTHON_INCLUDE_DIR-NOTFOUND
PYTHON_LIBRARY	PYTHON_LIBRARY-NOTFOUND
PYTHON_PACKAGES_PATH	lib/python2.6/dist-packages
SVNVERSION_PATH	SVNVERSION_PATH-NOTFOUND

WITH_1394	<input type="checkbox"/>
WITH_EIGEN	<input type="checkbox"/>
WITH_FFMPEG	<input type="checkbox"/>
WITH_GSTREAMER	<input type="checkbox"/>
WITH_GTK	<input checked="" type="checkbox"/>
WITH_JASPER	<input type="checkbox"/>
WITH_JPEG	<input checked="" type="checkbox"/>
WITH_OPENEXR	<input type="checkbox"/>
WITH_OPENGL	<input type="checkbox"/>
WITH_OPENNI	<input type="checkbox"/>
WITH_PNG	<input checked="" type="checkbox"/>
WITH_PVAPI	<input type="checkbox"/>
WITH_QT	<input type="checkbox"/>
WITH_TBB	<input type="checkbox"/>
WITH_TIFF	<input type="checkbox"/>
WITH_UNICAP	<input type="checkbox"/>
WITH_V4L	<input type="checkbox"/>
WITH_XIMEA	<input type="checkbox"/>
WITH_XINE	<input type="checkbox"/>

Click on Configure and Generate. The result is as follow:

```

Detected version of GNU GCC: 20101 (201001)
checking for module 'gtk+-2.0'
  package 'gtk+-2.0' not found
checking for module 'gthread-2.0'
  package 'gthread-2.0' not found
Could NOT find PythonLibs (missing: PYTHON_LIBRARIES PYTHON_INCLUDE_DIRS)

General configuration for OpenCV 2.4.2 =====

Platform:
  Host:           Linux 2.6.32-38-generic i686
  Target:         Linux
  CMake:          2.8.0
  CMake generator: Unix Makefiles
  CMake build tool: /usr/bin/make
  Configuration: Release

C/C++:
  Built as dynamic libs?: YES
  C++ Compiler:    /opt/arm-2010q1/bin/arm-none-linux-gnueabi-g++ (ver 2010q1-202)
  C++ flags (Release): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -O3 -DNDEBUG -DNDEBUG
  C++ flags (Debug): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wundef -Winit-self -Wpointer-arith -Wshadow -Wsign-promo -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3
  C Compiler:      /opt/arm-2010q1/bin/arm-none-linux-gnueabi-gcc
  C flags (Release): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -O3 -DNDEBUG -DNDEBUG

```

C flags (Debug): -W -Wall -Werror=return-type -Werror=address -Werror=sequence-point -Wformat -Werror=format-security -Wmissing-declarations -Wmissing-prototypes -Wstrict-prototypes -Wundef -Winit-self -Wpointer-arith -Wshadow -fdiagnostics-show-option -pthread -fomit-frame-pointer -ffunction-sections -g -O0 -DDEBUG -D_DEBUG -ggdb3

Linker flags (Release):

Linker flags (Debug):

Precompiled headers: YES

OpenCV modules:

To be built: core imgproc flann highgui features2d calib3d ml video objdetect contrib nonfree gpu legacy photo stitching ts videostab

Disabled: -

Disabled by dependency: -

Unavailable: androidcamera java python world

GUI:

QT 4.x: NO

GTK+ 2.x: NO

GThread : NO

GtkGLExt: NO

OpenGL support: NO

Media I/O:

ZLib: build (ver 1.2.6)

JPEG: build (ver 62)

PNG: build (ver 1.5.9)

TIFF: NO

JPEG 2000: NO

OpenEXR: NO

Video I/O:

DC1394 1.x: NO

DC1394 2.x: NO

FFMPEG: NO

codec: NO

format: NO

util: NO

swscale: NO

gentoo-style: NO

GStreamer: NO

OpenNI: NO

OpenNI PrimeSensor Modules: NO

PvAPI: NO

UniCap: NO

UniCap ucil: NO

V4L/V4L2: NO/NO

XIMEA: NO

Xine: NO

Other third-party libraries:

```
Use TBB:          NO
Use Eigen:        NO

Python:
Interpreter:      /usr/bin/python2.6 (ver 2.6.5)

Documentation:
Build Documentation:  NO
Sphinx:           NO
PdfLaTeX compiler:  NO

Tests and samples:
Tests:            YES
Performance tests: YES
Examples:        YES

Install path:     /home/rcar/OpenCV-2.4.2/build_arm

cvconfig.h is in: /home/rcar/OpenCV-2.4.2/build_arm
-----
Configuring done
Generating done
```

Remark: for optimization with NEON add these flags

- **CMAKE_C_FLAGS** : -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon
- **CMAKE_CXX_FLAGS** : -march=armv7-a -mcpu=cortex-a9 -mfloat-abi=softfp -mfpu=neon

Quit CMake

In terminal

- cd build_arm
- make

Verify libraries are generated in folder :

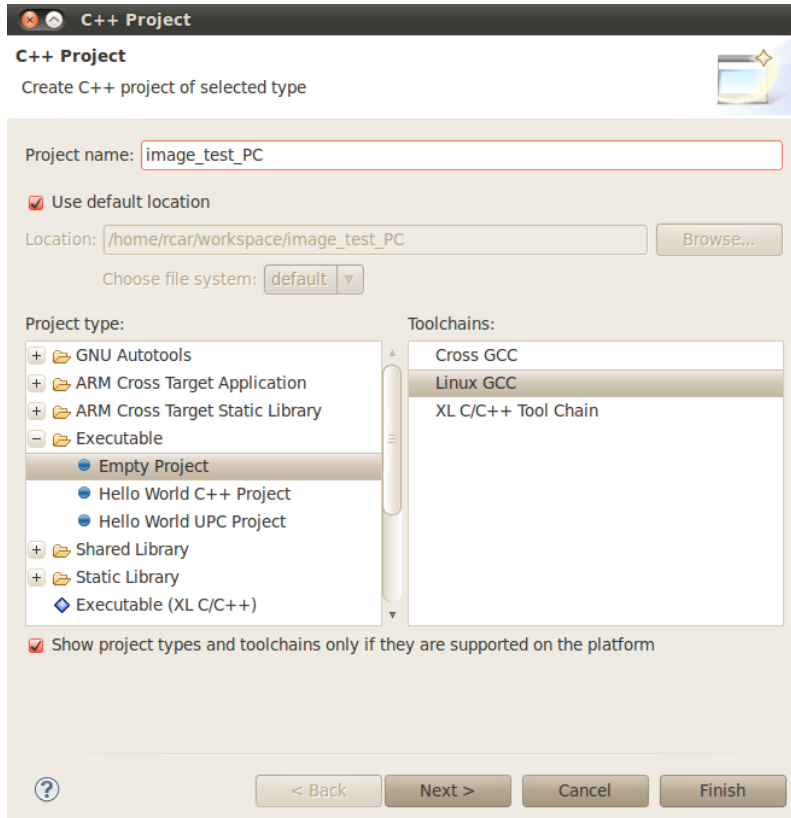
- /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde/home/renesas/OpenCV-2.4.2/build/lib

2.2 Eclipse Project with GNU toolchain

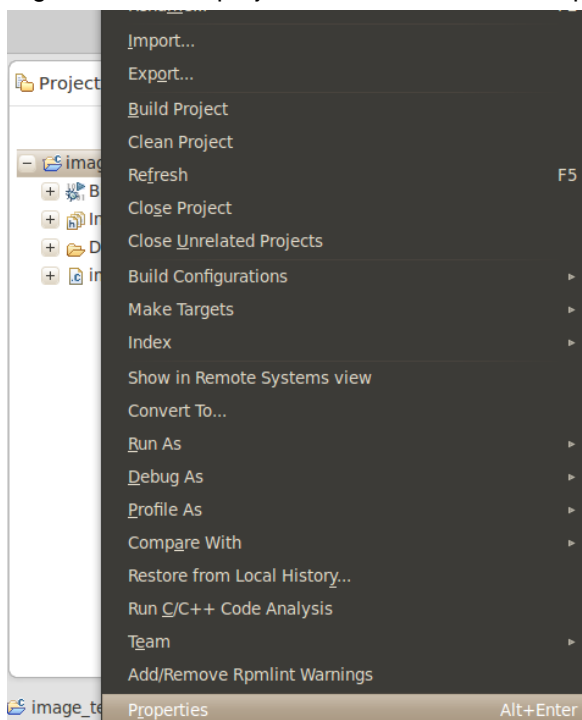
2.2.1 GNU Compiler

Open Eclipse then choose File->New->C++ Project

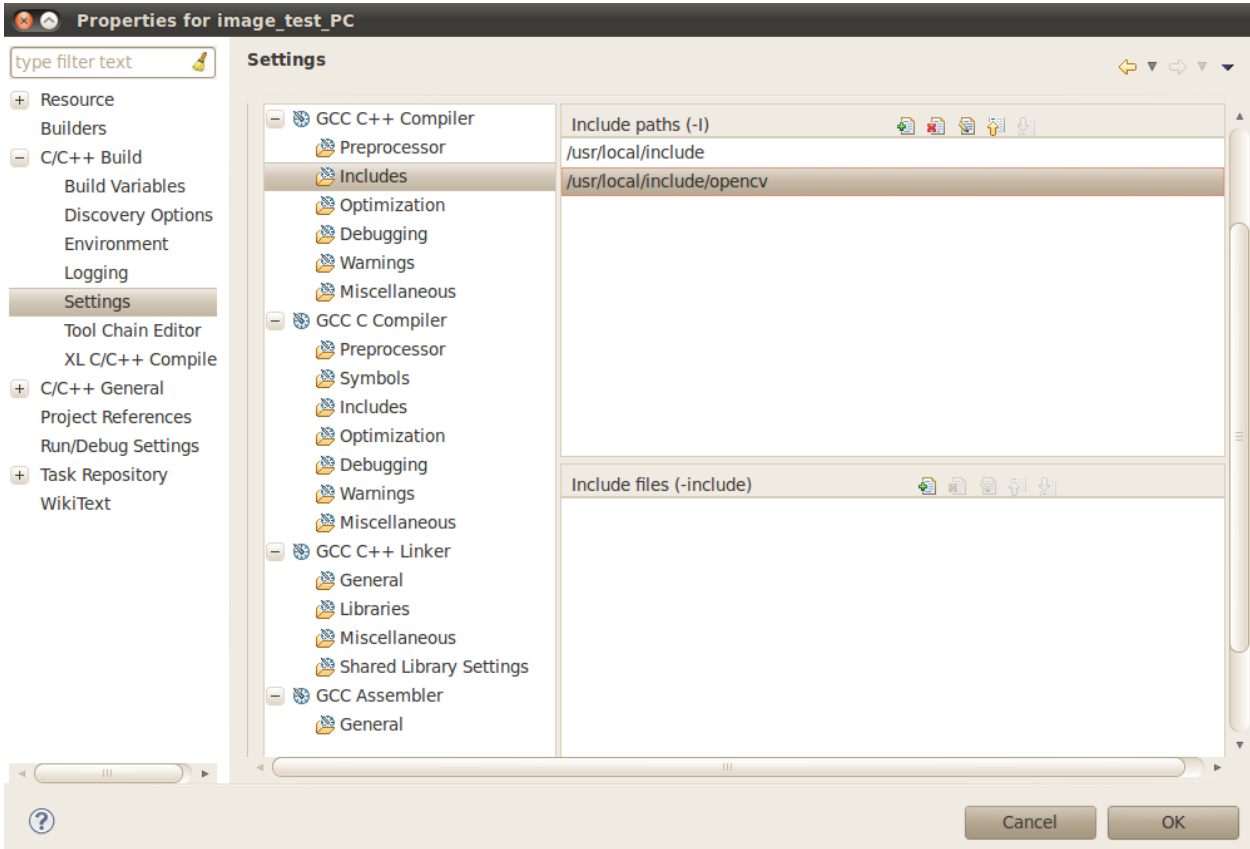
Select as below and click Next then Finish



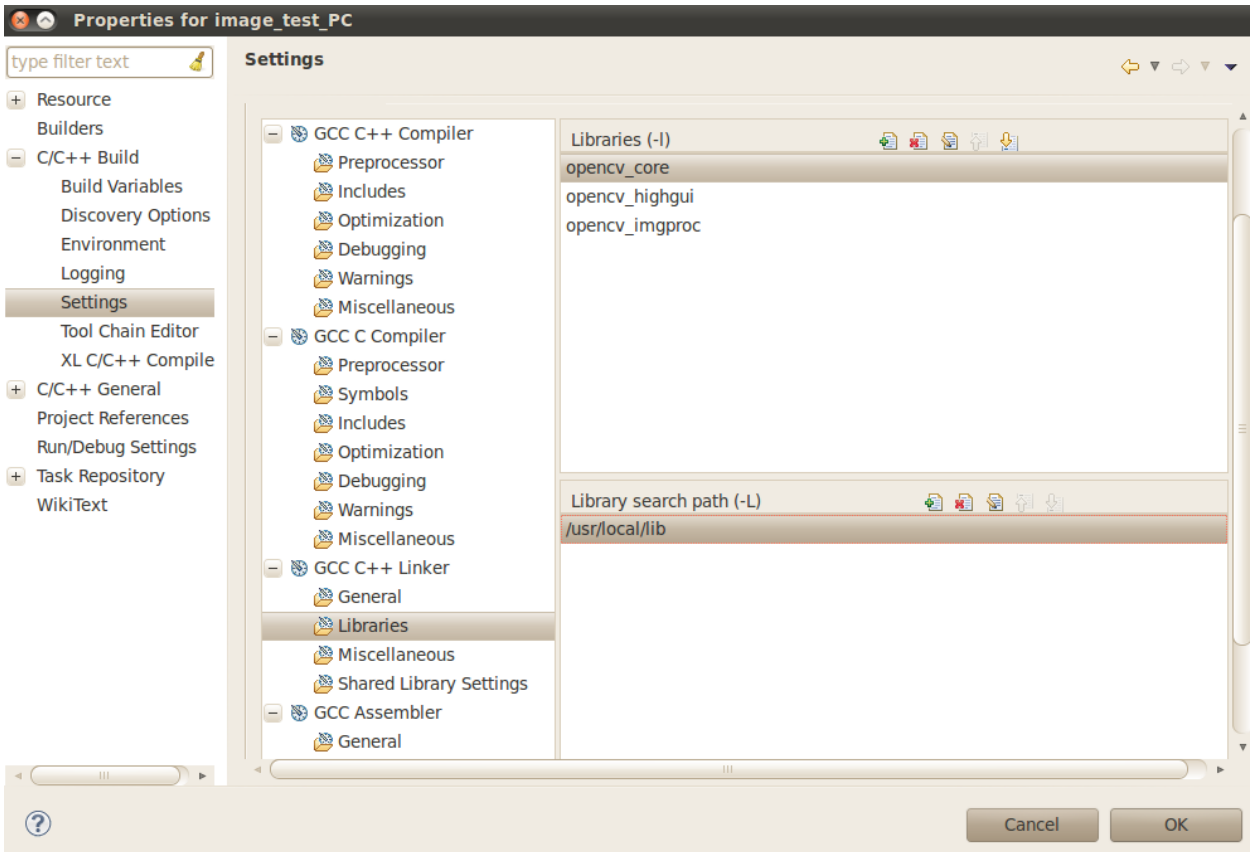
Right click on the project name then choose Properties



Add OpenCV Include paths



Add OpenCV Libraries



Copy image.cpp from /home/rcar/OpenCV-2.4.2/samples/cpp and paste it into project

Open image.cpp and modify the location of the image :

- `const char* imagename = argc > 1 ? argv[1] : "/home/rcar/OpenCV-2.4.2/samples/cpp/lena.jpg";`

Right click on the project and Build Project

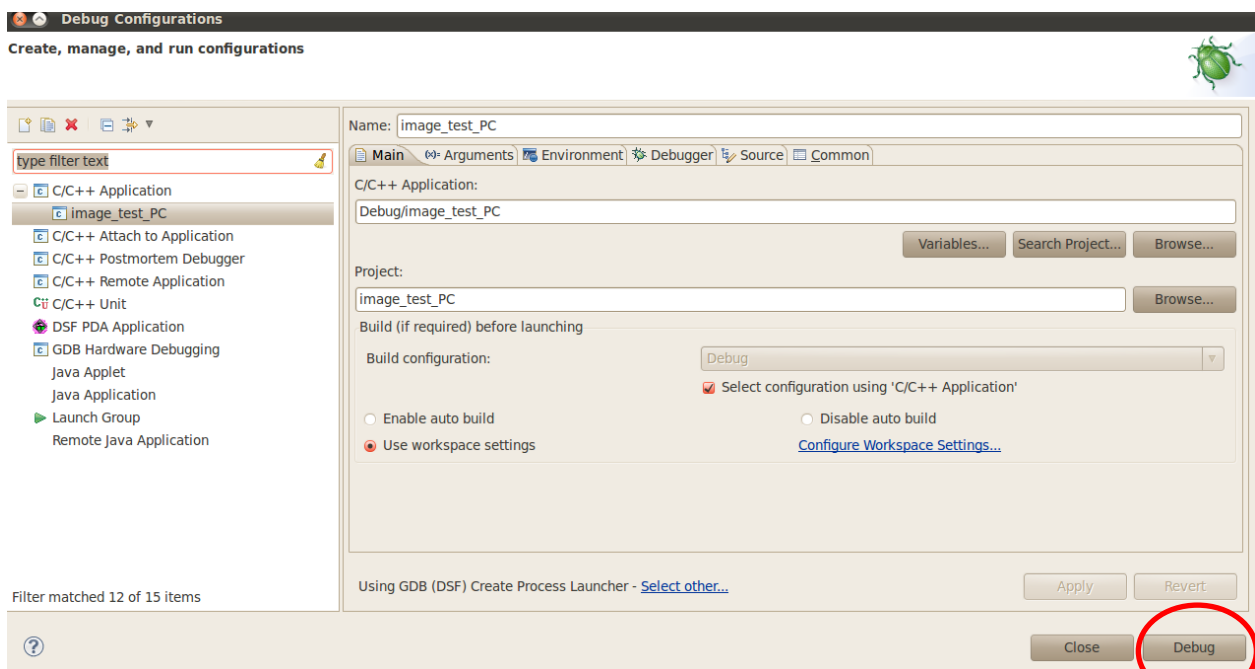
2.2.2 GNU Debugger

Right click on "image_test_PC" binary -> Debug As -> Debug Configurations

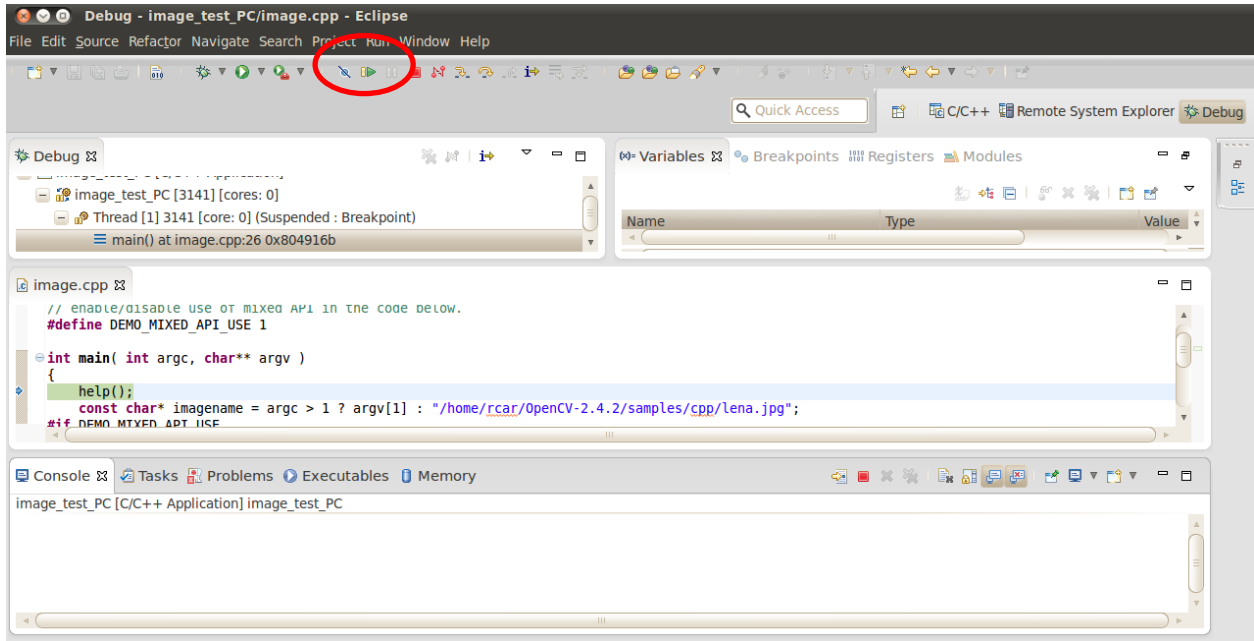
Double click on C/C++ Application

Select image_test_PC which is created automatically

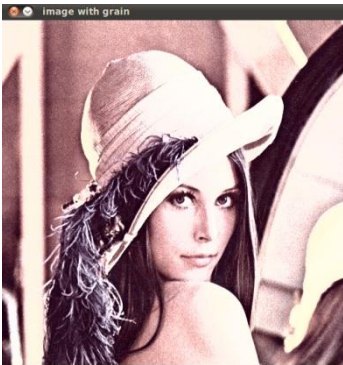
Click on Debug



Click on Run button



The image shall be displayed

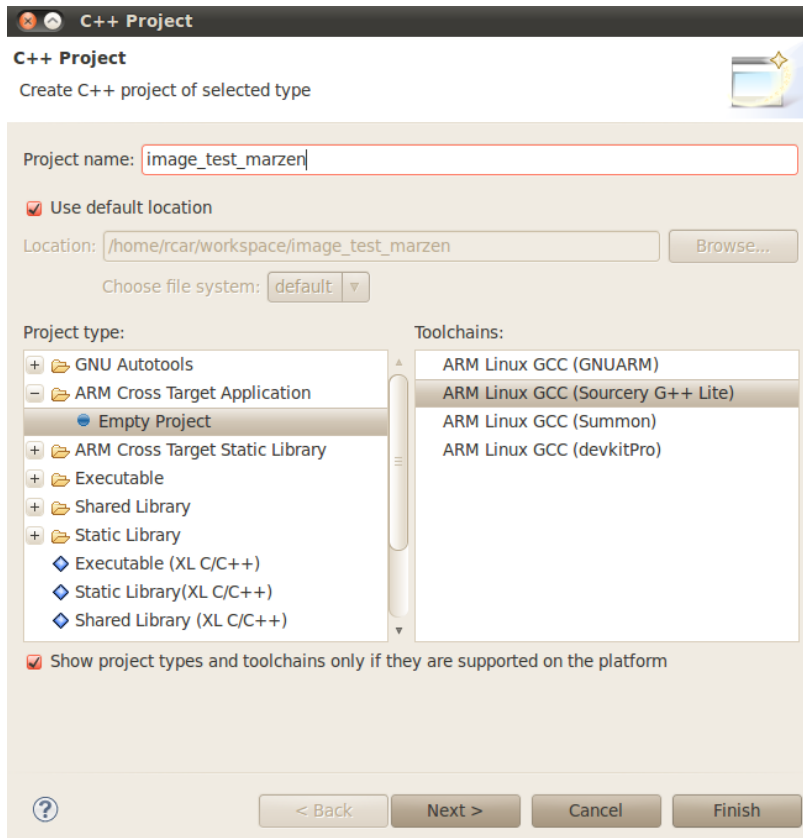


2.3 Eclipse Project with cross toolchain

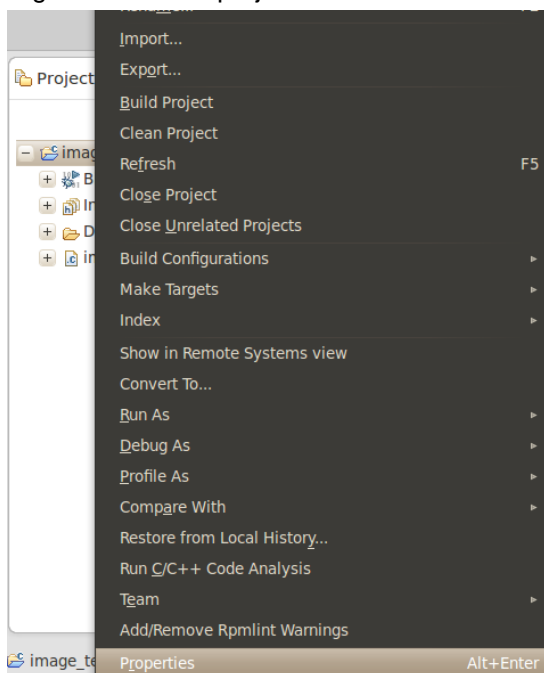
2.3.1 Cross Compiler

Open Eclipse then choose File->New->C++ Project

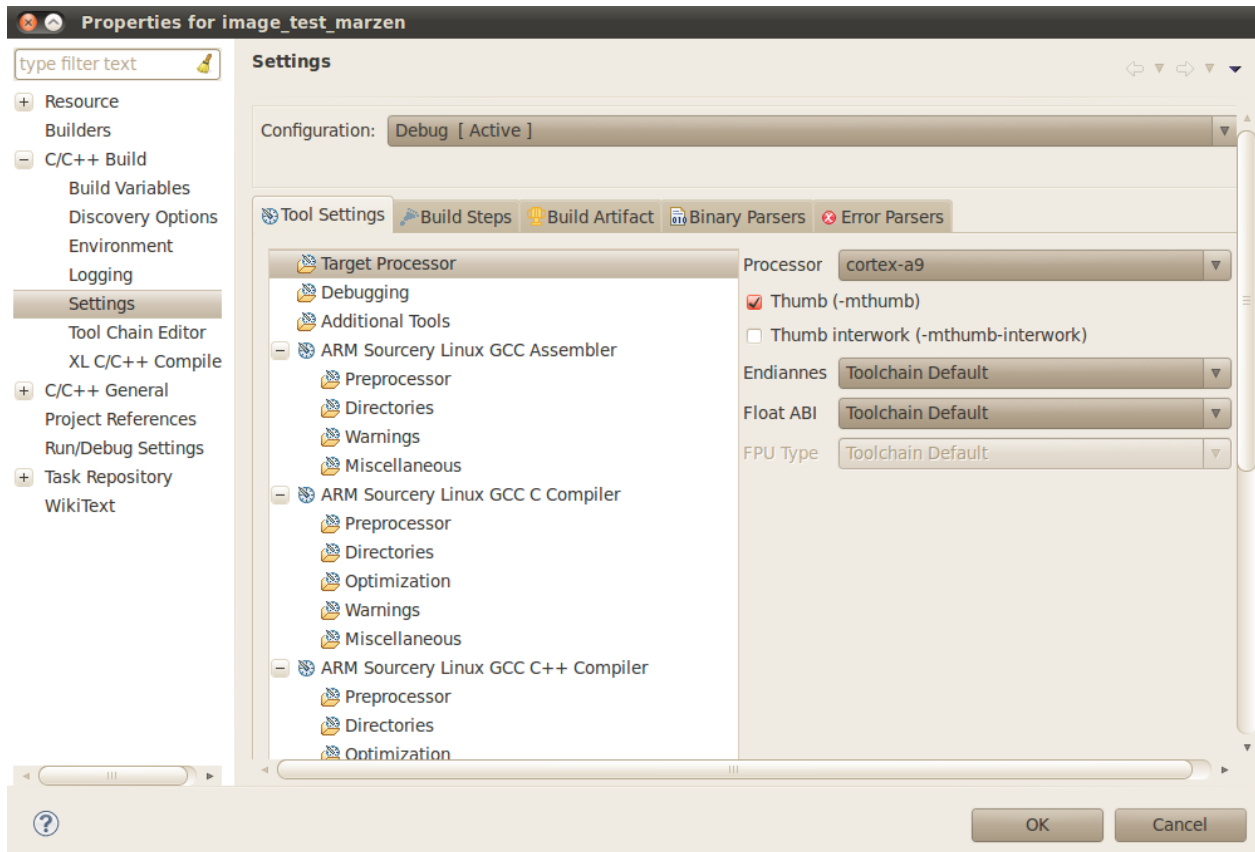
Select as below and click Next then Finish



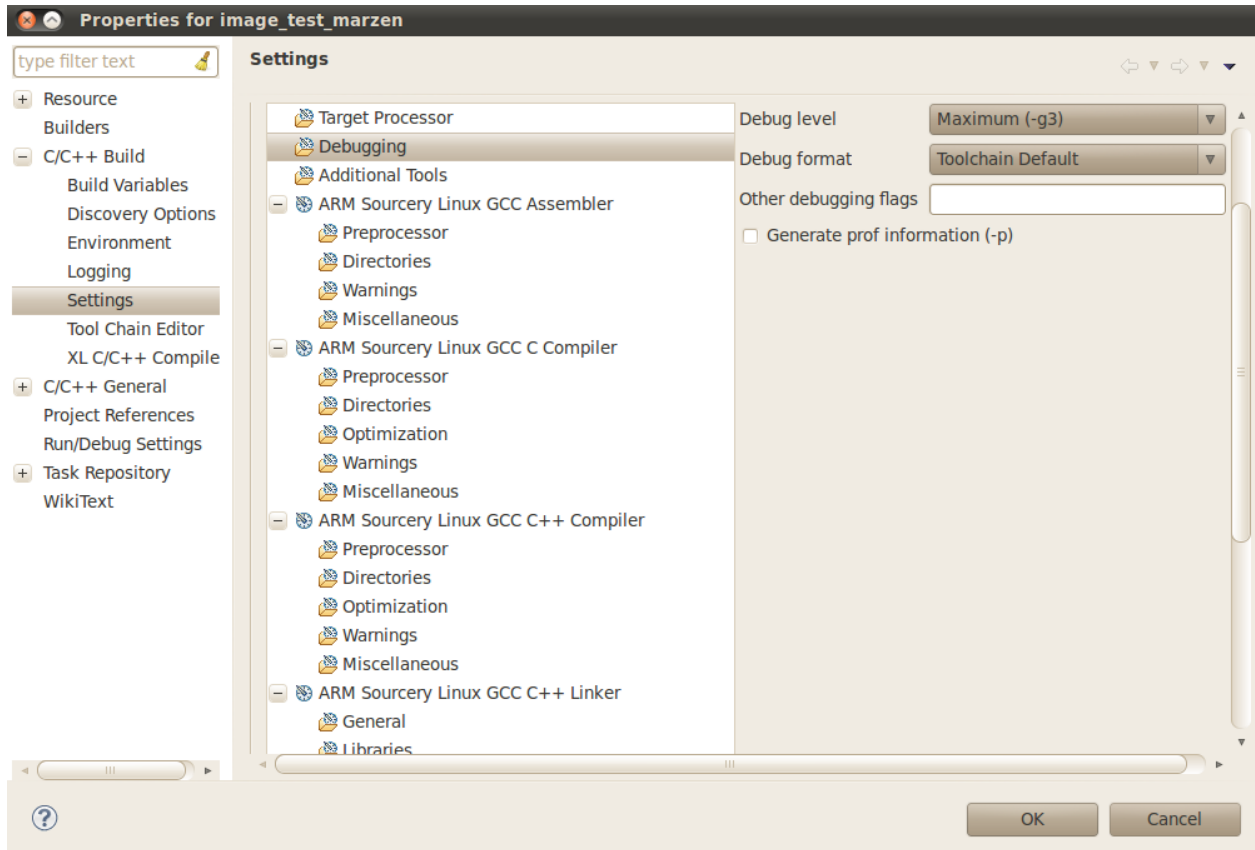
Right click on the project name then choose Properties



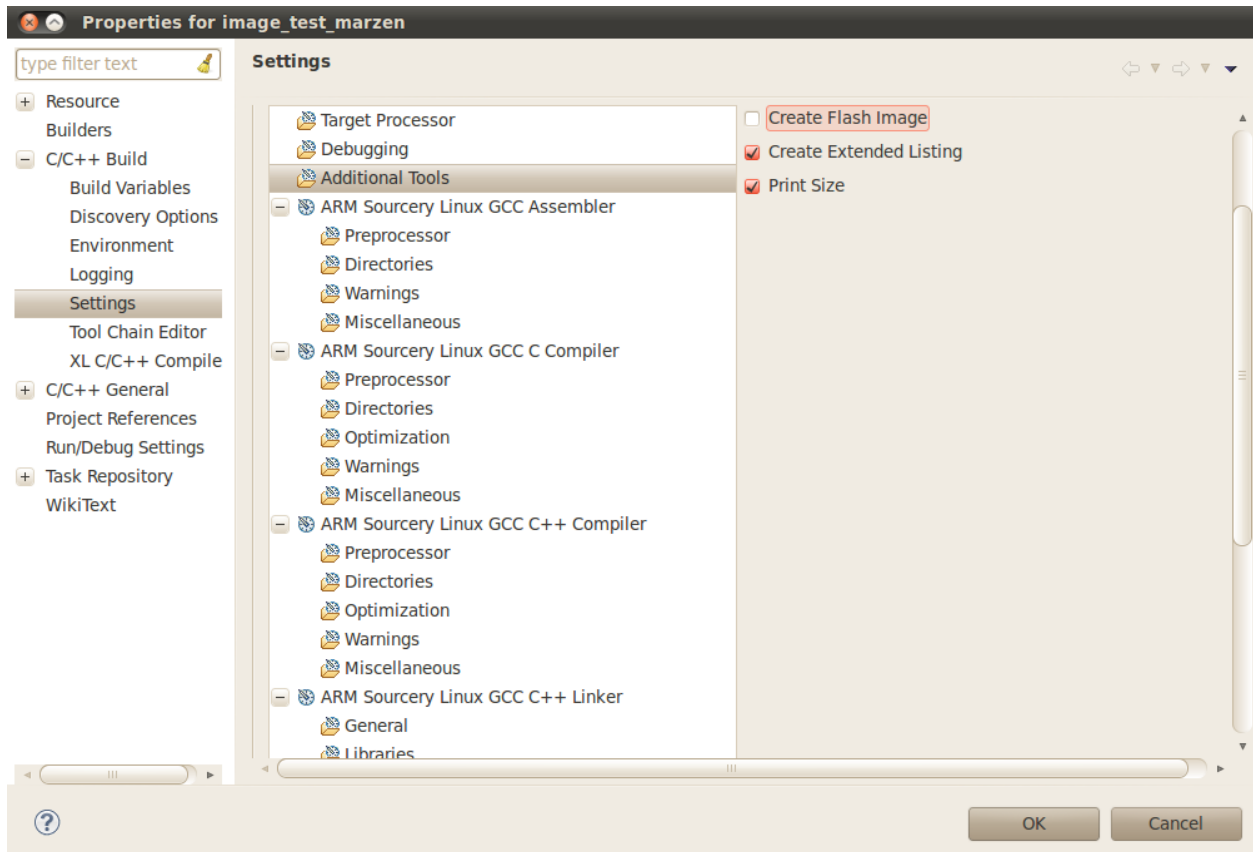
Modify Target Processor as follow:



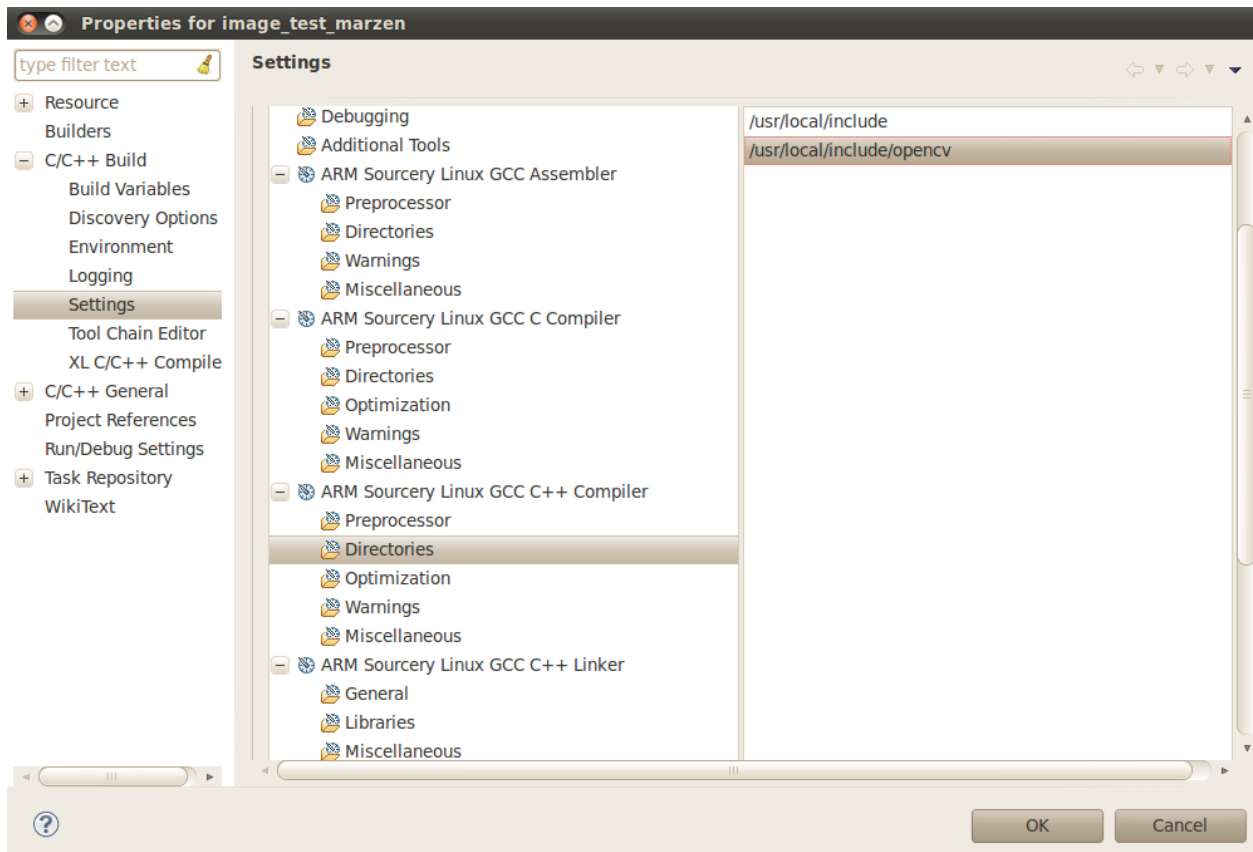
Modify Debugging as follow:



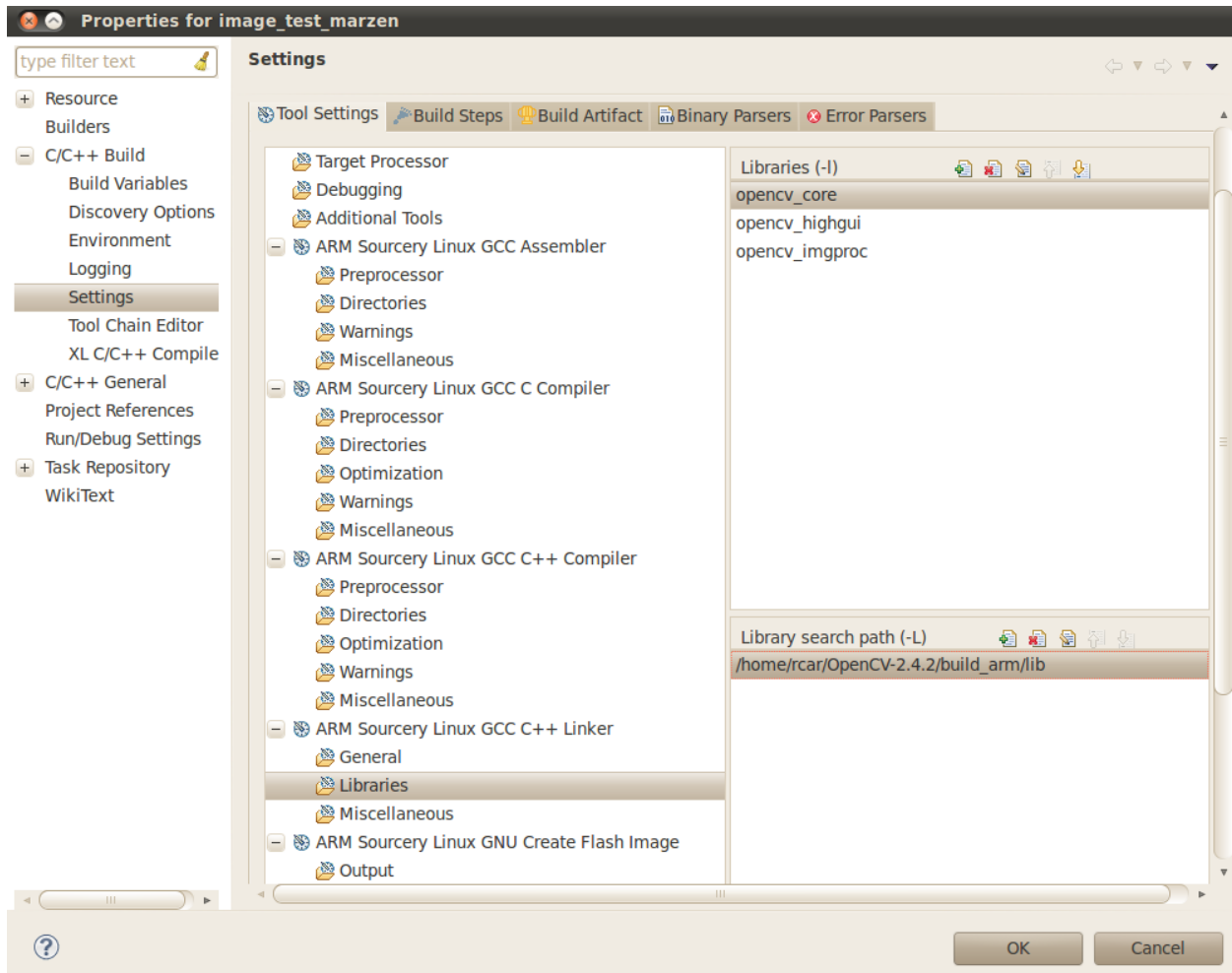
Modify Additional Tools as follow



Add OpenCV Include paths



Add OpenCV Libraries



Copy image.cpp from /home/rcar/OpenCV-2.4.2/samples/cpp and paste it into project

Open image.cpp and modify the location of the image :

- `const char* imagename = argc > 1 ? argv[1] : "/home/renesas/OpenCV-2.4.2/samples/cpp/lena.jpg";`

Right click on the project and Build Project

2.3.2 Cross Debugger

Before configuring the cross debugger, create a folder on the target in order to store the executable when connecting to the target.

From PC terminal,

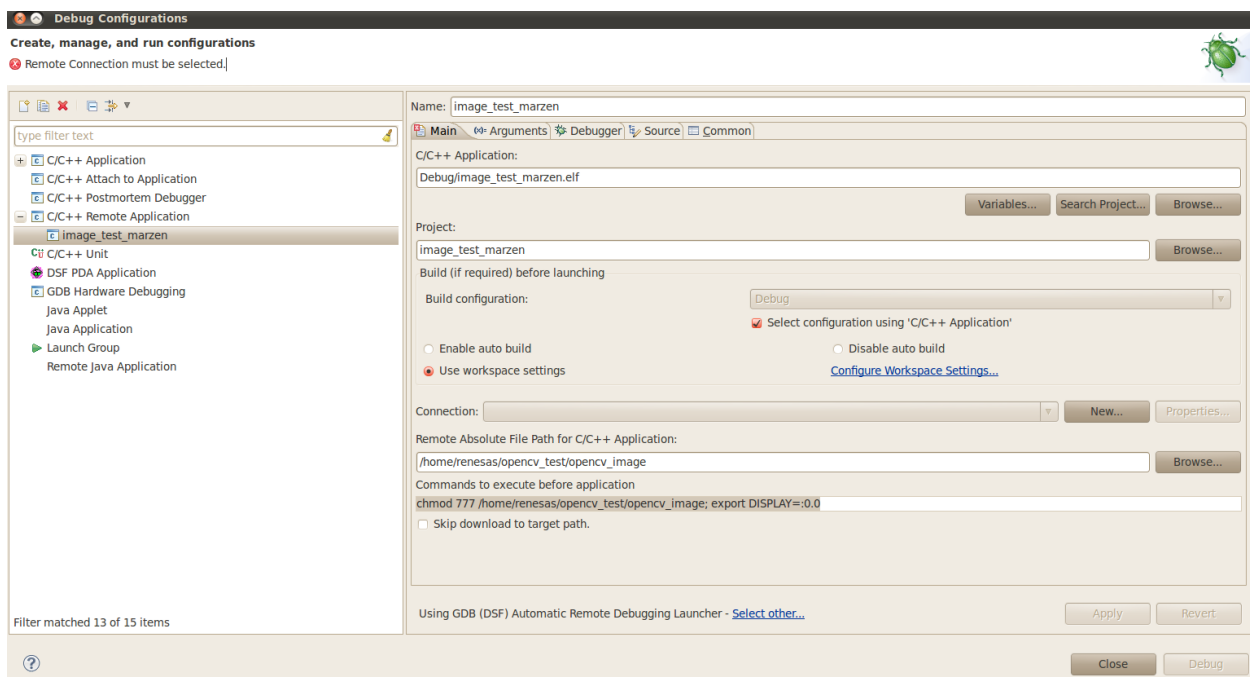
- `cd /home/rcar/linux/rootfs/marzen_targetfs/home/renesas/`
- `mkdir opencv_test`
- `sudo chmod 777 -R opencv_test`

Create an initialization file for the cross debugger so as it can find the target link libraries:

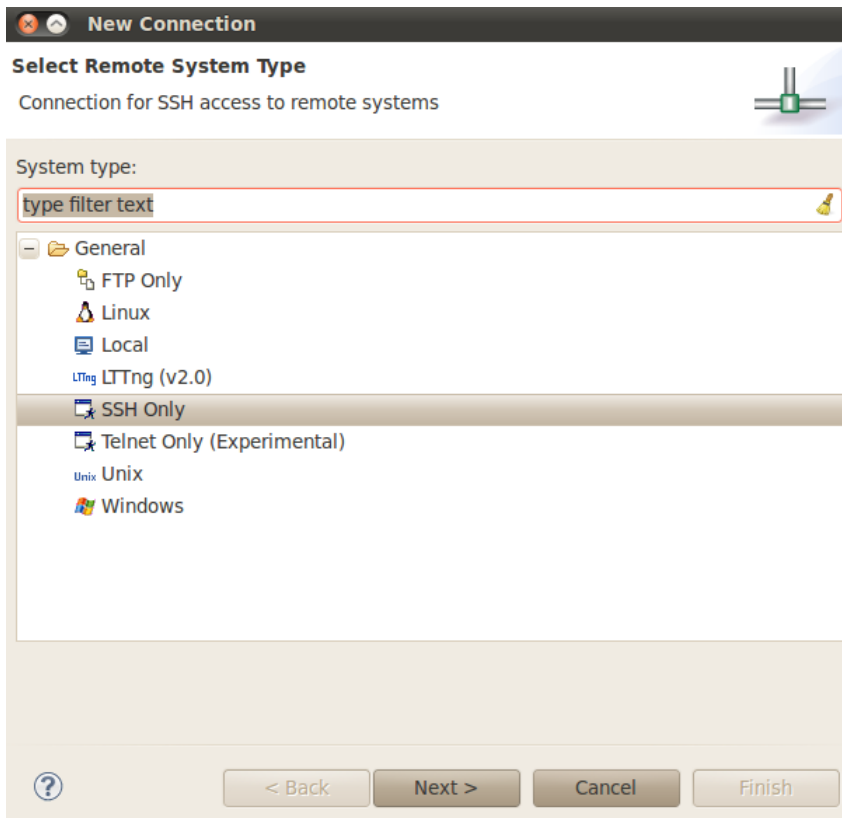
- `cd /home/rcar/workspace/image_test_marzen/`
- `gedit gdbinit`
- add the line below to the file and save it
 - `set solib-absolute-prefix /home/rcar/linux/rootfs/marzen_ubuntu1104_lxde`

Then go back to Eclipse,

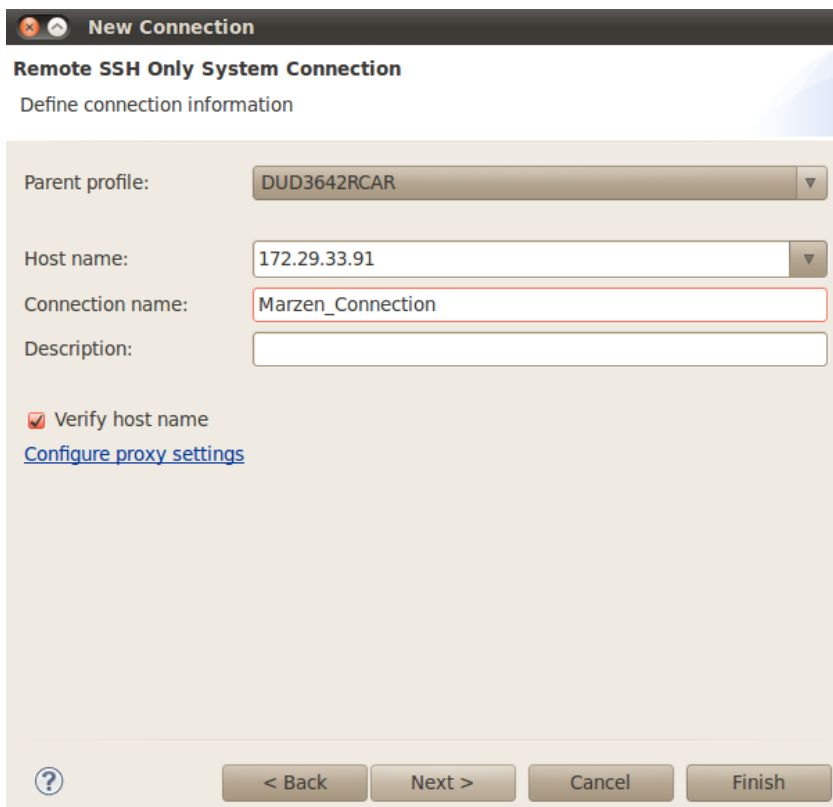
- Right click on “image_test_marzen.elf” -> Debug As -> Debug Configurations
- Double click on C/C++ Remote Application
- Select image_test_marzen which is created automatically



Click New to create a connection

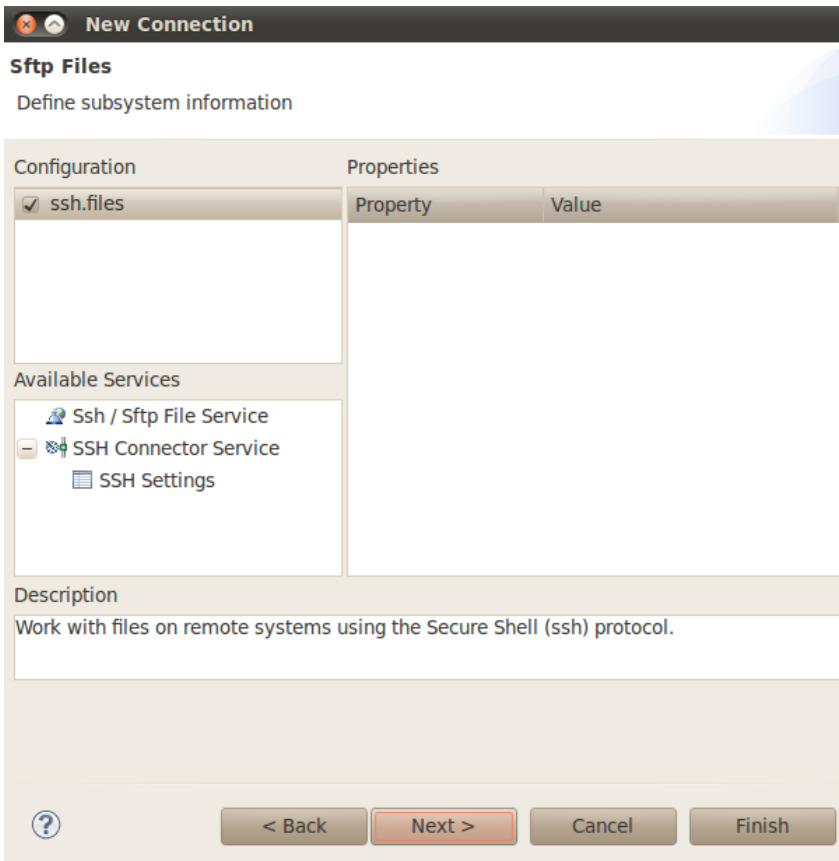


Select SSH only and click on Next



Fill in as mentioned and click Next

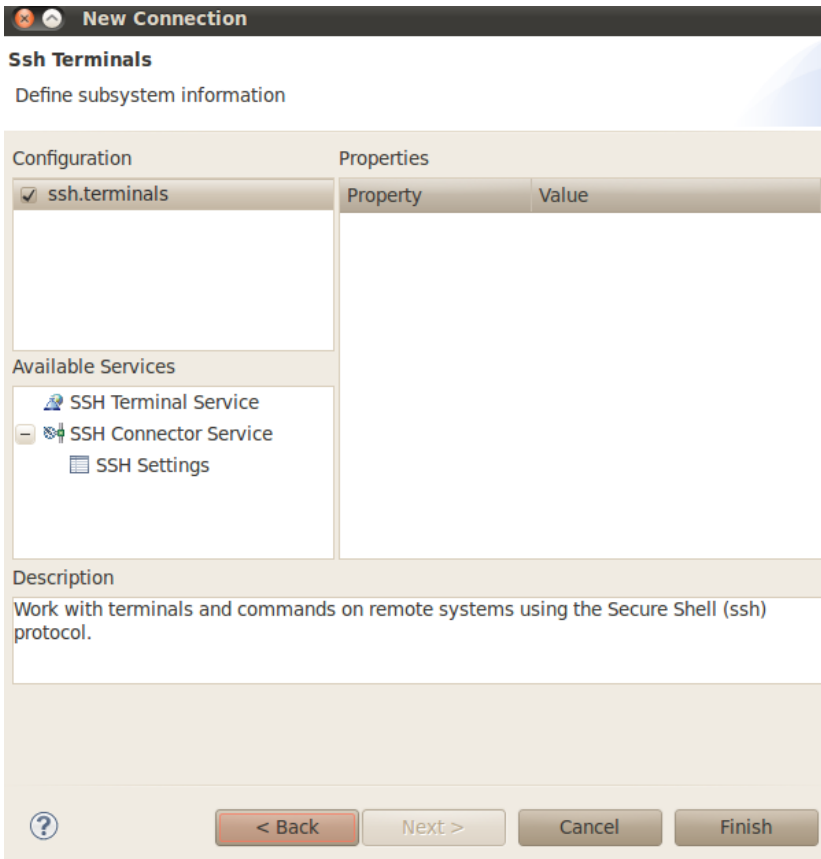
Host name: IP of your Marzen board



Click Next

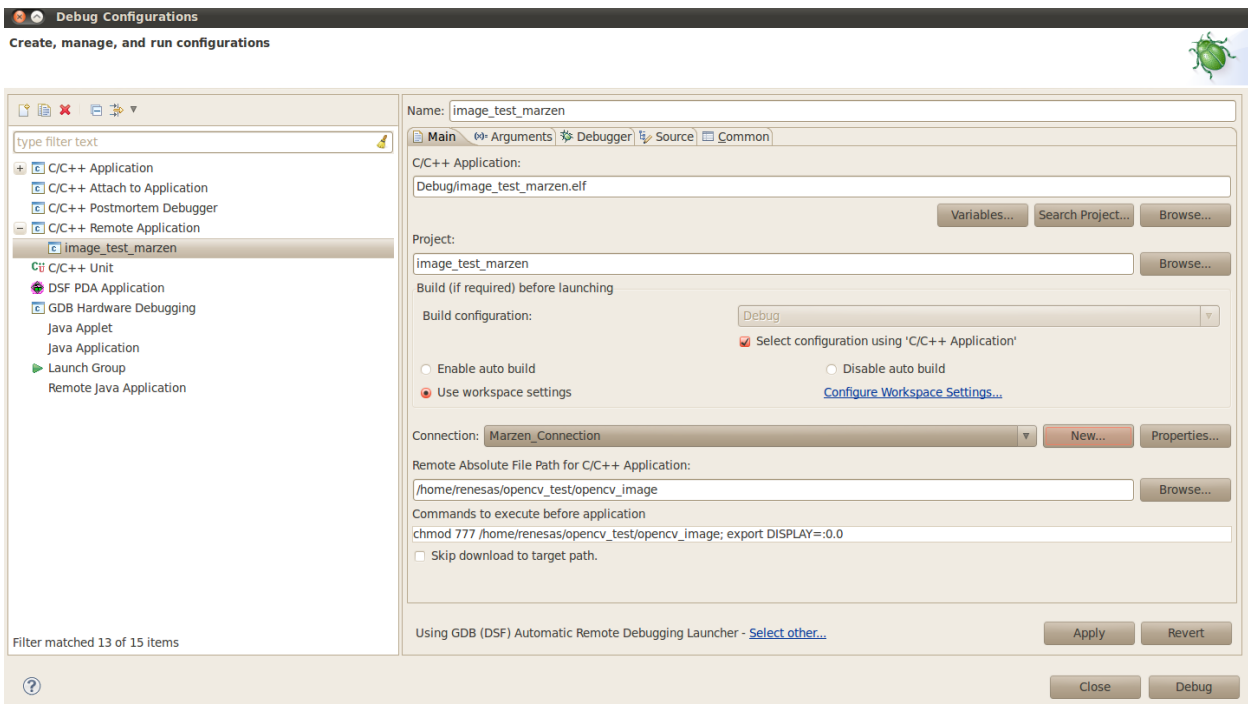


Click Next



Click Finish

Go back to Debug Configurations window



At Remote Absolute File Path for C/C++ Application option:

- /home/renesas/opencv_test/opencv_image

Remark: This is the location of the executable which is transferred from the PC to the target when connecting.

At “Commands to execute before application” option:

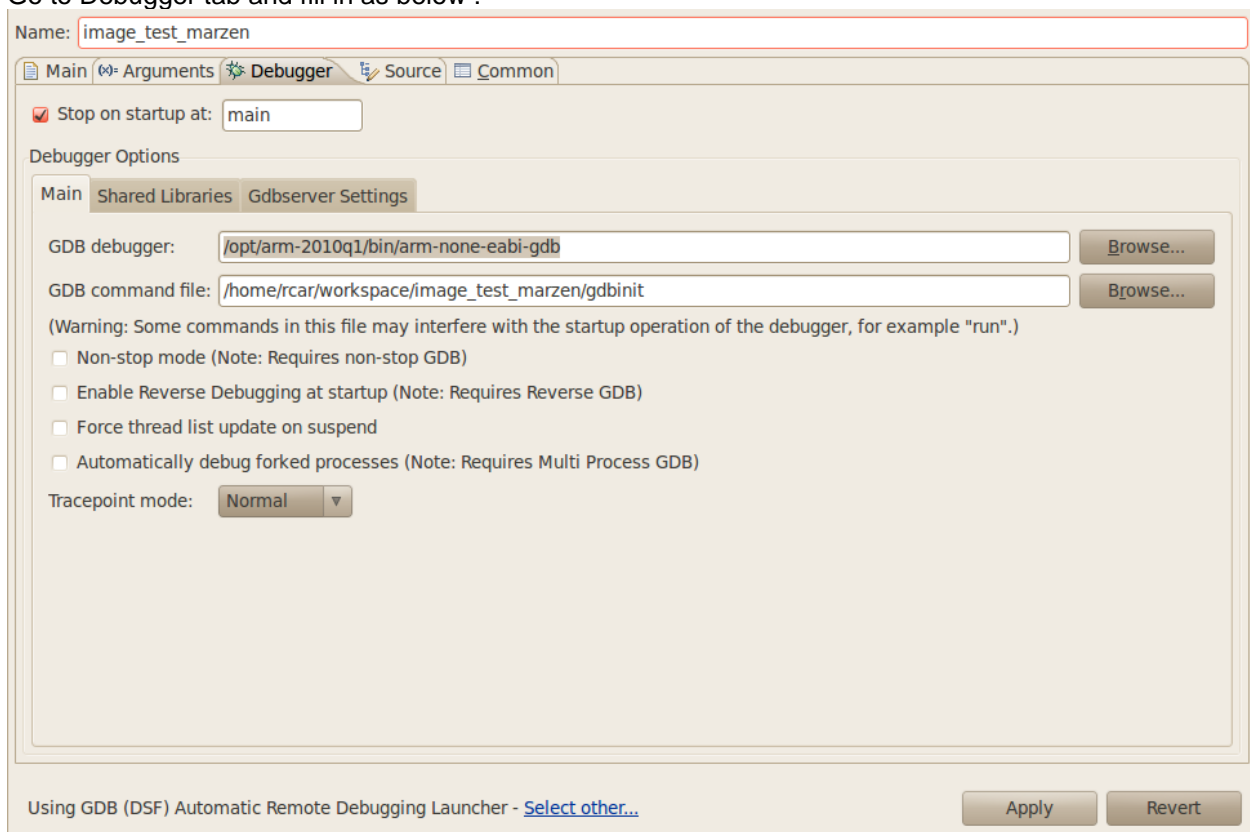
- `chmod 777 /home/renesas/opencv_test/opencv_image; export DISPLAY=:0.0`

Remark:

- “chmod” gives the right for executing the file
- “export DISPLAY” enables the target to provide its display features to the PC

Click Apply

Go to Debugger tab and fill in as below :



Keep Shared Libraries and Gdbserver Settings by default.

Click Apply

Click Debug

Enter User ID and PW:



The screenshot shows a dialog box titled "Enter Password". It contains the following fields and options:

- System type: SSH Only
- Host name: 172.29.33.91
- Connection name: Marzen_Connection
- User ID: renesas
- Password (optional): *****
- Save user ID
- Save password
- Buttons: Cancel, OK

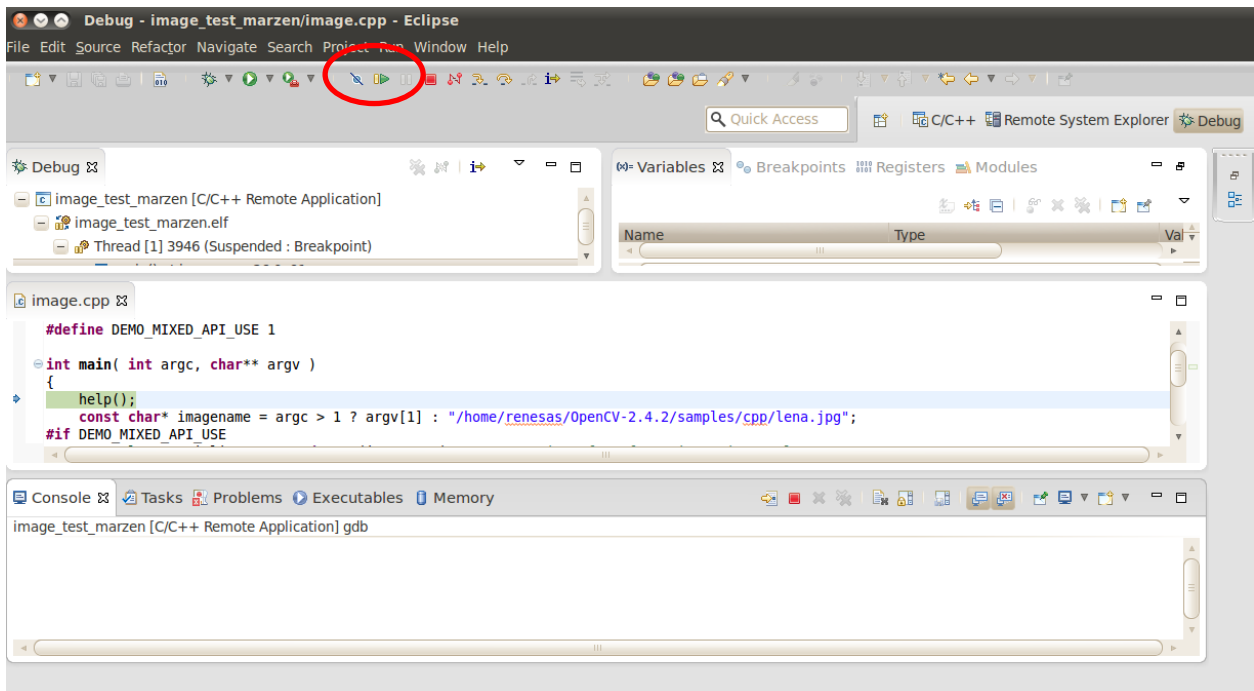
No need for secure storage so click on Cancel



The screenshot shows a dialog box titled "Secure Storage". It contains the following fields and options:

- Text: Please enter a new master password for the secure storage.
- Icon: A key and a padlock icon.
- Password: [Empty text box]
- Confirm password: [Empty text box]
- Show password
- Buttons: Cancel, OK

Starting debugging by clicking on Run button



The image shall be displayed on the screen of the Marzen board.



2.4 OpenCV performance

To launch OpenCV performance test refer to :

- <http://opencv.willowgarage.com/wiki/AnalyzePerfTestsLogs>

From target terminal, run performance test:

- `cd OpenCV-2.4.2/testdata`
- `python /home/renesas/OpenCV-2.4.2/modules/ts/misc/run.py /home/renesas/OpenCV-2.4.2/build -t imgproc`

When the test is finished, extract the result

- `python /home/renesas/OpenCV-2.4.2/modules/ts/misc/report.py /home/renesas/OpenCV-2.4.2/testdata/*.xml`

To make sure only one single core e.g. 0 is performing the test

- `taskset -c 0 python /home/renesas/OpenCV-2.4.2/modules/ts/misc/run.py /home/renesas/OpenCV-2.4.2/build -t imgproc`

Chapter 3 Revision history

Version	Date	Document Number	Description
1.0	October 2012		First release

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.

The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

Before changing from one product to another, i.e. to one with a different part number, confirm that the change will not lead to problems.

The characteristics of MPU/MCU in the same group but having different part numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different part numbers, implement a system-evaluation test for each of the products.

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