

**Cosmic-AM335x**

**QT Development Manual**

**SOM Product No: PCM-051**

**Carrier Board Product No: POB-002**



Release 2.0  
**September,2013**

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## QT Application Development for Cosmic-AM335x

In this Manual we are going to describe how to use this Qt application for development.

Our first chapter is dealing with the installation of Qt Creator and in second chapter we will explain how to configure QT creator for cross compilation. In our third chapter we will describe how to write an application(demo) using Qt Creator and also a UART application . After going through this manual you will not only familiar with Cosmic-AM335x board as well as you will also have an idea how to use Qt for application development.

### 1. Application development using Qt Creator

With the help of example projects, we will teach you how to work with Qt.we explain how to run Qt application on target(ARM architecture),in Linux(Ubuntu) environment.

#### 1.1. Qt Creator Installaion

##### Qt in linux

First of all install Qt Creator with the help of Ubuntu Software Center

Enter Qt Creator in the search box in the right top corner(in Ubuntu Software Center). Install it(see the below image)

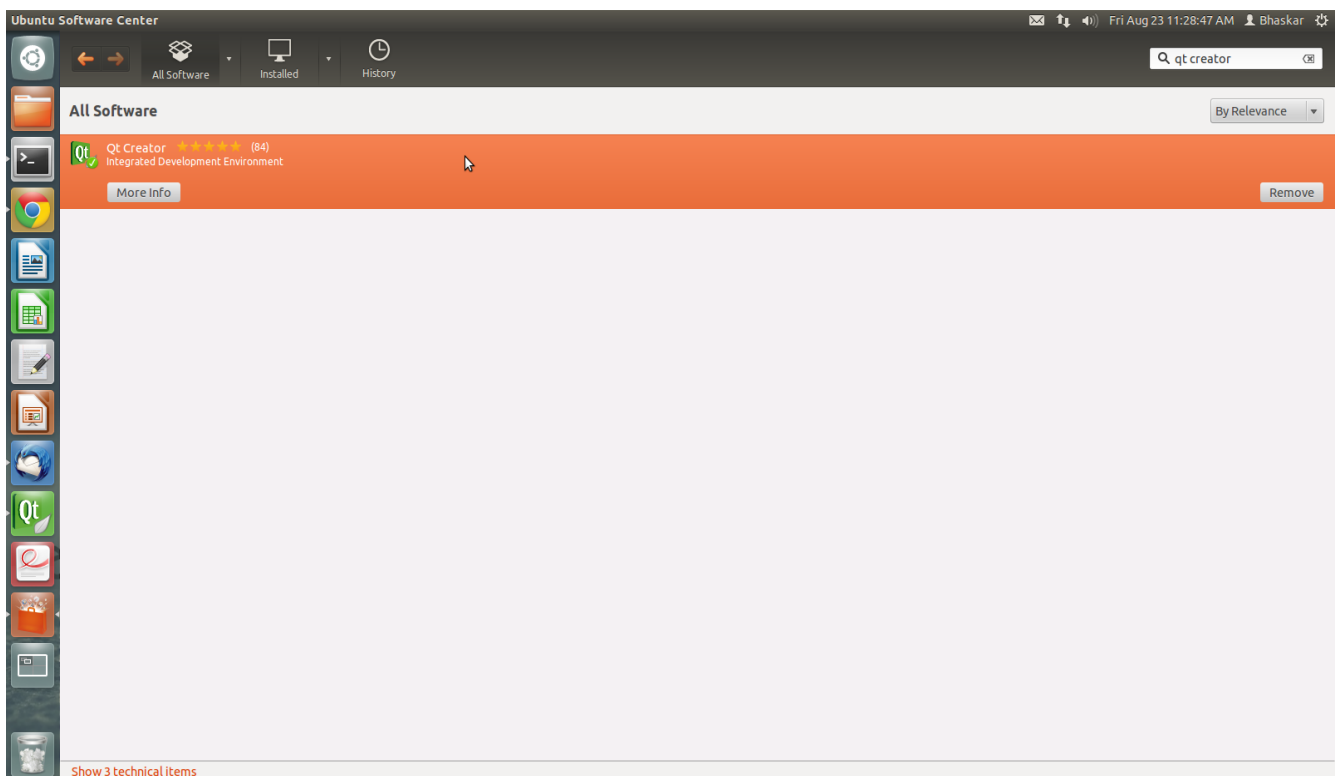


Figure 1.1

## 2. QT Creator Configuration for Cosmic-AM335x

**Note:** Before starting the procedure, power up the Cosmic board and set the ip address to the target.

### 2.1. Configuring QT Creator for Cross Compilation

Now lets setup QT creator to configure **qmake**. From the QT creator main menu shown below select the following:

**Tools -> Options...**

On the left side vertical menubar click **Build & Run**

Click the **Qt Versions** tab under Build & Run

**Remove** any versions that may already exist to make sure you start with a clean configuration

Click **Add...** on the right

Navigate to **/home/bhaskar/work/phytec/src/OpenBoard-AM335xPD13.0.0/platformPHYCORE-AM335x/sysroot-cross/bin/qmake**

Note: here Navigate to the path of qmake in our PC. (refer N 2.4)  
**Select qmake** then **click on Open**

Double click on **Version Name** and give the Qt Version a descriptive name such as **Qt 4.7.4(sysroot-cross)** See image below.

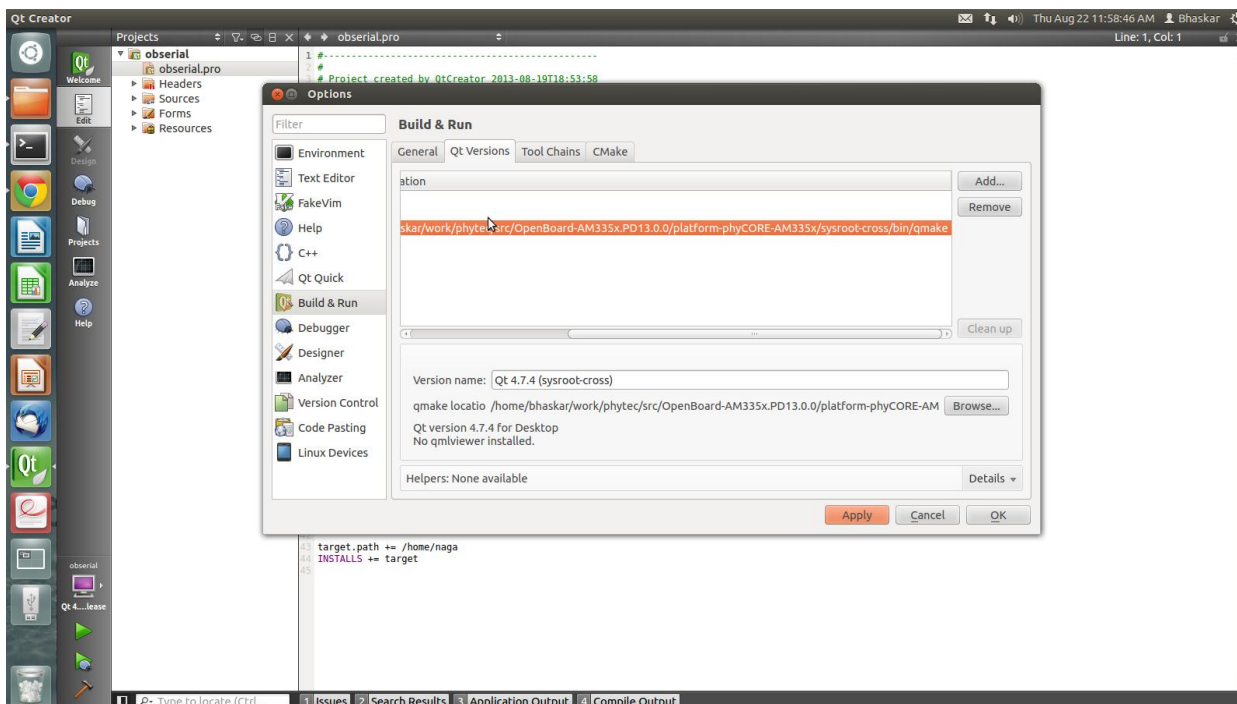


Figure 2.1.1

Export the Toolchain Path(refer 2.3.3)

Click the **Tool Chains** tab under Build & Run

Click **Add** in the top right and add a **GCC**

For **Compiler Path** select Browse

Navigate to **/home/bhaskar/work/phytec/src/arm-cortexa8-linux-gnueabi/bin**

**Note:** here navigate to the path where you have exported the tool chain

Select **arm-cortexa8-linux-gnueabi-gcc** and click on open

Repeat the process to select a debugger, you will find it at the same location:

**/home/bhaskar/work/phytec/src/arm-cortexa8-linux-gnueabi/bin/arm-cortexa8-linux-gnueabi-gdb**

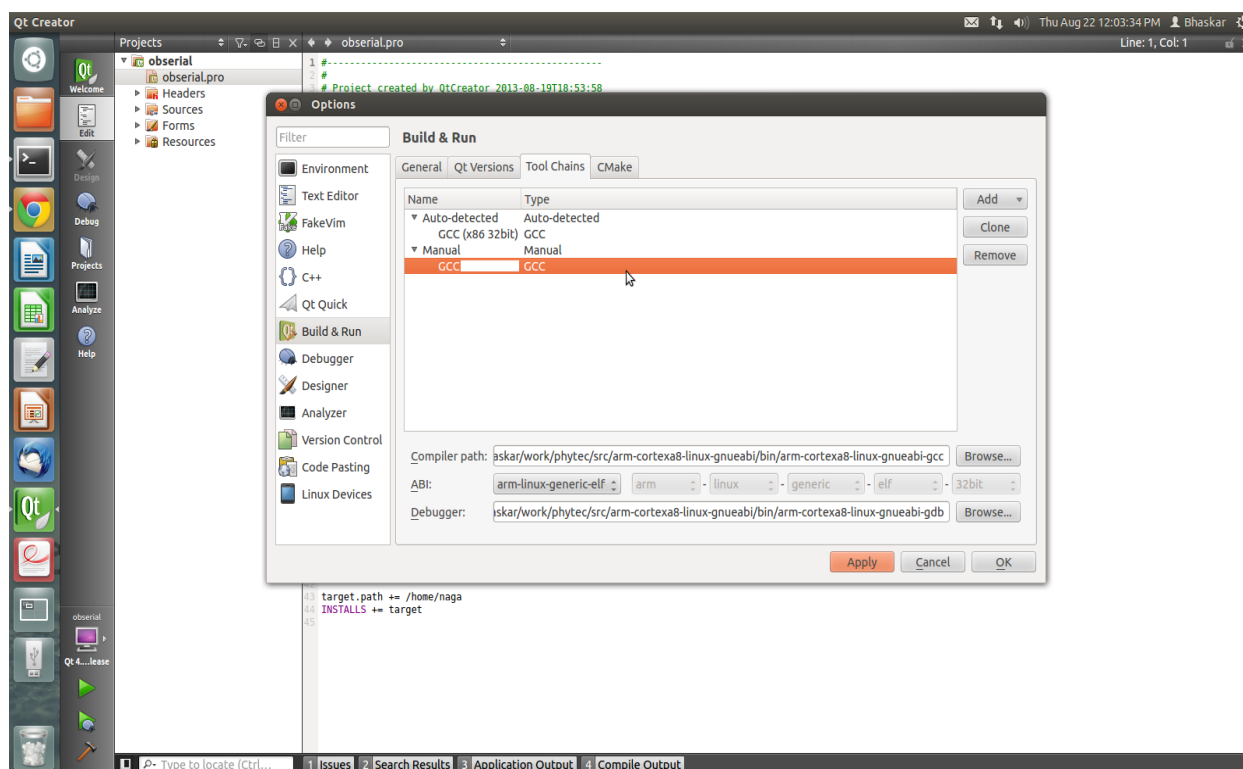


Figure 2.1.2

Now lets setup our Target. While still in the **Tools -> Options** menu

On the left side of the window, select the **Linux Devices** tab

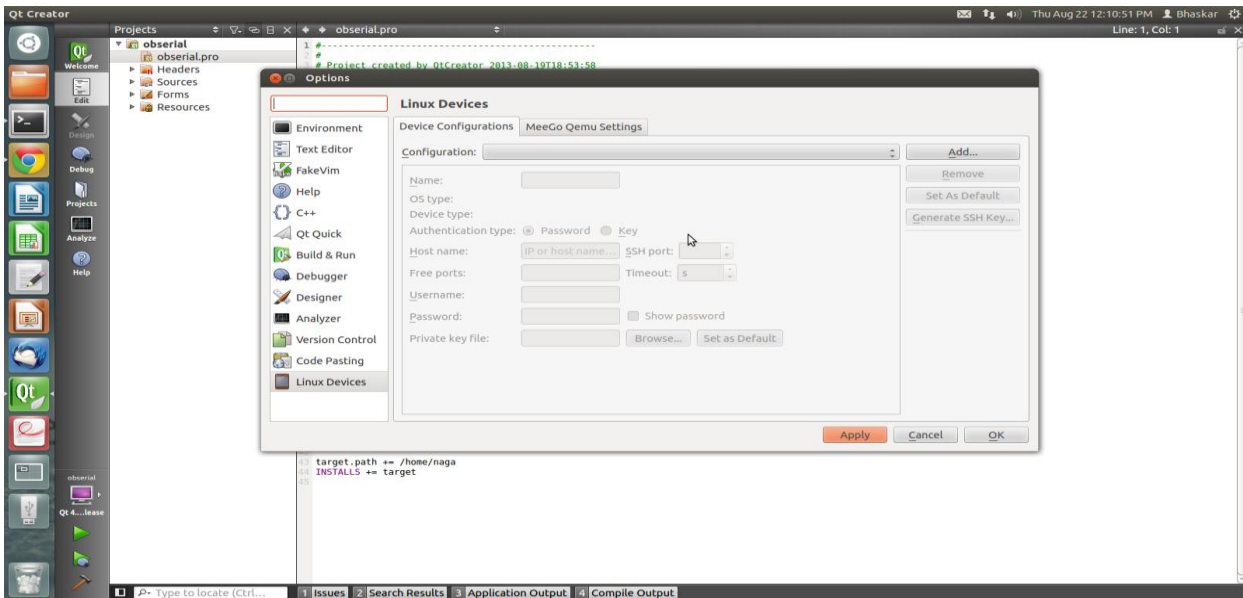


Figure 2.1.3

In Linux Devices: click the **Device Configurations** tab

Click **Add...** in the top right and select **Generic Linux device** and click on **Start Wizard**

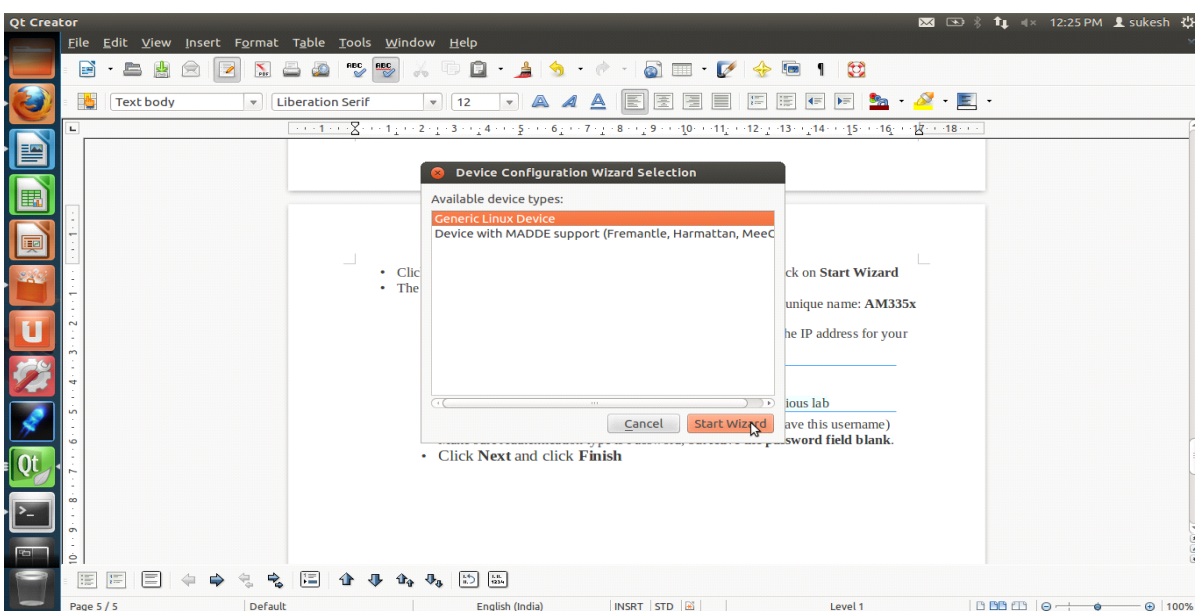


Figure 2.1.4

The Device Configuration Wizard Selection Dialog box comes up

Change the name **Generic Linux Device** to give the device a unique name: **AM335x**

Type in the IP address of the Embedded Linux Device. Type the IP address for your board, not the one shown in the screen capture.

For Username type in **root**

Make sure Authentication type is Password, but **leave the password field blank**.

Click **Next** and click **Finish**

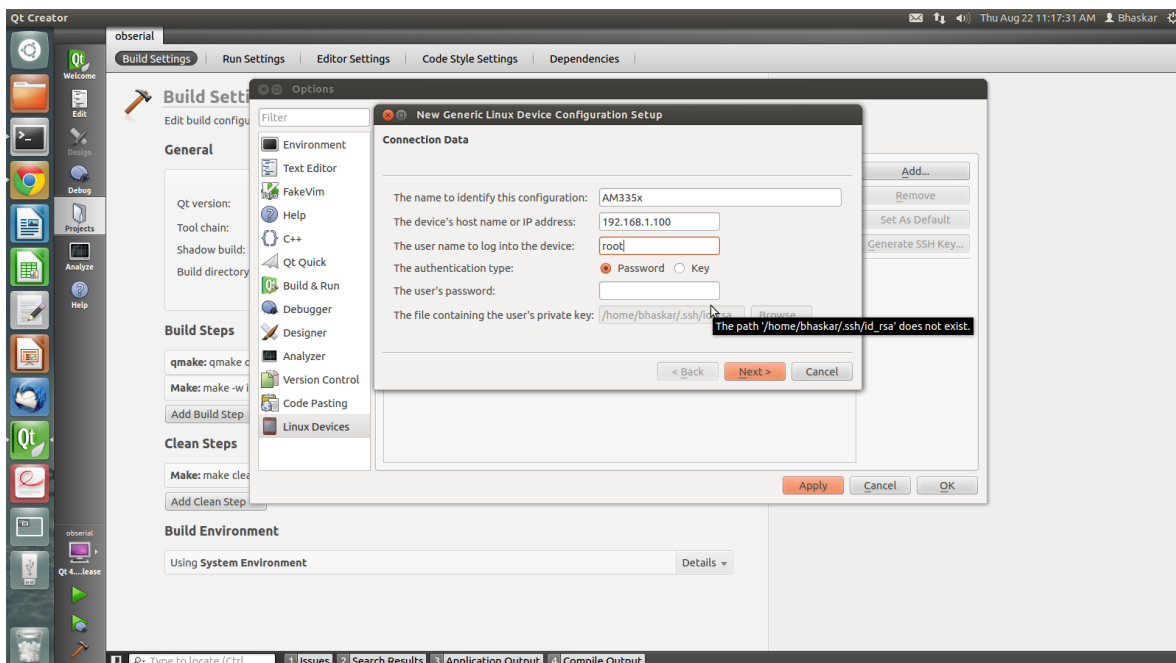


Figure 2.1.5



You should see that the target test passed, so you can close that window.

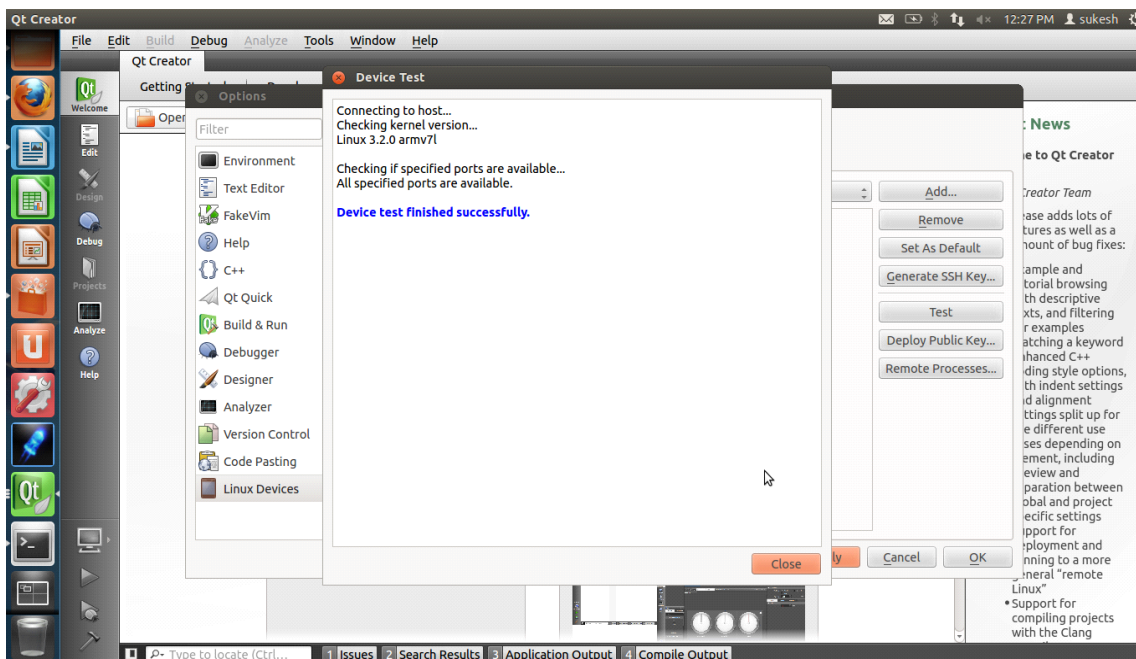


Figure 2.1.6

Now we need to setup an SSH key so that the host can communicate with the target

Still under the Device Configurations tab click "Generate SSH Key.."

Select **Key size: 1024**

**Key algorithm RSA**

Then click **Generate SSH Key** in the SSH Key Configuration dialog box

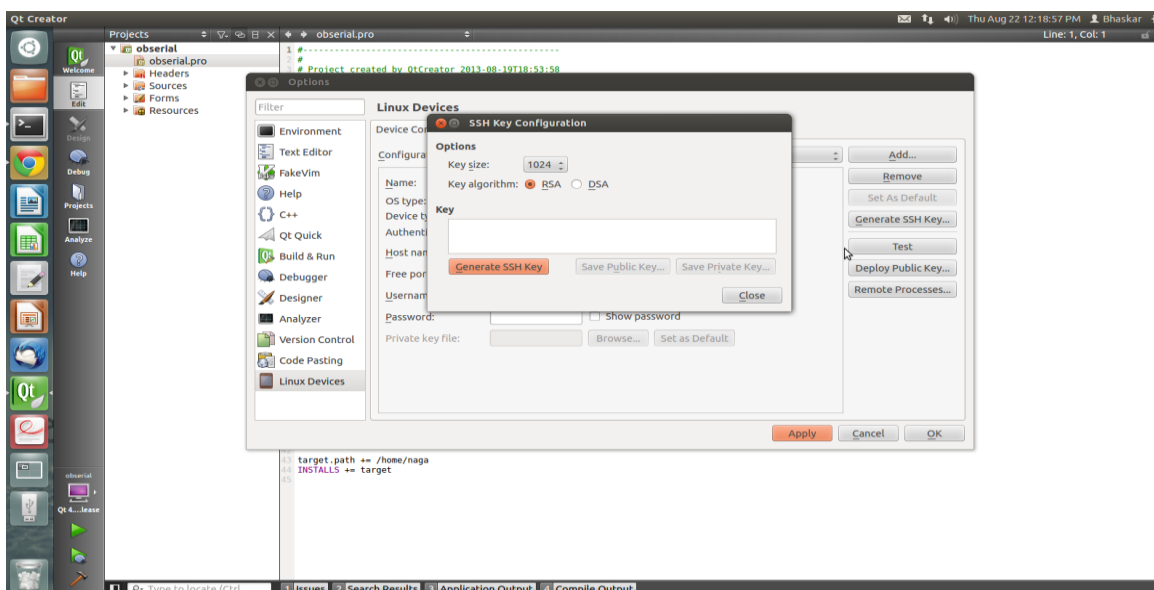


Figure 2.1.7

Click **Do not Encrypt** key file

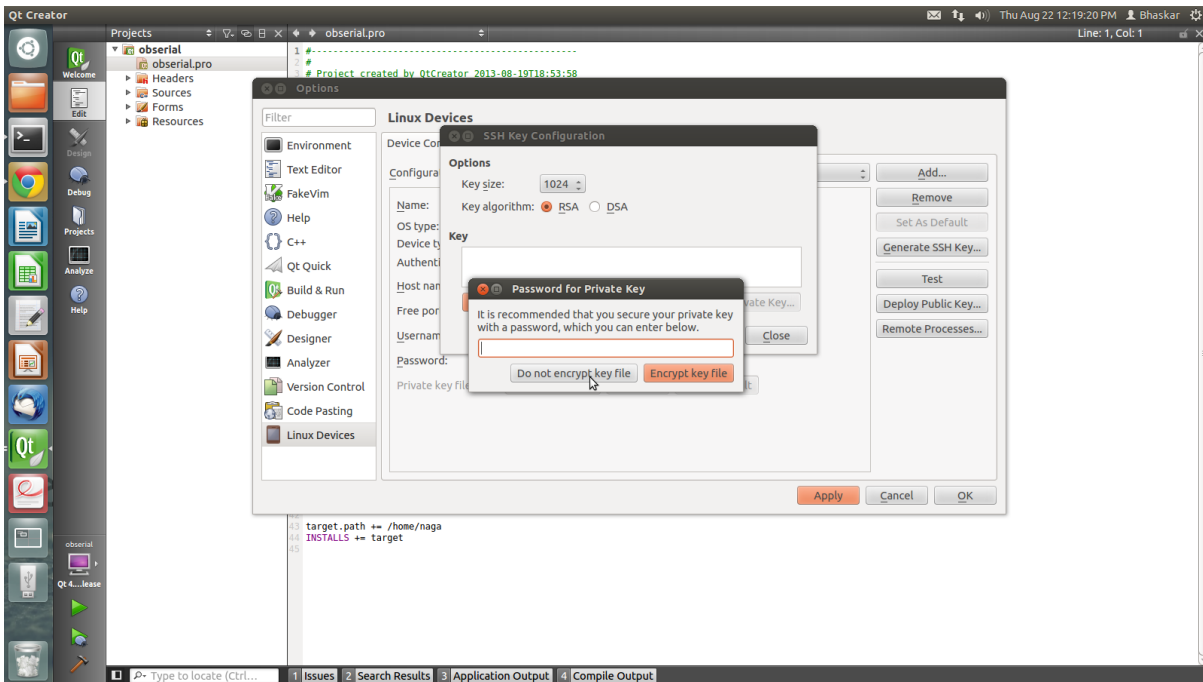


Figure 2.1.8

Then click **Save Public Key...**

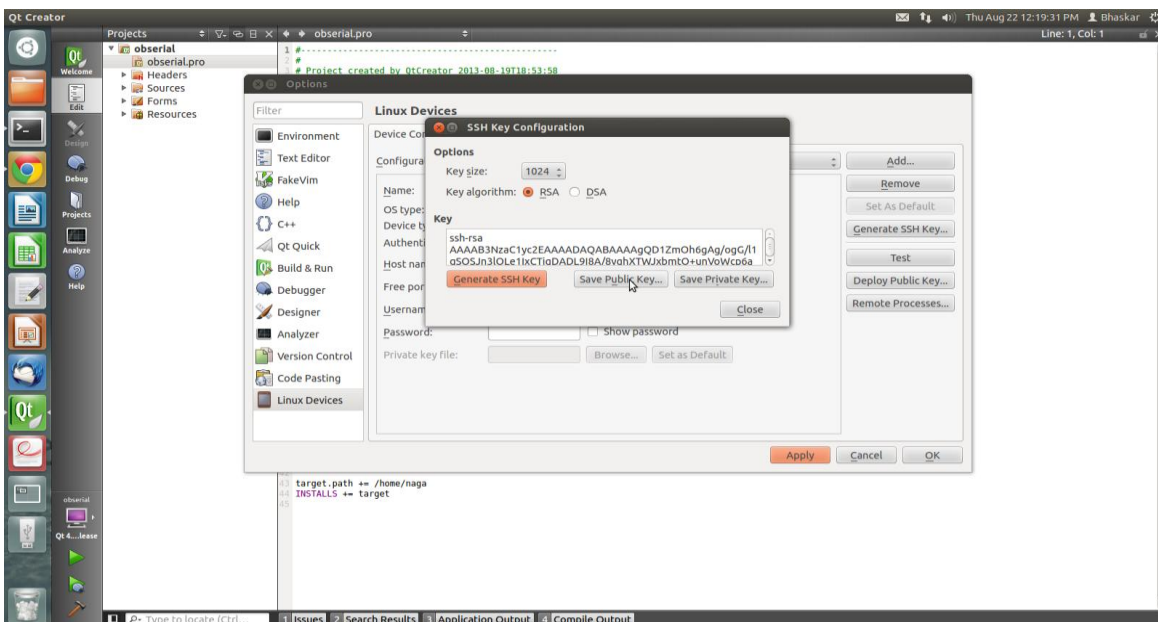


Figure 2.1.9

Just use the default name `id_rsa.pub` and **Click Save** and **Click Close** to close the Generate SSH Key window.

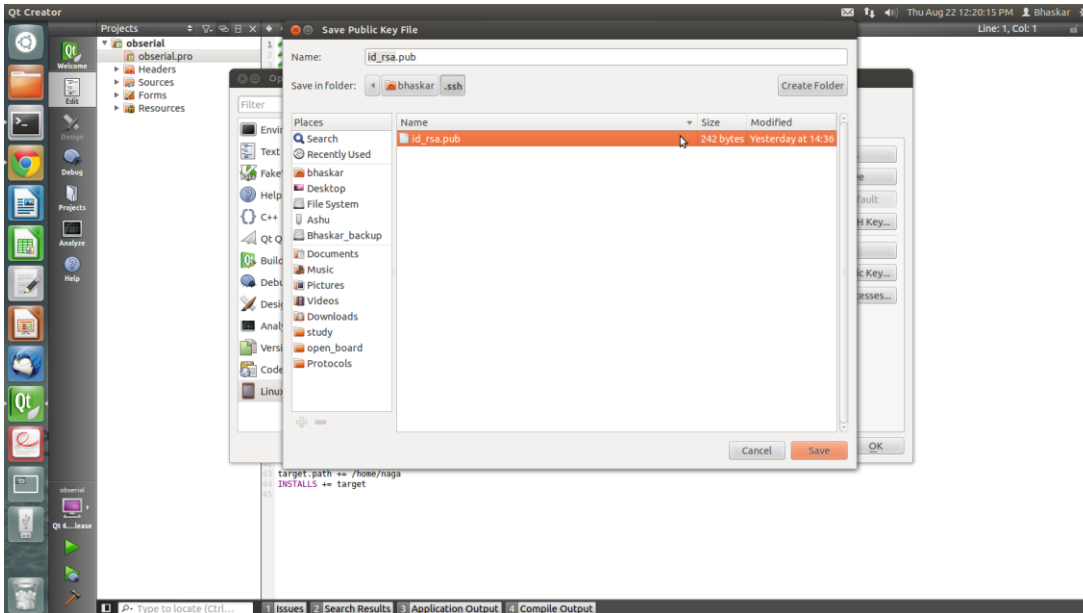
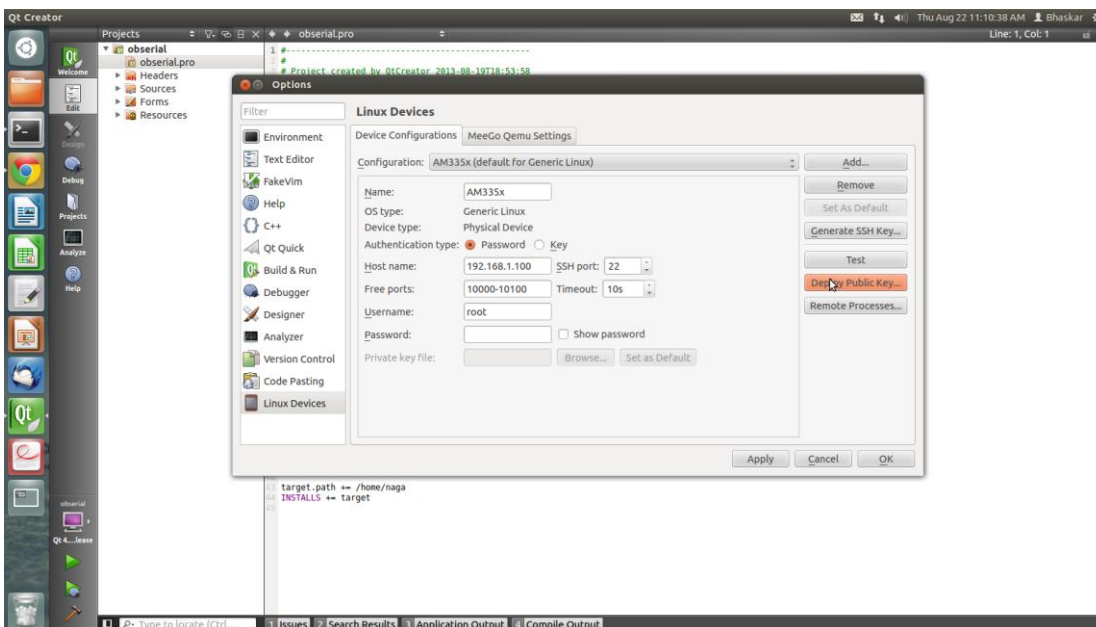


Figure 2.1.10

Under the Device Configurations tab now click **Deploy Public Key...**



Figurer 2.1.11

Select the file just generated (should be under /home/bhaskar/.ssh)

## IMPORTANT

You may need to right click and select **show hidden files** or **Ctrl+h**

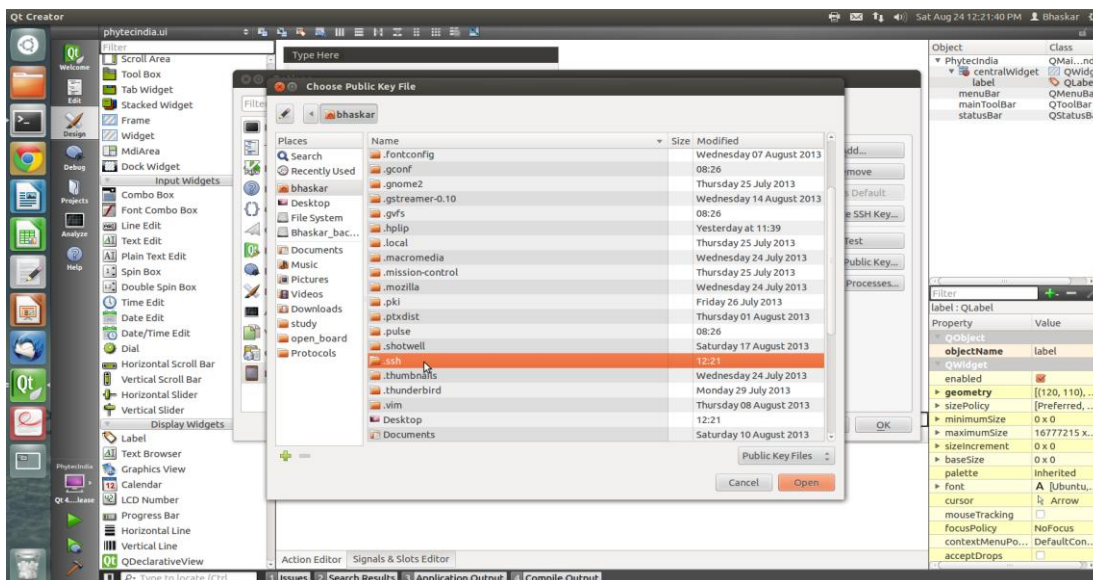


Figure 2.1.12

Select the file **id\_rsa.pub** and click on **Open**, shortly a window should show up saying "Deployment finished successfully"

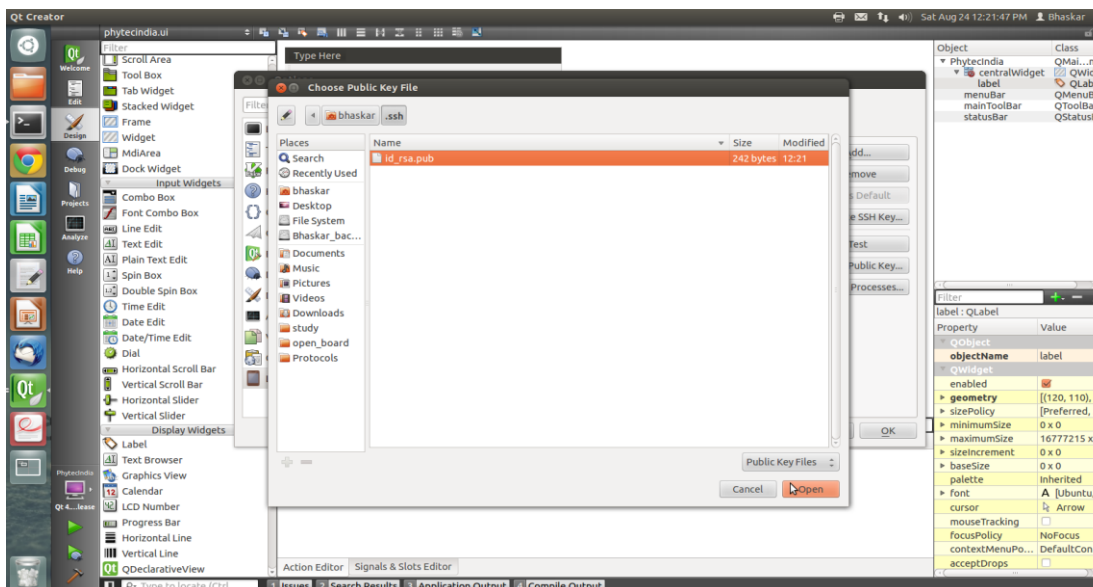


Figure 2.1.13

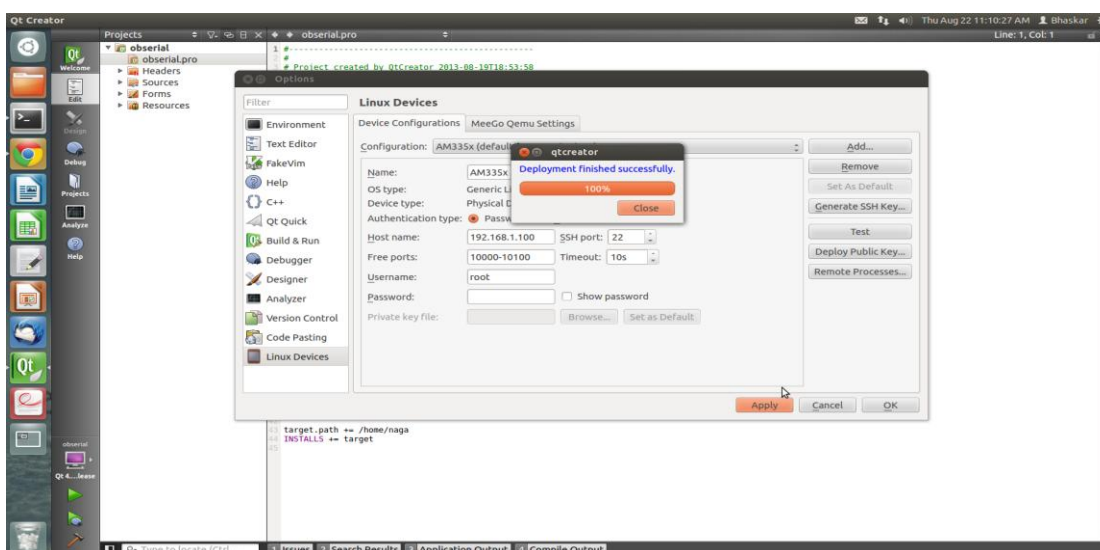


Figure 2.1.14

Close the window and **Click OK** to exit the Linux Devices Window

## 2.2.Target Setup

### Host Setup

First open the terminal (ALT+CTRL+T).

#### 2.2.1.Toolchain Insatallation

This section explains how to install prebuilt toolchain binaries on the Host. Whereas building of Toolchain is explained in buidsystem section.

#### 2.2.2.Downloading the Toolchain:

Download the toolchain from the public ftp of PHYTEC from the link below.

<ftp://ftp.phytec.de/pub/Products/India/Cosmic-AM335x/Linux/PD13.0.0/tools/toolchain/arm-cortexa8-linux-gnueabi.tar.bz2>

#### 2.2.3.Export the Toolchain to Shell Path:

Export the Toolchain to Shell Path

Extract the toolchain that has downloaded, from terminal issue the following

```
$ tar -xvf arm-cortex8-linux-gnueabi.tar.bz2
```

Now write a script that export the target Architecture and toolchain prefix as below.

```
$ vim env.sh
```

In the file add the following lines

```
export PATH=$PATH:/home/<user>/<path to toolchain bin>
export ARCH=arm
export CROSS_COMPILE=arm- cortex8-linux-gnueabi-
```

Save and exit from the editor. Execute the script by issuing  
**`$. env.sh`**

**Note:** The command is “dot space env.sh”. Execute the above command for every new shell where you are trying to start compilation of Linux kernel or bootloaders. Check whether the toolchain path is set or not by issuing

**`$PWD`**

Displays the path, where you have set this Toolchain path

**`$ echo $PATH`**

Above command displays the entire paths that are added to Shell PATH variable separated by colon ‘:’. See if your path is printed on the terminal. If you are not able to see your toolchain path repeat the steps from the beginning of this section.

**`$ echo $PATH`**

### **2.3. Building qmake using ptxdist**

#### **2.3.1 Download the PTX-dist packet from the following link:**

<ftp://ftp.phytec.de/pub/Products/India/Cosmic-AM335x/Linux/PD13.0.0/buildsystems/ptxdist/ptxdist-2012.03.0.tar.bz2>

Extract the above downloaded source

**`$ tar -xvf ptxdist-2012.03.0.tar.bz2`**

Go to downloaded folder

**`$ cd ptxdist-2012.03`**

Configure the packet

**`$. /configure`**

When the configure script is finished successfully, to compile run

**`$ make`**

**`$ sudo make install`**

#### **2.3.2. Download the PTX-dist BSP source from following link:**

<ftp://ftp.phytec.de/pub/Products/India/Cosmic-AM335x/Linux/PD13.0.0/buildsystems/ptxdist/Cosmic-AM335x.PD13.0.0.tar.bz2>

Extract the source

**`$ tar -xvf Cosmic-AM335x.PD13.0.0.tar.gz`**



Go to extracted folder

```
$ cd Cosmic-AM335x.PD13.0.0
```

Select the toolchain

```
$ ptxdist toolchain <path_of_toolchain_bin>
```

**Refer 1.3.3 to set the Toolchain path,copy and paste the path here**

Start the build

```
$ ptxdist go
```

Check the qmake image at platform-phyCORE-AM335x/sysroot-cross/bin/qmake

```
$ ls platform-phyCORE-AM335x/sysroot-cross/bin/qmake
```

#### **2.4.Setting Serial Console (Minicom)**

```
$ sudo minicom -s
```

Select the option serial port setup from menu on terminal and press **'Enter'**

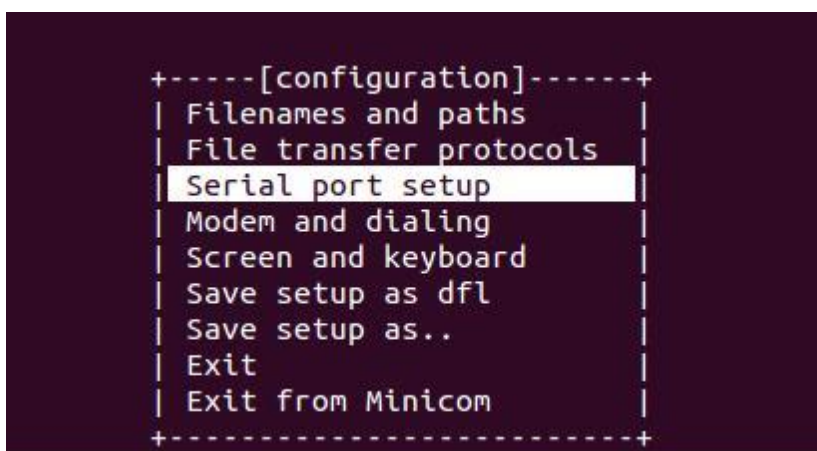


Figure 2.4.1

Using the options at left; make the setting as shown in the figure 3.2. For ex: Serial device – dev/ttsyS0, first press ‘A’ the cursor blinks at the particular line then change the device name to /dev/ttyS0 and press **‘ENTER’**.



Figure 2.4.2

After making all changes like baud rate -115200, hardware control flow -No etc. that are required press '**ENTER**' to come out from the screen, now the previous screen will appear.

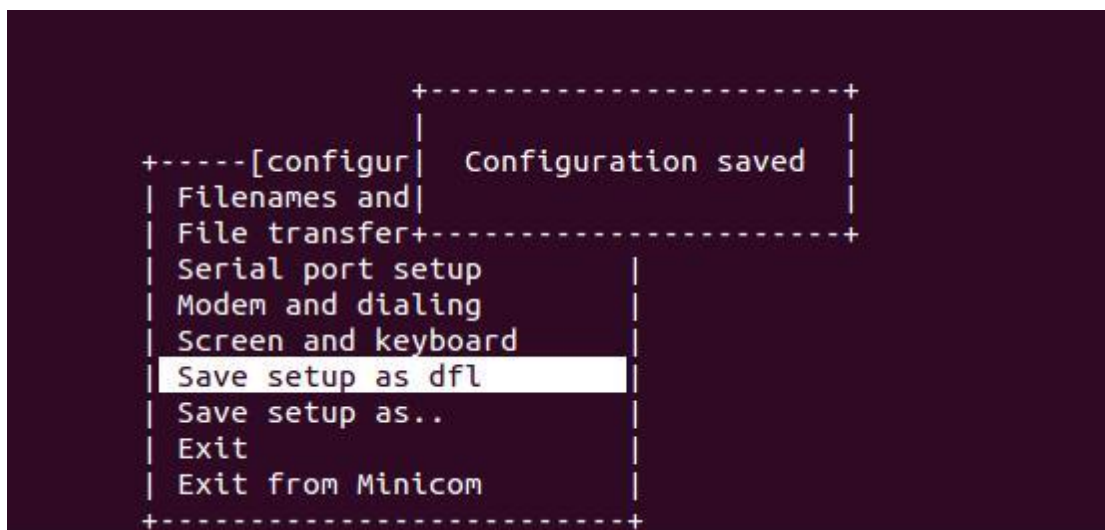


Figure 2.4.3

Now select the 'Save setup as dfl' it saves the setting as default.

Now select '**Exit**'



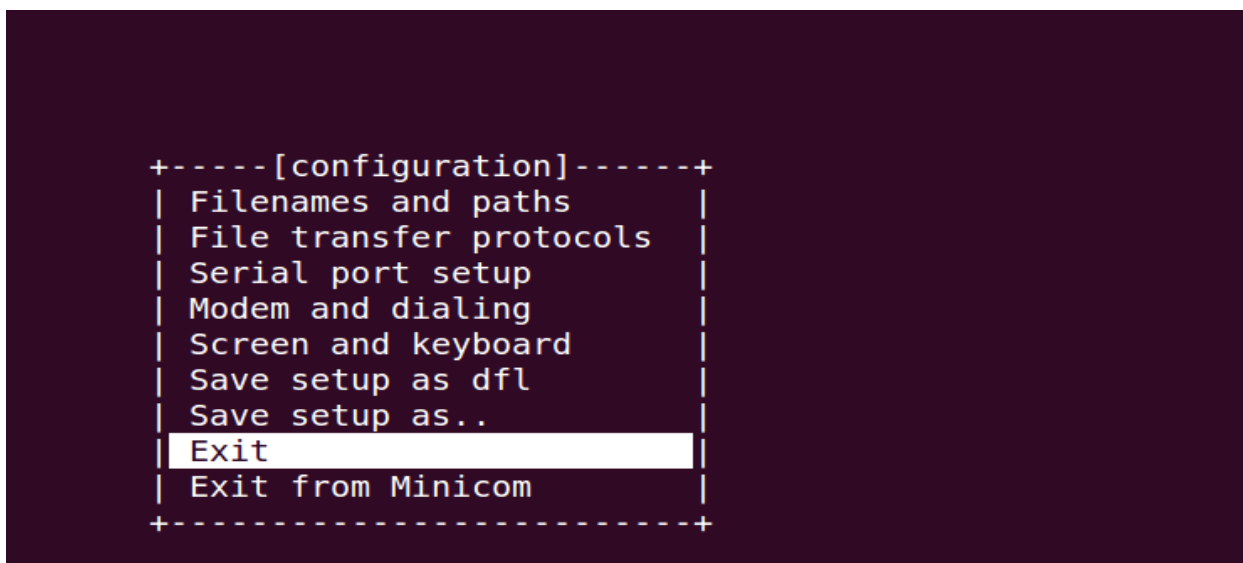


Figure 2.4.4

It will take into 'minicom' the serial terminal.

### **2.5.Set the ip for Cosmic-AM335x**

To see all the interfaces present on the open board

```
$ ifconfig -a
```

After this we got the particular interface then we have to configure it.

```
$ ifconfig eth0 192.168.1.100 up
```

where eth0 is the interface name.

Again check whether it is configured or not

```
$ ifconfig -a
```

Then we have to set the gateway

```
$ route add default gw 192.168.1.1
```

To see the change in the gateway.

```
$route
```

### 3. Application development

#### 3.1. Simple Demo Application:

Open a New Project

Under **Forms**, double click on **phytec.ui** This will bring up the widget editor.

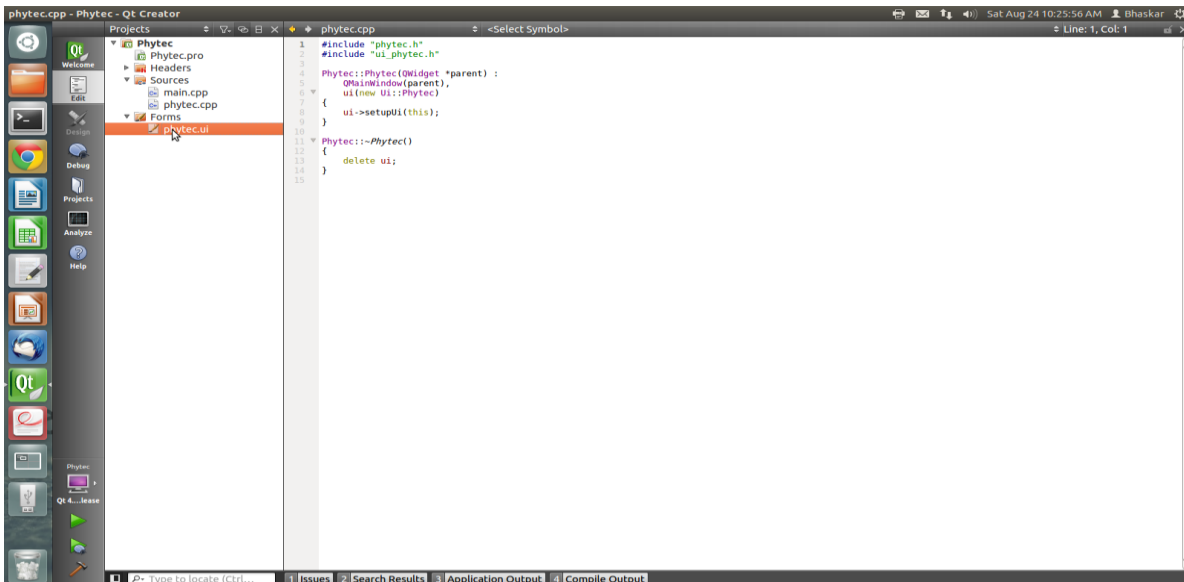


Figure 3.1.1

Find the **label widget** in the category of *display widgets*, left click and drag it on to the **User Interface (UI)**.

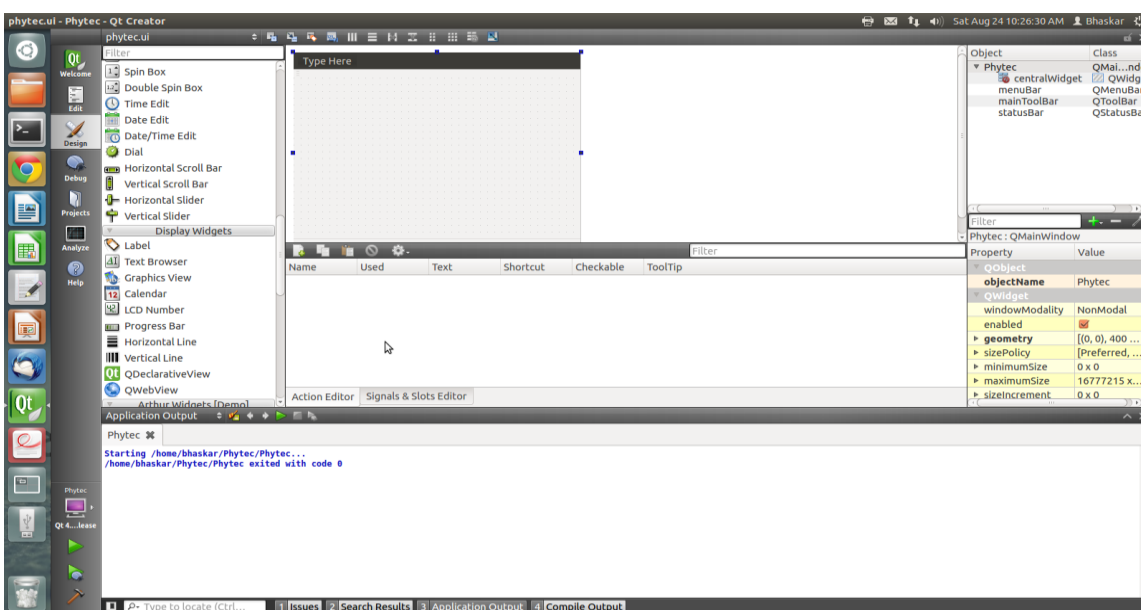


Figure 3.1.2

Type any name (PhytecIndia) into the label widget and stretch out the borders so you can see all the letters

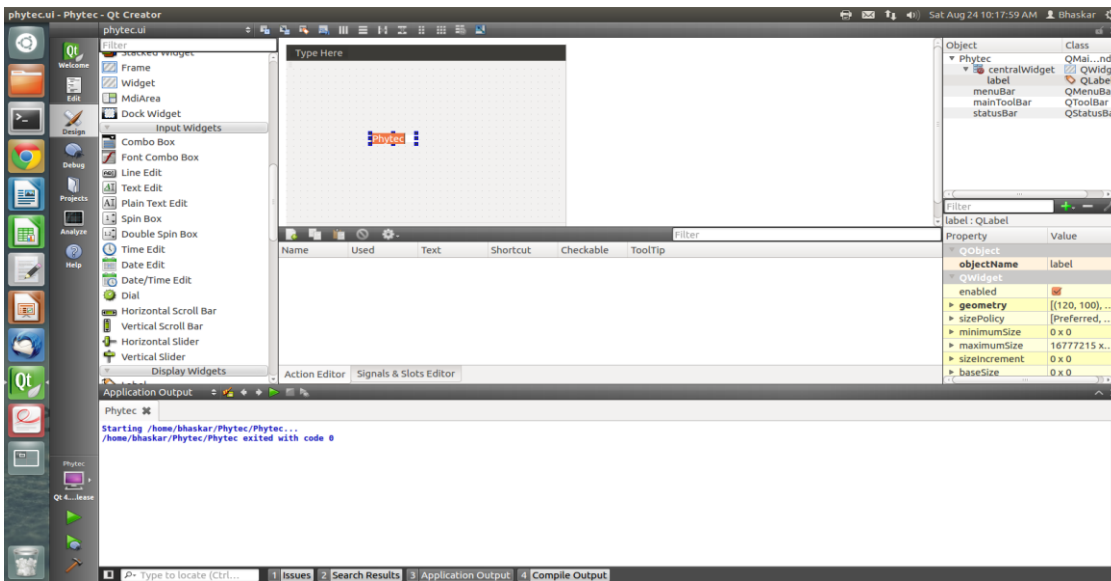


Figure 3.1.3

File->Save **phytec.ui**

Now we need to check and update the build and run settings:

On the left side vertical menubar select **Projects**

Select the **Build Settings** tab and select the **Qt 4.7.4(sysroot-cross)Release** for build configuration.

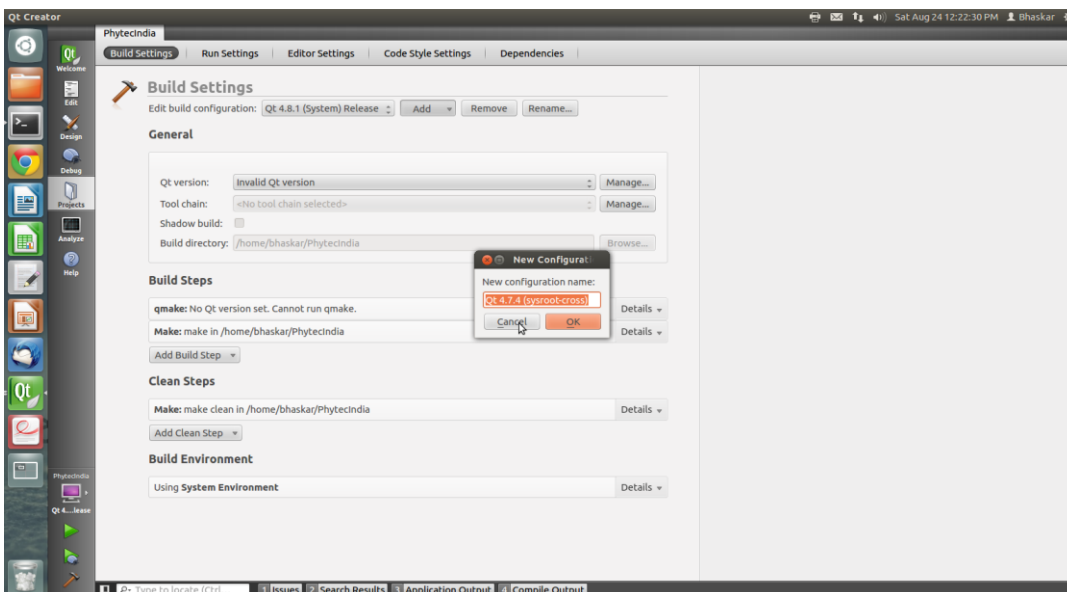


Figure 3.1.4

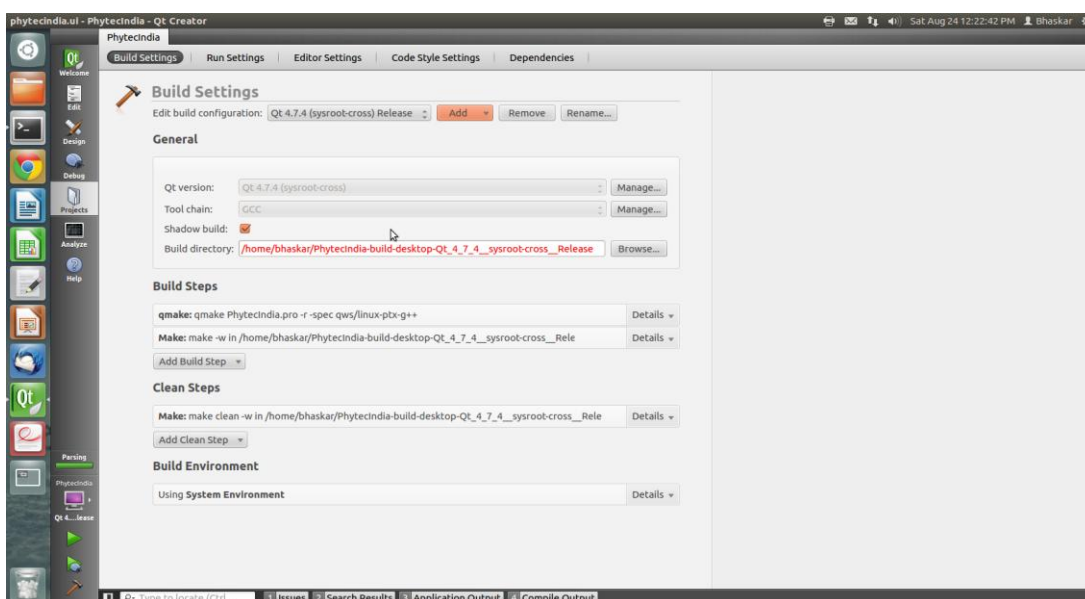


Figure 3.1.5

Now under the Projects Mode select the **Run Settings** tab

Under Deployment click **Add** and select **Deploy to Remote Linux Host**

However you see the **<no target path set>** error

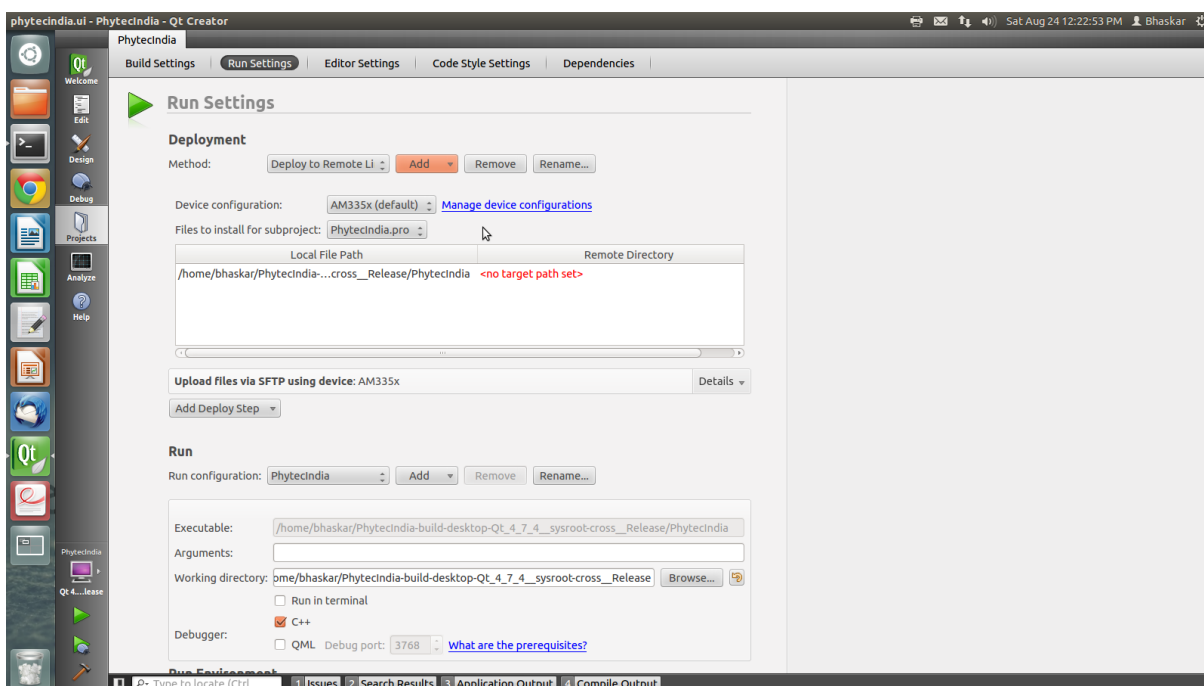


Figure 3.1.6

To fix the **<no target path set>** error do the following:  
 Click on **Edit** on the left side vertical bar and click on **Phytecindia.pro**

Add the two lines below to the bottom of Phytecindia.pro as shown in the screen shot below

```
target.path += /home/phytec
INSTALLS += target
```

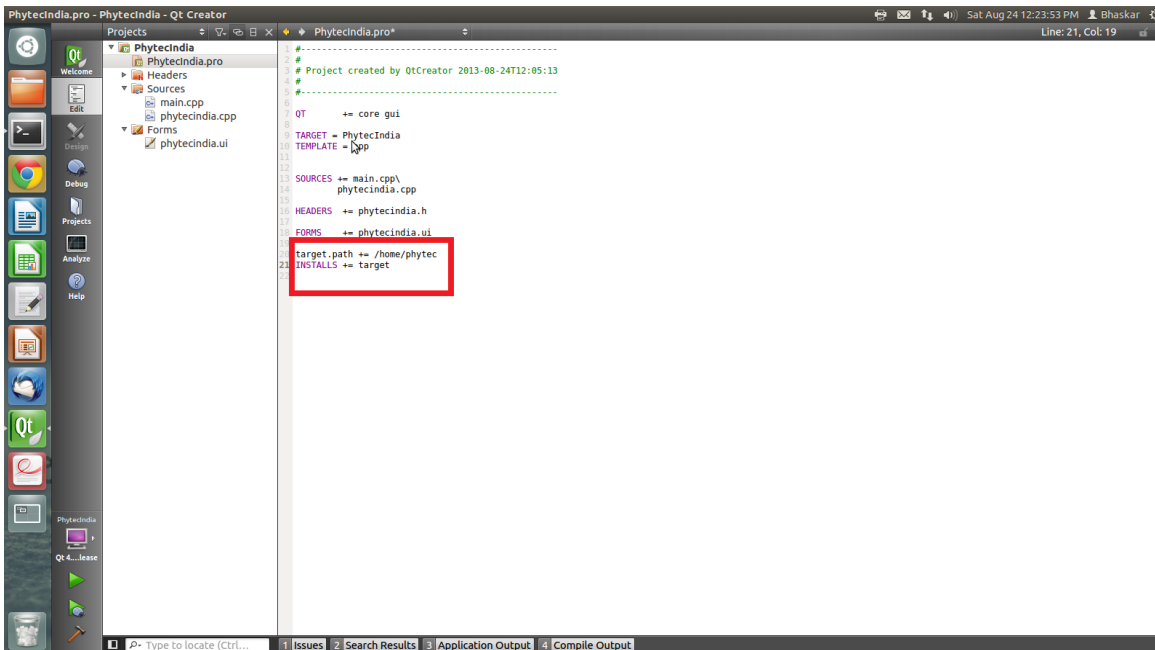


Figure 3.1.7

Select **File -> Save**

Click on **Projects** on the left side vertical bar and you should now see the error is gone and replaced with **/home/phytec**

Now in the Run portion: **Select Add -> terminal (on Remote Generic Linux Host)**

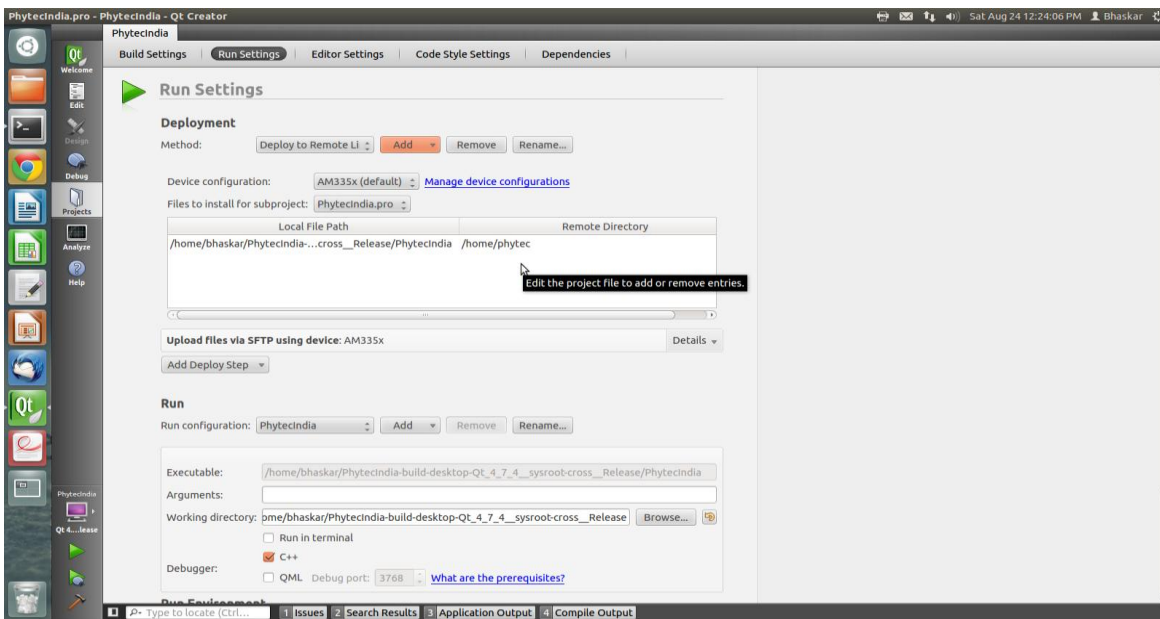


Figure 3.1.8

## Finally we are ready to run IMPORTANT

If matrix is not running add `-qws` to the Arguments in **Run Settings**

- Click the **Green Arrow** on the bottom left to run the project or Press **Ctrl+R**
- Save all files if asked

**NOTE:** To exit from the hello world running on the target, click on the "X" on the upper right menu bar.

The Output can be seen in the connected LCD display.

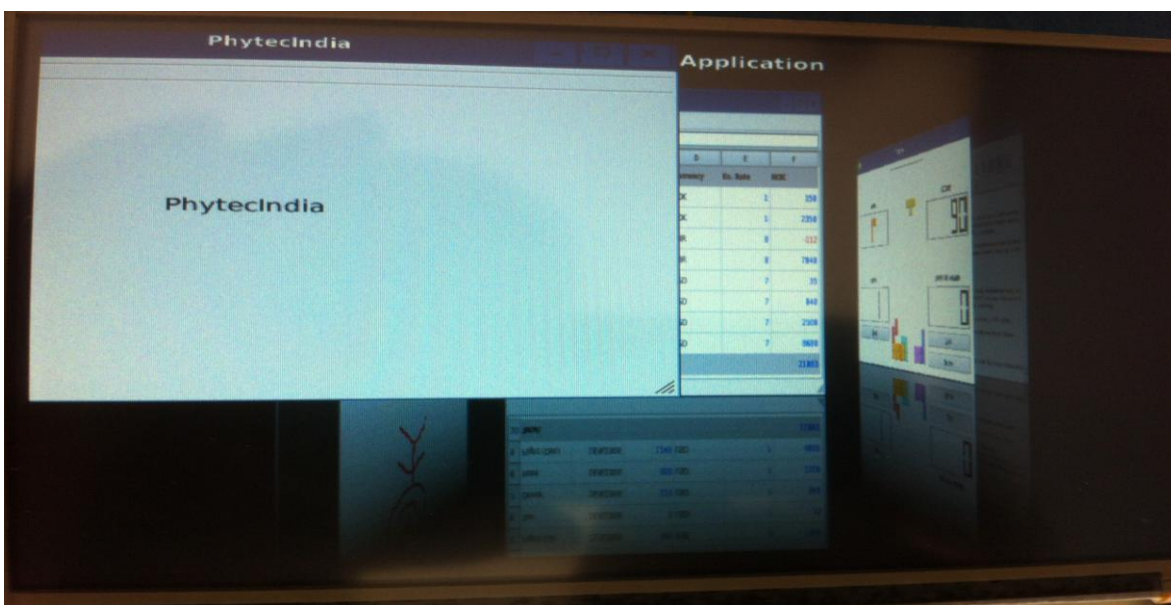


Figure 3.1.9

### 3.2.Uart Read Application

**Open the Uart project build it and run it on the target**

Down load the Source code of Uart from the following link:

[ftp://ftp.phytec.de/pub/Products/India/Cosmic-AM335x/Linux/PD13.0.0/src/apps/Qt\\_uart.tar.gz](ftp://ftp.phytec.de/pub/Products/India/Cosmic-AM335x/Linux/PD13.0.0/src/apps/Qt_uart.tar.gz)

Select **File-> Open File or Project**

Open the obserail.pro file in the Qt\_uart folder.

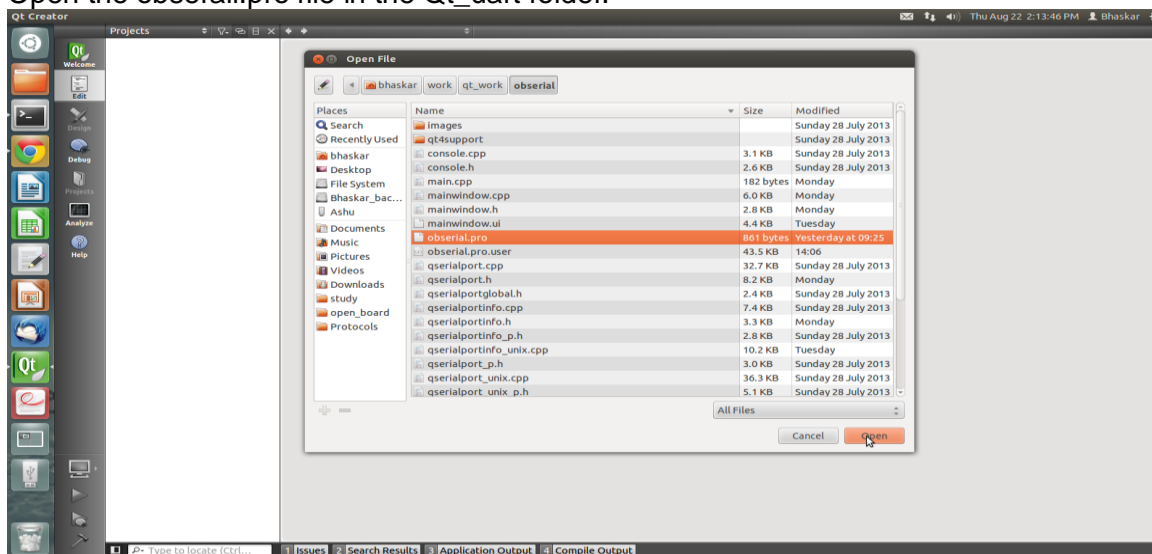


Figure 3.2.1

Click on **Edit** on the left side vertical bar and click on **obserial.pro**

Add the two lines below to the bottom of obserail.pro as shown in the screen shot below

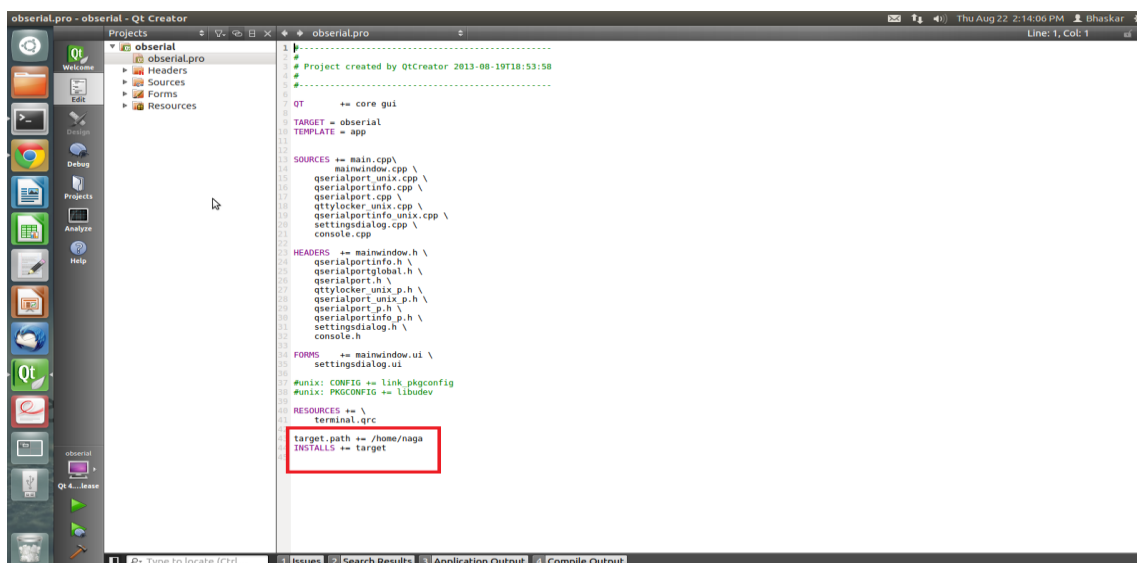


Figure 3.2.2



target.path += /home/naga

INSTALLS += target

Select **File -> Save**

Now we need to check and update the and run settings:

Now under the Projects Mode select the **Run Settings** tab

Under Deployment click **Add** and select **Deploy to Remote Linux Host**

Now in the Run portion: **Select Add -> obserial (on Remote Generic Linux Host)**

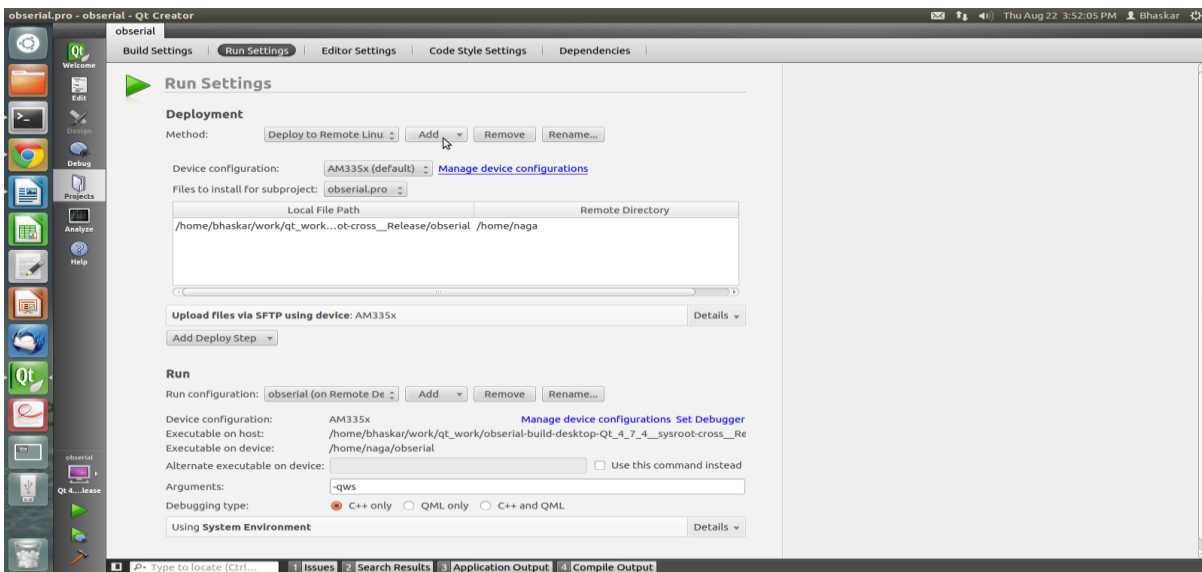


Figure 3.2.3

Now on **host side** (power up the target if not and make proper settings and make sure Ethernet wire is connected on target side)

To login to the target give the following command

**`$ssh root@<ipaddress of target>`**

```
bhaskar@phytec:~$ ssh root@192.168.1.100
```

Figure 3.2.4

Now you are in **target**

```
bhaskar@phytec:~$ ssh root@192.168.1.100
root@phyCORE-AM335x:~$ ls
Settings  adc      audio   button  led     naga
root@phyCORE-AM335x:~$
```

Figure 3.2.5



Go to the path which we mentioned in bottom of the .pro file in Qt creator

i.e, target.path += /home/naga (see the following image.)

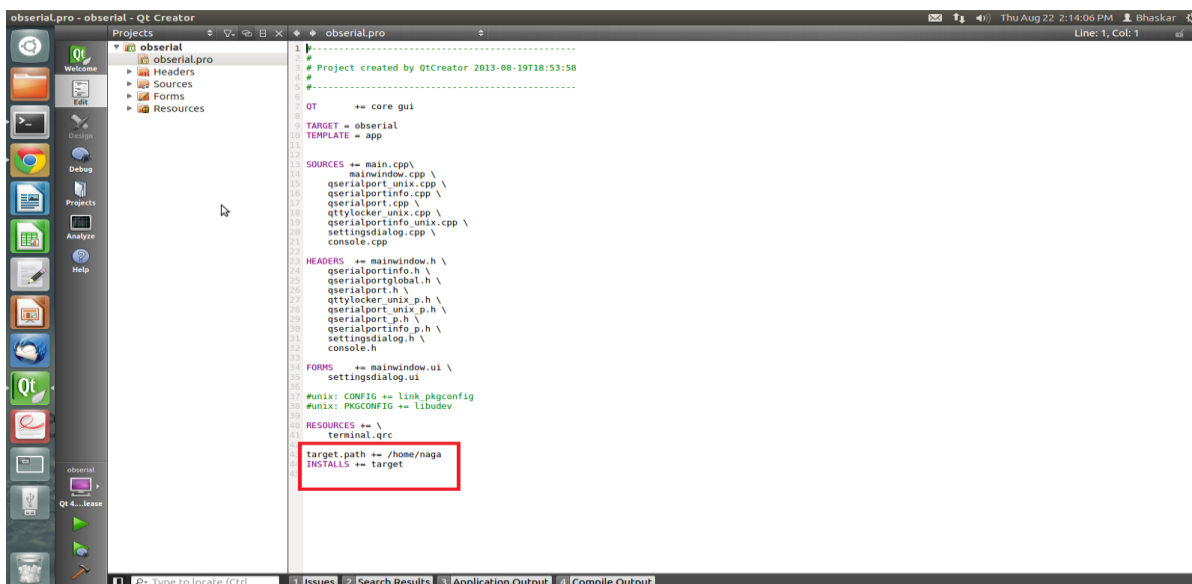


Figure 3.2.6

**`$cd /home /naga`**

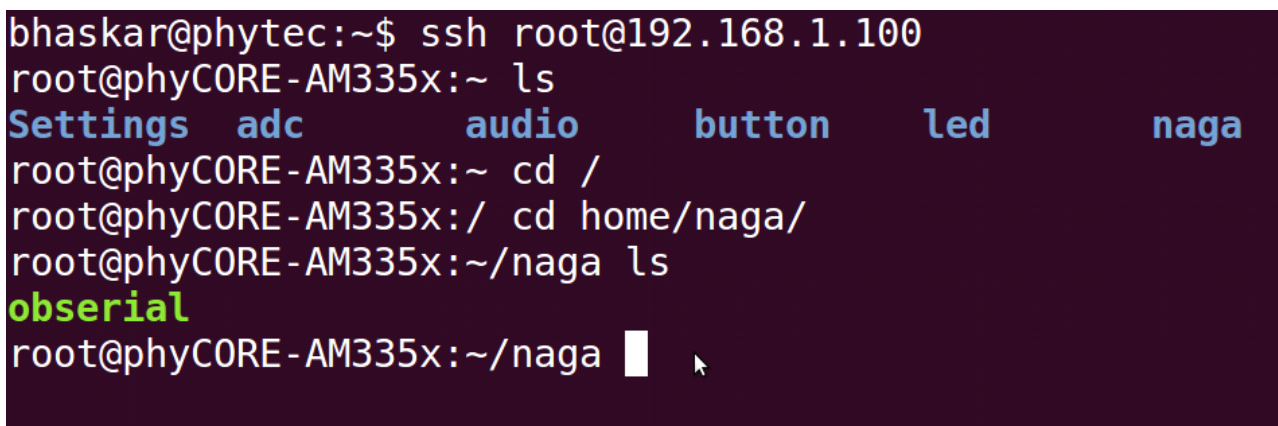


Figure 3.2.7

Now execute the output file `./obserial -qws`

**`./obserial -qws`**

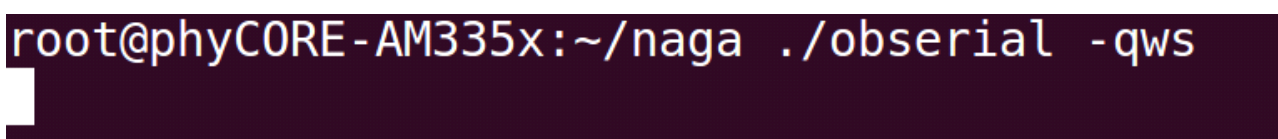


Figure 3.2.8

Now you will see the console in LCD display

First connect the usb hub to the target and then connect Mouse and Keyboard to that hub. Click on the setting icon (which is third icon in the below row)

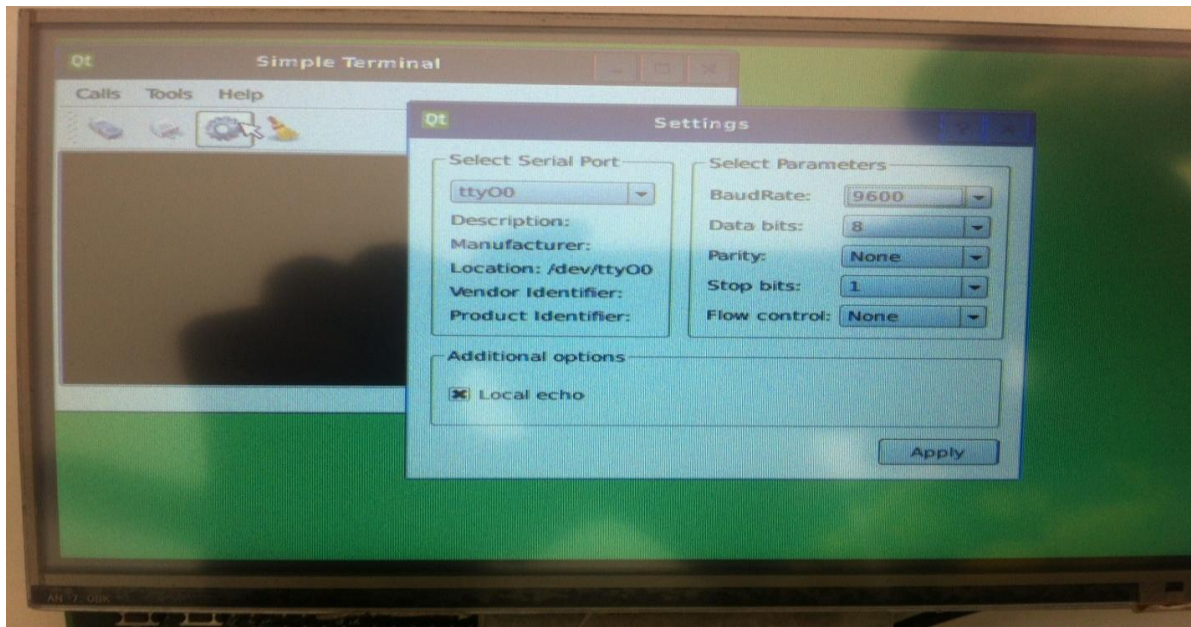


Figure 3.2.9

Set the Baud rate (The baud rate in LCD display should match the baud rate in serial port settings in target)

Set the serial port settings in LCD display (preferably **ttyO0**)

Click on the Apply

Click on the icon(connect to serial port) which is first icon in the below row

Now type any letters on keyboard which is connected to usb hub, it visible on terminal of the LCD display

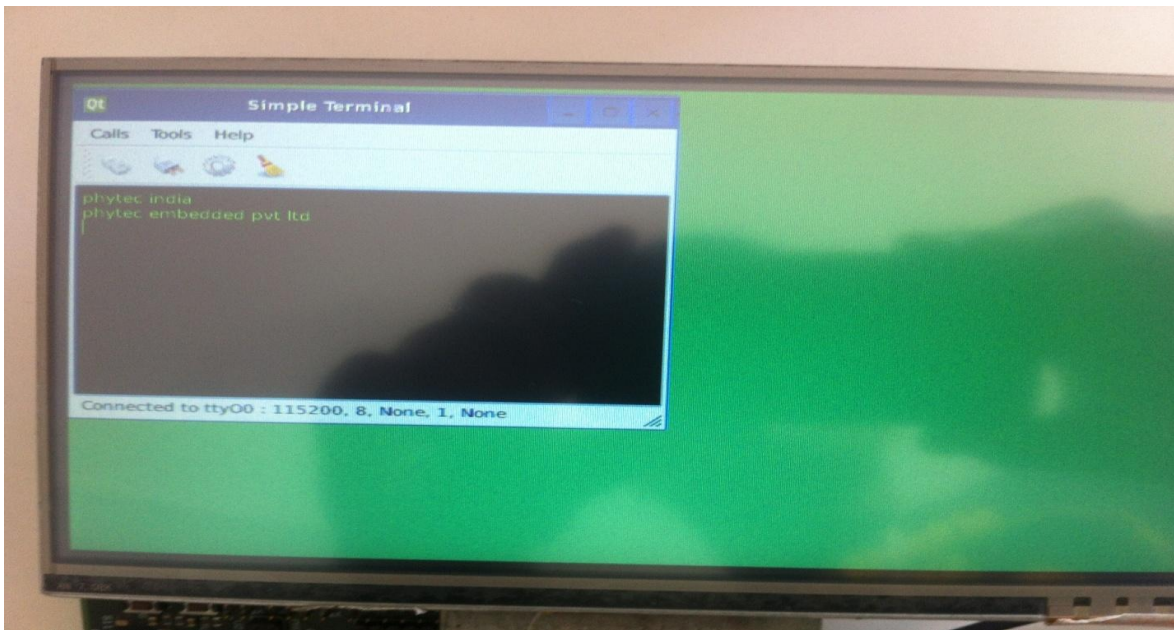


Figure 3.2.10

Open the minicom and login to the board

The same will be displayed on the minicom

```
root@phyCORE-AM335x:~ phytec india phytec embedded pvt ltd
```

Figure 3.2.11

# PHYTEC

**Get the dialog going ...  
... and stay in touch**

## **India**

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.....We are looking forward to hear from you! .....