

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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PHYTE



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.(referN 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.

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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

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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

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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

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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



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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

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Figure 2.1.7



Click Do not Encrypt key file

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Figure 2.1.8

Then click Save Public Key...

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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.

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Figure 2.1.10

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

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Contract of the second of the	Apply c	ancel <u>OK</u>

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

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Select the file **id_rsa.pub** and click on **Open**, shortly a window should show up saying "Deployment finished sucessfully"







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Analyze Qt Quick	Host name: 192 168 1 100 SSH port: 22	Test
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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.

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

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

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

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

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:

<u>ftp://ftp.phytec.de/pub/Products/India/Cosmic-</u> 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

\$ Is 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.

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Figure 2.4.3

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

Now select 'Exit'

Ň



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

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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 strech out the borders so you can see all the letters



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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 selct the **Qt 4.7.4(sysroot-cross)Release** for build configuration.







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

phytecin	ndia.ui - Ph	aul - Phytecindia - Qt Creator (Creator Code Style Settings Code Style Settings Dependencies) Phytecindia Build Settings Editor Settings Code Style Settings Dependencies Run Settings Deployment Method: Deploy to Remote Li Code Remore Rename Device configuration: AM335x (default) Manage device configurations Files to install for subproject: Phytecindia.pro Code Style Settings Code Style Settings Local File Path Remote Directory //home/bhaskar/Phytecindiacross_Release/Phytecindia <-no target path set>	
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	PhytecIndia	Arguments:	
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Figure 3.1.6

-IYT



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

Phytecl	ndia.pro - I	PhytecIndia - Qt Creator		🖶 📨 🄃 🖬 Sat Aug 24 12:23:53 PM 👤 Bhaskar 🔱
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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)



PhytecIndia.pro - Phy	ytecIndia - Qt Creator	🖶 🖾 🍂 🐠 Sat Aug 24 12:24:06 PM 💄 Bhaskar 🔱
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Projects Projects Analyze Pelp Help	Files to install for subproject: Phytecindia.pro 2 Local File Path Remote Directory /home/bhaskar/Phytecindiacross_Release/Phytecindia /home/phytec Edit the project file to add or remove entries.	
	Upload files via SFTP using device: AM335x Details + Add Deploy Step *	
Protectinetia	Run Phytecindia Control Run configuration: Phytecindia Add Remove Recutable: /home/bhaskar/Phytecindia-build-desktop-Qt_4_7_4_sysroob-cross_Release/Phytecindia	
Q: 4test	Working directory: bme/bhaskar/Phytecindia-build-desktop-Qt_4_7_4_sysroot-cross_Release) Browse Browse	

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

 $\ensuremath{\text{NOTE}}$: 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.







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

Select File-> Open File or Project

Open the obserail.pro file in the Qt_uart folder.

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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 obserial.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)





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>





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.)

obserial	.pro - obse	rial - Qt Creator			Thu Aug 22 2:14:06 PM 🔳 Br	naskar 🗘	
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Figure 3.2.6

\$cd /home /naga

bhaskar@phytec:~\$	ssh root@1	.92.168.1.1	00	
root@phyCORE-AM33	85x:~ ls			
Settings adc	audio	button	led	naga
root@phyCORE-AM33	85x:~ cd /			
root@phyCORE-AM33	85x:/ cd hom	ne/naga/		
root@phyCORE-AM33	35x:~/naga l	.s		
obserial	_			
root@phyCORE-AM33	35x:~/naga	k		

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)

6 . (A)	Qt Se	ttings			
	Select Serial Port tty00 * Description: Manufacturer: Location: /dev/tty00 Vendor Identifier: Product Identifier: Additional options ELocal echo	Select Param BaudRate: Data bits: Parity: Stop bits: Flow control:	eters 9600 8 None 1 None		
				ply	

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



Get the dialog going and stay in touch

India

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