

# **Intel® IoT Gateway Development Kit DK50 Series**

**Getting Started Guide**

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***April 2015***



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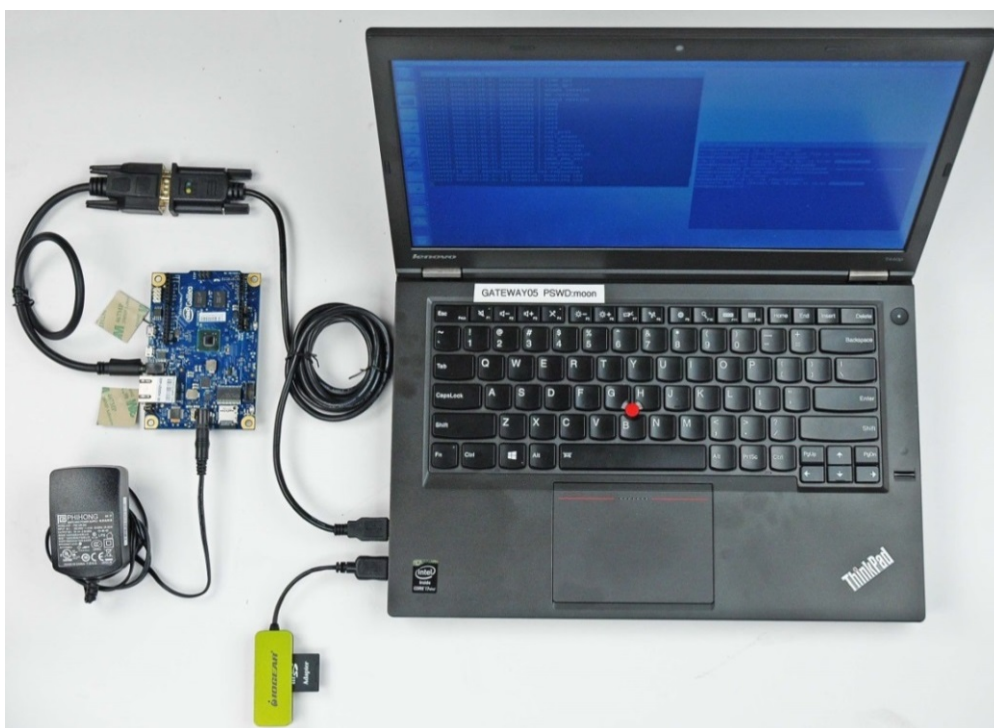
## Quick Power-On

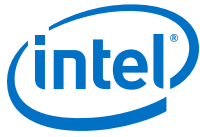
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The following terms are used in these steps:

- Target Device refers to the Intel® IoT Gateway - DK50 Series.
  - Host System refers to a Linux system that you provide.
1. Connect the **Serial Interface** to a Host System running PuTTY.
  2. Connect the **Power Supply**.
  3. At the login prompt, use `root` for both the login ID and password.

The Target Device is now booted with the sample runtime image. This sample runtime image is for evaluation purposes only. After you have explored its features, use the rest of this document to build a production-ready runtime image.





## Revision History

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Date	Revision	Description
April 2015	007	Changed information related to recommended development hosts Updated errata
February 2015	006	First Intel® IoT Gateway 2.1 release Document restructured Updated appendix to build an Intelligent Device Platform Project with Wind River Workbench Added appendix for Triage Tool Command and other modifications throughout
October 2014	005	Added appendix to build an Intelligent Device Platform Project with Wind River Workbench
September 2014	004	Corrected document references / added links
August 2014	003	Corrected licensing instructions
July 2014	002	Added Knowledge Forum appendix and made minor edits, mostly in correcting inconsistent formatting
May 2014	001	Initial public release



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## 1.0 Introduction

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### 1.1 About the Intel® IoT Gateway Development Kit DK50 Series

The Intel® IoT Gateways provide pre-integrated hardware and software building blocks. The gateways connect legacy and new systems, and enable seamless and secure data flows between edge devices and the cloud. Using a single, integrated solution allows you to focus your resources on innovating for new services, bug data solutions, and other IoT-focused applications.

Intel® IoT Gateway Development Kit DK50 Series includes the following:

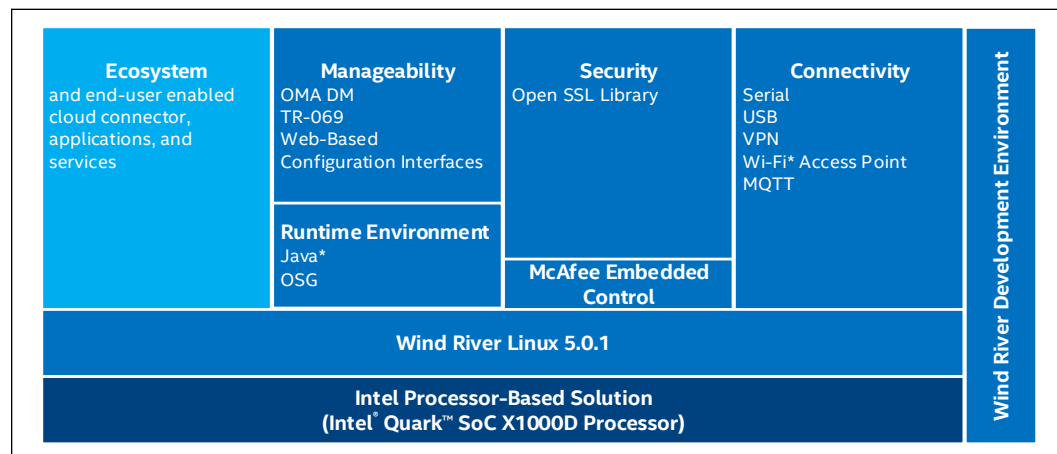
- **Software:** Wind River® Linux (Host), Wind River® Intelligent Device Platform XT, Wind River Workbench, McAfee\* Embedded Control
- **Security:** Open SSL\* Library, McAfee\* Embedded Control
- **Manageability and provisioning:** OMA DM, TR-069, Web-based configuration interfaces
- **Runtime environments:** Java\*, OSGi\*
- **I/O:** Ethernet\* 10/100, USB 2.0 host & device, RS-232, full PCIe mini card slot, UART 5V/3.3V, SPI for Arduino shield, I2C, 14 digital I/O pins, 12-bit 8 channel ADC
- **Memory and storage:** 512 KB SRAM, 256 MB DDR3, onboard microSD card

The Intel® IoT Gateway - Development Kit DK50 Series provides a key ingredient for enabling the connectivity of legacy industrial, energy, and transportation devices to the IoT. It integrates technologies and protocols for networking, embedded control, enterprise-grade security, and easy manageability on which application-specific software can run. This product offers:

- **Speed:** By integrating hardware and software building blocks.
- **Protection of legacy investments** by connecting new and legacy systems with intelligent compute platforms for communication to the cloud.
- **Secure data** with standards-based interfaces.

The following diagram illustrates the software components that are included in the Intel® IoT Gateway Development Kit DK50 Series Software Stack.

**Figure 1. Software Stack**



## 1.2 Intel® IoT Gateway Development Kit DK50 Series Kit Contents

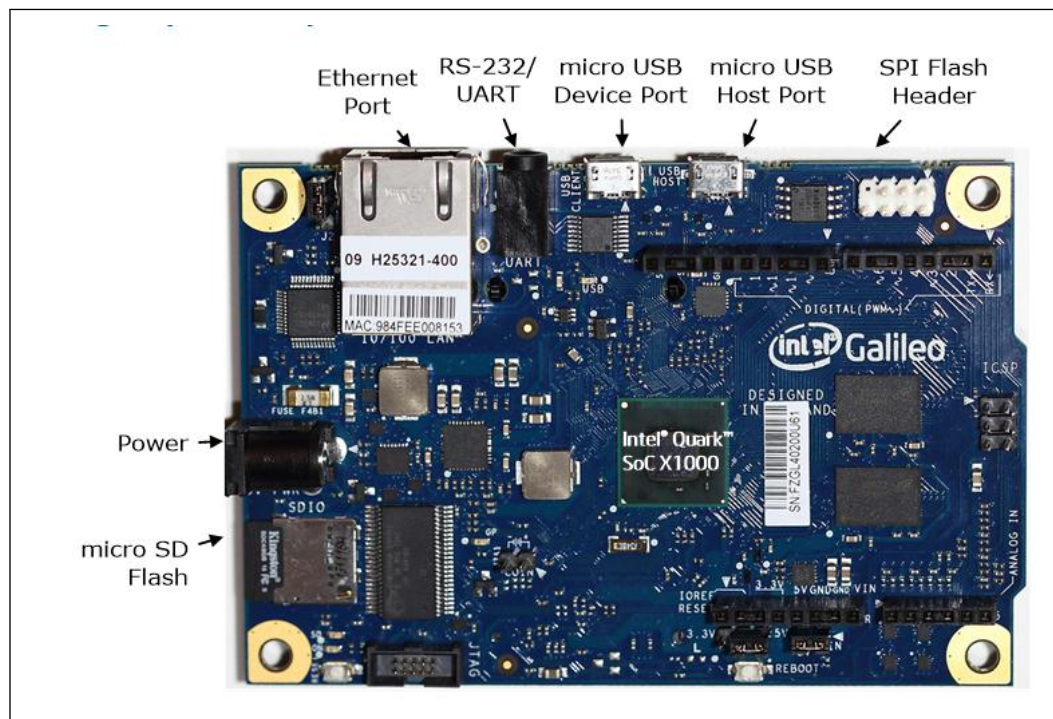
Your kit contains the following items:

- One Intel® Galileo Development Board
- One power adapter
- One power cord
- Documentation
- Micro-SD flash memory card (installed) with pre-loaded Wind River® Intelligent Device Platform XT image
- One USB to flash memory card adapter
- One USB flash memory drive with a backup image for the Target Device OS.

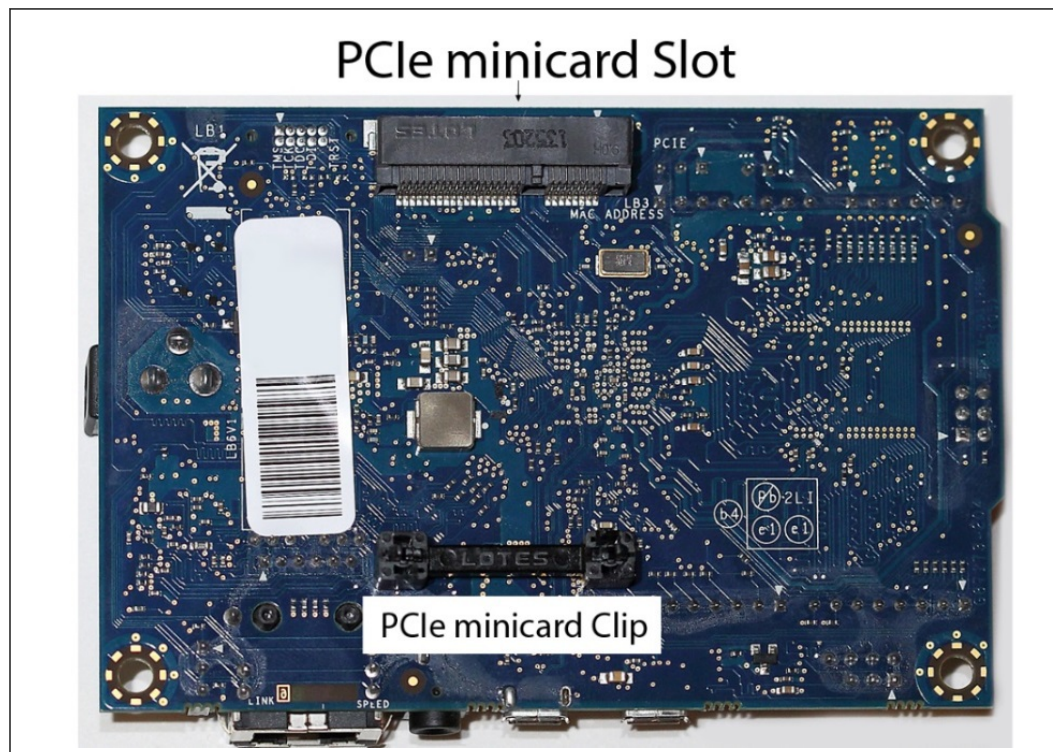
In addition, some versions of the Development Kit may include the following:

- Four nylon standoffs and screws
- Intel® 7260 dual-band wireless network adapter (PCIe\* Mini Card)
- 2x internal Wi-Fi\* antenna with U.FL connector
- Metal chassis for Intel® Galileo Development Board
- 2x external Wi-Fi\* antenna with RP-SMA male connector

**Figure 2. Intel® IoT Gateway Development Kit DK50 Series Top View**



**Figure 3. Intel® IoT Gateway Development Kit DK50 Series Bottom View**





## 1.3 About this Guide

This guide is organized as follows:

- **Chapters 1 - 4:** How to set up your Target Device, including connecting it to your Host System.
- **Chapters 5 - 7:** How to build your own runtime software and install it on your Target Device.
- The appendices provide information about:
  - Using the Intel® IoT Gateway Knowledge Forum.
  - Building an Intelligent Device Platform Project using Wind River Workbench.
  - Using the Wind River Workbench to perform a Project Export / Import.
  - Using the Triage Tool to aid in debugging.
  - Using DediProg to program the SPI Flash.
  - Installing and configuring PuTTY.

For help with typing commands to your Linux terminal, use *Intel® IoT Gateway Development Kit DK50 Series - Getting Started Guide Commands* at [https://downloadcenter.intel.com/Detail\\_Desc.aspx?agr=Y&DwnldID=24331&lang=eng&wapkw=dk50](https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&DwnldID=24331&lang=eng&wapkw=dk50). This text file includes all of the commands in this Getting Started Guide. The purpose is to provide you with an easy way to copy and paste commands to your Linux terminal.

### Document Conventions

This document uses the following conventions:

- "Development Kit" refers to the Intel® IoT Gateway Development Kit DK50 Series. This term includes the gateway hardware, the board firmware, and the software from Wind River Systems, Inc.
- "Target Device" refers to the gateway device onto which you will install Wind River® Intelligent Device Platform XT runtime software.
- "Host System" refers to a Linux system that you will use to configure your Target Device. You will install development tools from Wind River Systems, Inc. on this system. The Host System is not included in this kit.

The examples in this publication use a Host System that has an Intel® Core™ i5 second generation processor and Ubuntu® Desktop 14.04 distribution software. If you are using a different operating system, substitute the instructions in this publication with instructions that are appropriate for your system.

- This font is used for commands, API names, parameters, filenames, directory paths, and executables.
- **Bold text** is used for graphical user interface entries, buttons, and keyboard keys.

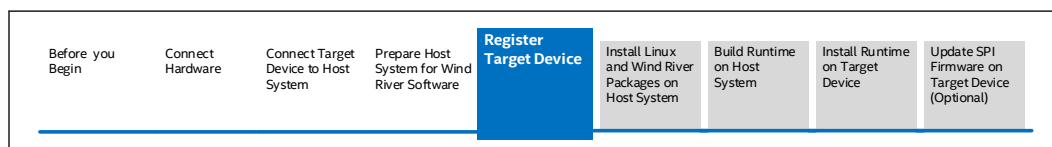
This font in a gray box is used for commands or scripts that you must type.

This font in a green box displays responses to your commands.



- To help you keep track of your progress, illustrations are used at the beginning of each key task. The following is an example of these illustrations.
  - A white background indicates steps you have completed.
  - A blue background indicates the step you are about to work on.
  - A gray background indicates future steps.

Figure 4. Sample "You Are Here"



## 1.4 Reference Documents

The following documents will help you complete your installation.

Table 1. Reference Documents

Title	Link	Description
<i>Intel® IoT Gateway Development Kit- DK50 Series - Getting Started Guide Commands</i>	<a href="https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&amp;DwnldID=24331&amp;lang=eng&amp;wapkw=dk50">https://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&amp;DwnldID=24331&amp;lang=eng&amp;wapkw=dk50</a>	Text file of the commands used in this document
<i>Wind River® Linux 5.0 / 5.1 Recommended Development Host Distributions</i>	Wind River Online Support: <a href="https://knowledge.windriver.com/@api/deki/files/153500/041441.pdf">https://knowledge.windriver.com/@api/deki/files/153500/041441.pdf</a>	<ul style="list-style-type: none"> <li>Recommended Development Host Distributions</li> <li>Required Host Packages by Host Distribution</li> </ul>
<i>Wind River® Linux 5.0.1 - Users Guide</i>	<a href="https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-linux-user-guide.html">https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-linux-user-guide.html</a>	<ul style="list-style-type: none"> <li>Wind River Linux Overview</li> <li>Development &amp; Build Environment</li> <li>Configuration and Build</li> <li>Layers &amp; Recipes</li> <li>Userspace &amp; Kernel Development</li> <li>Debugging</li> </ul>
<i>Wind River® Intelligent Device Platform XT 2.0 - Product Brief</i>	<a href="https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-product-brief.html?wapkw=wind+river">https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-product-brief.html?wapkw=wind+river</a>	<ul style="list-style-type: none"> <li>Product Overview</li> <li>Wind River Intelligent Device Platform Architecture</li> <li>Technical Specifications</li> </ul>
<i>Wind River® Intelligent Device Platform XT 2.0 - Programmer's Guide</i>	<a href="https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-programmers-guide.html?wapkw=wind+river">https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-programmers-guide.html?wapkw=wind+river</a>	<ul style="list-style-type: none"> <li>Wind River Intelligent Device Platform Overview</li> <li>Architecture</li> <li>Security, Connectivity &amp; Management</li> <li>Validation</li> <li>System Owner, Device &amp; Application Development Vendor Tasks</li> </ul>
<i>continued...</i>		



Title	Link	Description
<i>Wind River® Intelligent Device Platform XT 2.0 - Release Notes</i>	<a href="http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html">http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html</a>	<ul style="list-style-type: none"><li>• Changes in this release</li><li>• Requirements</li><li>• Issues &amp; Customer Service</li></ul>
<i>Wind River® Intelligent Device Platform XT 2.0 Security Guide</i>	<a href="https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-security-guide.html?wapkw=wind+river">https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-security-guide.html?wapkw=wind+river</a>	<ul style="list-style-type: none"><li>• Platform Security Overview</li><li>• Security Planning</li><li>• Risks, Threats &amp; Intelligent Device Platform Security Mechanisms</li><li>• BKMs, Keys &amp; Certificates</li><li>• Secure Repository</li><li>• Encrypted Data Storage</li></ul>
<i>Wind River® Intelligent Device Platform XT EMS Profile - User's Guide</i>	<a href="http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-user-guide.html">http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-user-guide.html</a>	<ul style="list-style-type: none"><li>• Device Management Overview</li><li>• Mashery API Reference and Examples</li></ul>
<i>Wind River® EMS Device Management - User's Guide</i>	<a href="http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-ems-device-management-user-guide.html">http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-ems-device-management-user-guide.html</a>	<ul style="list-style-type: none"><li>• Wind River Intelligent Device Platform Edge Management System Overview</li><li>• Device side and Cloud side components Device Onboarding, Application Development and Target component updates</li><li>• Alarm workflow and error recovery</li></ul>
<i>Wind River® Intelligent Device Platform XT EMS Profile - Release Notes</i>	<a href="http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-release-notes.html">http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-intelligent-device-platform-xt-ems-profile-release-notes.html</a>	<ul style="list-style-type: none"><li>• Product Overview</li><li>• Host and Target Requirements</li><li>• Usage Caveats and Known Issues</li></ul>

## 1.5 Before you Begin

<b>Before you Begin</b>	Connect Hardware	Connect Target Device to Host System	Prepare Host System for Wind River Software	Register Target Device	Install Linux and Wind River Packages on Host System	Build Runtime on Host System	Install Runtime on Target Device SD Flash Drive	Update SPI Firmware on Target Device (Optional)
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Review the following information to make sure you have everything you need.

### Required Experience Level

You need basic experience using the Linux command line interface.





## Items and Software You Need to Provide

You will need to provide the following items to complete your installation:

**Table 2. Items to Obtain**

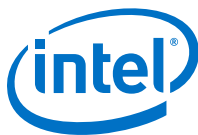
What you need	First Needed in	Notes
Host System hardware (recommended): <ul style="list-style-type: none"> <li>3<sup>rd</sup> Generation Intel® Core™ i5 processor or better</li> <li>CPU with four or more cores and with Intel® Hyper-Threading Technology</li> <li>150 GB or more of free disk space</li> <li>4 GB or more RAM</li> <li>One USB 2.0 port</li> </ul>	<a href="#">Connect the Target Device to a Host System</a> on page 18	The minimum hardware requirements are: <ul style="list-style-type: none"> <li>Intel® Pentium® 2 processor</li> <li>80 GB free disk space</li> <li>768 MB RAM</li> </ul> With these minimum requirements, your performance may not be adequate.
Host Operating System	<a href="#">Connect the Target Device to a Host System</a> on page 18	The Wind River Systems, Inc. development tools may be installed on many different Linux* based host systems. See <a href="#">Recommended Development Hosts</a> on page 15 These instructions have been validated on an Ubuntu 14 64-bit host system.
Communications: <ul style="list-style-type: none"> <li>PuTTY utility or equivalent</li> <li>Serial to USB cable</li> </ul>	<a href="#">Connect the Target Device to a Host System</a> on page 18	
USB flash drive with at least 4 GB capacity	<a href="#">Use Wind River WebIF to Configure the Target Device (Optional)</a> on page 50	The contents of this flash drive will be overwritten.
Micro SDHC flash memory card reader or adapter.	<a href="#">Deploy Image to Micro-SD Flash Card</a> on page 40	

## Recommended Development Hosts

The following recommended development host distributions have been tested by Wind River to run Wind River Linux 5.0 / 5.0.1. Intel recommends the Ubuntu Desktop 14.04 (base version) 64-bit OS for your Host System.

**Table 3. Recommended Development Hosts**

Distribution	Architecture
Ubuntu* Desktop 14.04 (base version) or 12.04	x86 32-bit, x86 64-bit
Red Hat Enterprise Linux Workstation 6.5	x86 32-bit, x86 64-bit
Red Hat Enterprise Linux Workstation 7	x86 64-bit
<i>continued...</i>	



Distribution	Architecture
OpenSUSE* 12.2	x86 32-bit, x86 64-bit
Novell* SUSE Linux Enterprise Desktop 11 SP2	x86 32-bit, x86 64-bit
Fedora* 18	x86 32-bit, x86 64-bit

These instructions in this guide were validated on an Ubuntu 14.04 (base version) 64-bit host system, which is available at <http://old-releases.ubuntu.com/releases/trusty/as/ubuntu-14.04-desktop-amd64.iso>

**Caution:** To maintain Wind River® Intelligent Device Platform XT compatability, do not perform `sudo apt-get upgrade`

For detailed information on supported Linux development hosts, and for additional Linux host requirements, see the *Wind River® Intelligent Device Platform XT 2.0 - Release Notes* at <http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html>

### Login IDs and Passwords

You will be prompted for several login IDs and passwords throughout these installation procedures. The following is a quick reference to them.

**Table 4. Login IDs and Passwords**

Logging into...	ID and Password
Target Device	ID: root Password: root
Target Device local wireless network	Password: windriveridp
Wind River Intelligent Device Platform Administration Console (WebIF)	ID: admin Password: admin

### Technical Support

For users with a registered product, Intel provides technical support for this Development Kit through Intel® Premier Support. If you do not already have an Intel Premier Support account, you may apply for one when you register this Development Kit in [Register Your Development Kit](#) on page 25.

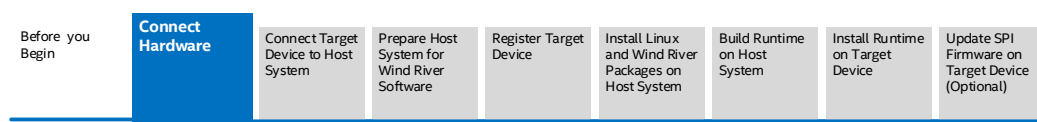
To submit a support request using Intel Premier Support, go to <https://businessportal.intel.com>. Click the **Product Support Tab** -> **Intel Premier Support Home**. Submit your issue using one of these product names:

- Intel® IoT Gateway Development Kit DK50 Series
- Intel® Development Toolkit for Data Gateways

In addition to Intel® Premier Support, registered users can use the Intel® IoT Gateway - Knowledge Forum to ask "how-to" questions. Follow the instructions in [Intel IoT Gateway Knowledge Forum](#) on page 45 to register, login, and submit questions in this online support forum.

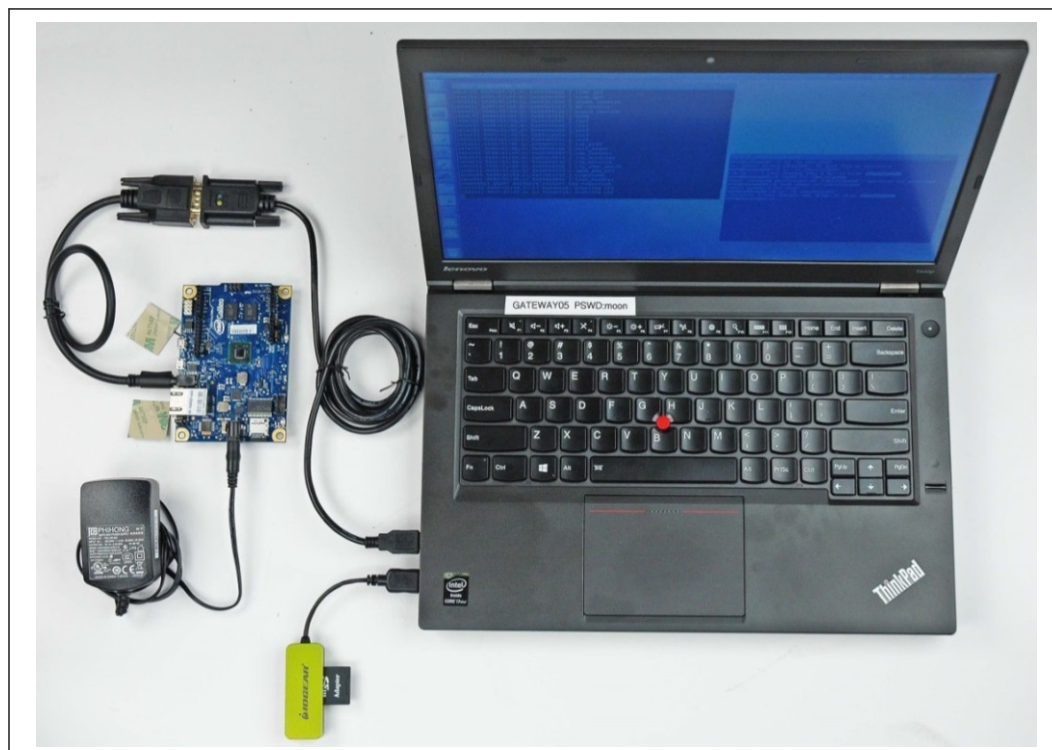


## 2.0 Connect the Hardware



You will begin your installation by connecting the Target Device hardware. Connect your hardware as shown:

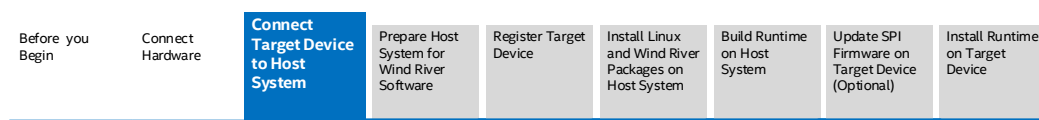
**Figure 5. Connect Hardware**



**Note:** The laptop in the photograph is not included in your Development Kit.



## 3.0 Connect the Target Device to a Host System



This section shows you how to make a connection between your Host System and Target Device using the PuTTY utility for a serial console connection. The instructions in this section are specific to PuTTY, but you can use a different utility to make your connection if you prefer. See your instructions for your utility if you use another utility. If you need help configuring PuTTY on your Host System, see [Installing and Configuring PuTTY](#) on page 79.

### What you need to do

1. Save a session in your PuTTY configuration named **Intel IoT Gateway**. Under Serial line type `/dev/ttyUSB0`
2. From your Host System `$HOME` command prompt, display the available TTY ports. Use the following command:

```
ls /dev/tty*
```

Write down the resulting TTY port information. You will use this in the next step.

3. The RS-232 cable is already connected to your Target Device. Connect the other end to your Host System USB port.
4. Plug in your Target Device.
5. While still at the `$HOME` prompt, change the ownership and permissions for using PuTTY. This example uses `tttyUSB0` for the port. Your port may be different; see the port you wrote down in the previous step. Use the following command, replacing `tttyUSB0` with the port that you wrote down.

```
sudo chmod 666 /dev/ttyUSB0
```

6. Start the PuTTY utility.
7. Load the IoT Gateway session that you saved in step 1.
8. Click **Open** to launch a PuTTY Virtual Terminal session. You are now connected to the Target Device. The Virtual Terminal opens to a blank screen.
9. Leave the screen at this point. You will return to it later.



### 3.1 Connecting with a Wireless Network Connection

**Note:** A wireless connection requires a wireless network adapter (PCIe\* Mini Card). This section assumes the Intel® 7260 dual-band wireless network adapter is installed.

The Target Device advertises a wireless network with a service set identifier (SSID) of IDPDK-xxxx, where xxxx is the last four digits of the wireless network card MAC address. This section guides you through using this information to connect a Host System to the Target Device's wireless network to access the features on the Target Device.

1. From the PuTTY Virtual Terminal, issue the following command to determine the wireless SSID of the Target Device:

```
grep ssid /etc/config/wireless
```

The output displays the SSID:

```
option ssid IDPDK-xxxx
```

2. Write down your SSID.
3. Issue the following command from the Target Device command line to determine the IP address used for the wireless Access Point:

```
ifconfig br-lan
```

The output includes the IP address, denoted by `inet addr`

```
inet  
addr:<TARGET_DEVICE_IP_ADDRESS>
```

The Target Device ID address is likely set to the default 192.168.1.1

4. Write down your Target Device IP address.
5. On the Host System (not in the PuTTY Virtual Terminal), select the **System Settings** icon.
6. Click the **Network** icon.
7. Click **Wireless**.
8. Click the dropdown arrow next to **Network Name** and then click the SSID that you wrote down.
9. When prompted, enter the password: windriveridp.

The Target Device and Host System are now connected through a wireless network. You can use ssh to log in to the Target Device from the Host System. See [Remotely Logging in to the Target Device with ssh](#) on page 20.



## 3.2 Connecting with a Wired Ethernet Connection

1. Use an Ethernet cable to connect the Target Device LAN1 port to an I/O port on a router that has an integrated DHCP server. It is important to use the port, labeled Ethernet LAN 1 on your Target Device. This port connects as eth1.
2. Confirm on the PuTTY video display for the Target Device that the Target Device is connected at eth1. Your screen should display:

```
eth1 NIC Link is Up
```

3. Issue the following command from the PuTTY Virtual Terminal command line to determine the IP address used for the network Access Point:

```
ifconfig br-lan
```

The output includes the IP address, denoted by `inet addr` as shown:

```
inet addr:<TARGET_DEVICE_IP_ADDRESS>
```

The Target Device IP address is probably set to the default of 192.168.1.1

4. Write down your Target Device IP address.

The Target Device and Host System are now connected to a wired network. You can use ssh to log in to the Target Device from the Host System. See [Remotely Logging in to the Target Device with ssh](#) on page 20.

## 3.3 Remotely Logging in to the Target Device with ssh

Once the Target Device and Host System are connected through a wired or wireless network, you can use ssh to remotely log in to the Target Device from the Host System.

1. Validate that both the Target Device and the Host System have a valid IP address and **are on same subnet**. Use the following command on both the Target Device and the Host System to see the IP address on each.

```
ifconfig
```

2. Be sure both Host System and the Target Device return an IP address and the subnet addresses match. For example, the following addresses are valid and they are on the same subnet:

### Target Device IP address

```
192.168.1.1
```

### Host System IP address

```
192.168.1.9
```

3. On the Target Device execute the following command to start the sshd daemon:

```
service sshd start
```



You should see the following output:

```
Starting OpenBSD Secure Shell server: sshd
done.
```

4. (Optional): To automatically start sshd for all future reboots, execute the following command on the Target Device:

```
update-rc.d sshd defaults
```

5. To remotely login to the Target Device from the Host System, at the Host System execute the following command, substituting <TARGET\_DEVICE\_IP\_ADDRESS> with the Target Device IP address that you wrote down earlier.

```
ssh root@<TARGET_DEVICE_IP_ADDRESS>
```

Your screen displays:

```
root@<TARGET_DEVICE_IP_ADDRESS>'s password:
```

6. Type the Target Device password:

```
root
```

When you successfully log in to the Target Device, the command prompt is displayed:

```
root@WR-IntelligentDevice:~#
```



## 4.0 Prepare to Build Your Runtime Image

The first part of this publication got you up and running with a sample runtime image that you used to explore some of the Target Device features. This part of the document guides you through creating your own runtime image. Although you will not be using your Target Device again for a while, the steps in the remainder of this publication assume that you have completed the setup steps.

### 4.1 Task Checklist and Completion Times

Below are the key tasks you will complete in the remainder of the chapters. You must complete each of these tasks in order. Upon completing one chapter, continue to the next until you reach the optional information in the appendices.

The full installation process, including the steps to build your own runtime image takes several hours. The time required will vary, depending on your skills and experience, the processor speed of the system that you use to perform the configuration steps, and the speed of your internet connection.

The estimated completion times in the table below are based on Ubuntu\* Desktop 14.04 running on an Intel® Core™ i5 second generation processor and with an internet connection running at approximately 3 MB per second.

You will prepare the Host System before working more with the Target Device.

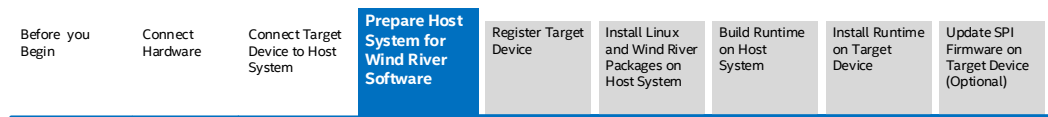
**Note:** Host System refers to a computer system onto which the development tools from Wind River Systems, Inc. will be installed. Target Device refers to the hardware that is included in your Development Kit.

Done	Task	Section	Estimated Completion Time
	<b>Preliminary Steps</b>		<b>30 - 90 minutes</b>
✓	Gather necessary components	<a href="#">Items and Software You Need to Provide</a> on page 15	10 minutes
✓	Connect the Target Device and a Host System	<a href="#">Connect the Target Device to a Host System</a> on page 18	10 minutes
	Update Host System Linux	<a href="#">Install Ubuntu Linux Updates</a> on page 23	10 minutes to 1 hour, depending on the number of updates to install
	Create Host System directories, and confirm Host System free space.	<a href="#">Create Directories and Confirm Disk Space</a> on page 23	10 minutes
<b>continued...</b>			



Done	Task	Section	Estimated Completion Time
	Register your Development Kit to obtain a Wind River SW license. A license is required to complete the remaining steps in this publication.	<a href="#">Register Your Development Kit</a> on page 25	10 minutes to register. Up to 1 day to receive license
	<b>Install and Build Runtime on Host System</b> The completion time is highly dependent on the Host System and the Internet connection speed.		<b>5 - 10 hours</b>
	Install base packages for Wind River Linux 5.0.1, Wind River Intelligent Device Platform XT 2.0, Wind River Workbench 3.3.5	<a href="#">Installing the Wind River Host Tools</a> on page 30	2 - 4 hours
	Build the runtime software image on the Host System and copy the image to a USB flash drive.	<a href="#">Build Intelligent Device Platform XT Runtime Software</a> on page 38	3 - 5 hours
	<b>Install Runtime Image to Target Device</b>		<b>45 minutes</b>
	Install the runtime image on the Target Device.	<a href="#">Deploy Image to Micro-SD Flash Card</a> on page 40	45 minutes
<b>Total Estimated Time to Complete Installation</b>			<b>6 - 12 hours</b>

## 4.2 Prepare Host System for Wind River Software Installation



### Install Ubuntu Linux Updates

The Linux software on your Host System must be current before you install the Wind River Host Tools software. This section provides instructions to perform this update. From your Host System command line interface, use the following command to apply the Ubuntu updates:

```
sudo apt-get update
```

### Create Directories and Confirm Disk Space

Create the following directories on your Host System:

- `$HOME/WindRiver` - This directory is used to install the Wind River Host Tools. The installation requires approximately 30 GB of free space in this directory.
- `$HOME/Installer` - This is a temporary directory that you can delete after completing your installation. The installation requires approximately 15 GB of free space in this directory.



- `$HOME/Project` - The project directory in which you will develop your Intelligent Device Platform XT-based solution. The build requires approximately 20 GB of free space in this directory.
- `$HOME/Project/build-cache` - The build cache directory. Using a build cache can significantly reduce the time required to build the project after incremental changes are made. The build requires approximately 10 GB of free space in this directory.

Use these commands to create the directories:

```
cd $HOME
mkdir WindRiver
mkdir Installer
mkdir Project
mkdir Project/build-cache
```

You must also have approximately 15 GB of temporary disk space in the `/tmp` directory

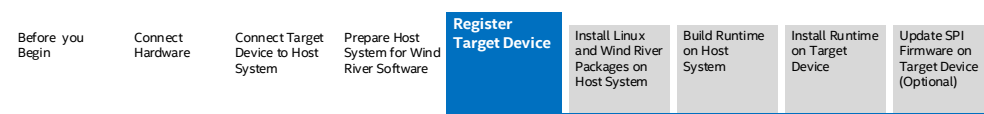
In total, a minimum of approximately 100 GB is required to complete the full runtime build process.





## 5.0 Register Your Development Kit

**Important:** If you are using an Early Access Development Kit or a Loaner Development Kit from the Intel Demo Depot, use the 90-day License Authorization Code provided in the Dear Customer Letter that came with your kit. In this case, you do not need to register your Target Device. Instead, skip ahead to [Install Linux Packages and Wind River Linux Host Tools on the Host System](#) on page 30.



Before you begin the installation process, you must register your Development Kit. The registration process submits a license key request to Wind River to permit you to download Wind River Development software. You cannot use the Wind River installer to download the Wind River software without this license.

You will use the login ID and password that you create or use in these steps to access the Intel Registration Center. On the Intel Registration Center you can see a list of licensed products and download the installers for those software products.

1. In your Web browser on any computer, go to <https://registrationcenter.intel.com>

The following screen is displayed:

**Figure 6. Register a Product**



2. In the box for your email address, select the appropriate option for your email address:
  - **IMPORTANT:** If you have an Intel® Premier Support account, use the email address that is associated with that Intel® Premier Support account. Doing so will automatically add this product to your list of supported products.
  - Otherwise, use your preferred email address. Use an address that you can use when registering any future Intel products.
3. Type in the serial number that is located at the top of the *Dear Customer Letter* included in your product box.
4. A screen displays on which you must fill out your contact information. Click **Submit** after filling in your information.
5. Follow the correct path:
  - If your email address was not recognized, you will be prompted to create a user account. See [Figure 7](#) on page 26. Type in your preferred Login ID and password, and then click **Submit**.
  - If your email address is recognized, you will not see [Figure 7](#) on page 26. Continue to the next step.

**Figure 7. Create Support User Account**

6. A confirmation screen displays with the following displayed at the top of the screen. Click **Continue**.

**Figure 8. Wind River License Key Request Confirmation**



7. Type your user name and password to sign into the Intel Registration Center.
8. Once you have signed in, your list of subscribed products is displayed. See the example below.

**Figure 9. Logged Into Intel Registration Center**

**My Intel® Products**

Product Subscription Information	Download Latest Update	Release Posted
Intel® IoT Gateway Development Kit DK50	Version 2.0 (2.0.2)	
Intel® IoT Gateway Development Kit DK200	Version 2.0 (2.0.2)	08 Jul 2014
Intel® IoT Gateway Development Kit DK100	Version 2.0 (2.0.2)	08 Jul 2014

☐ Show Expired Registrations

[Export to CSV](#) [Search for older versions](#)

**Intel® Products**

- My Profile
  - Profile >
  - Notifications >
  - Sign Out
- Tools
- Data Administration
- Resources
- Questions & Answers

9. Click the version link for your product in the table of products to go to the product page.

The following screen displays:

**Figure 10. Intel Registration Center Product Page**

**Intel® IoT Gateway Evaluation Software Kit SK50**

The product updates/upgrades below are available based on your support subscription status.

Version:	Update (Build #)
2.0	2.0.2

Date posted: 08 Jul 2014 Build date: 08 Jul 2014

[Download: 32-bit & 64-bit Install Package](#) 59 MB

**Related Files**

File Name	Size
MD5 Checksum (md5sum)	1 KB

Intel takes your privacy seriously. Refer to Intel's [Privacy Notice](#) and [Serial Number Validation Notice](#) regarding the collection and handling of your personal information, the Intel product's serial number and other information.

The following registrations grant access to the Intel® IoT Gateway Software Evaluation Kit SK50 downloads.

☐ Show Expired Serial Numbers

Product Name	Serial Number	Support Status	Licenses	Purchase
Intel® IoT Gateway Evaluation Software Kit SK50		Active: 16 Sep 2014	N/A	Renewed

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- Click the **Download: [file]** link to download the Installer for the Wind River Host Tools. You will use this file to install the Wind River Host Tools in the next chapter. See the circled information in the above figure.

Upon completion, you will receive two email messages from "Intel Registration Center." Save these messages for future reference.

- One message is titled, "Intel® Premier Support Registration Successfully Completed". You can use Intel Premier Support for technical support of this Development Kit". See the sample message below.

**Figure 11. Email Message: Intel® Premier Support Registration Successfully Completed**

(If the characters do not show properly, please try viewing this email with UTF-8 encoding.)  
You have successfully completed the registration process. You now have access to the following product(s):

Intel® IoT Gateway Development Kit DK50

If you created a new account during the registration process, the product(s) should be available for that account. If you already had an account when you started the registration process, the product(s) should be available in that account.

You are now able to report issues and receive file downloads and announcements on the product(s) for which you registered by accessing <https://premier.intel.com>.

Sincerely,  
Intelligent Systems Group  
Intel Corporation

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\* Other brands and names may be claimed as the property of others.

- The other message is titled, "Thank you for registering Intel® IoT Gateway Development Kit DK50 Series". See the sample message below.

**Figure 12. Message: Thank you for registering Intel® IoT Gateway Development Kit DK50 Series**

(If the characters do not show properly, please try viewing this email with UTF-8 encoding.)  
Thank you for evaluating the Intel® IoT Gateway Development Kit DK50.

SAVE THIS SERIAL NUMBER  
Your serial number for this product is Serial number removed.

SOFTWARE LICENSE KEY  
Within 8-12 U.S. business hours you will receive a license key from Wind River®. If you do not receive your license key, please submit a ticket using [businessportal.intel.com](https://businessportal.intel.com).

DOWNLOAD THE SOFTWARE  
Download and save the product from Link removed.

PRODUCT UPDATES AND SUPPORT  
You will receive an email anytime the product you registered is updated. Your product update services will expire on permanent.

Please retain a copy of this email for your records.

Please do not reply to this email. This account is not monitored.

\* Other brands and names may be claimed as the property of others.

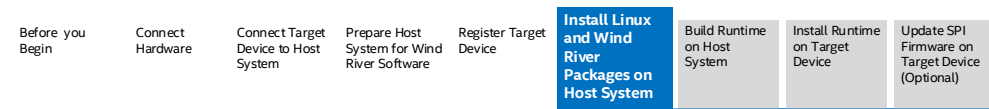


Under SOFTWARE LICENSE KEY the text indicates that you will receive a license key from Wind River. You will need this license key when you install the Wind River Components on the Host System in [Installing the Wind River Host Tools](#) on page 30



## 6.0 Install Linux Packages and Wind River Linux Host Tools on the Host System

---



This chapter will guide you through installing the Wind River Host Tools software on your Host System, and then verifying that all necessary Linux operating system packages are installed on the Host System.

You must have internet access and a Wind River license to complete these steps. You applied for the license in [Register Your Development Kit](#) on page 25. Check your email for the license information.

### Installing the Wind River Host Tools

In this section, you will install the following:

- Wind River Linux 5.0.1
- Wind River Intelligent Device Platform XT 2.0
- Wind River Workbench 3.3.5

If possible, begin these steps at the end of the day and in a location that can be unattended, so you can allow the installation to run overnight.

To complete this section, you need the following:

- The Installer file that you downloaded from the Intel Registration Center in [Register Your Development Kit](#) on page 25, step 10.
- The license information included in the License email message from Wind River. See [Figure 17](#) on page 34.
- An internet connection for your Host System.

**Note:**

The download and install process can take several hours to complete depending on the speed of your Internet connection. On an Intel® Core™ i5 second generation processor with a 3 MB per second download speed, these steps will take approximately 2 hours. At a 1 MB per second download speed, these steps will take approximately 4 hours.



**Note:** You may have used different directory names when you created directories in [Create Directories and Confirm Disk Space](#) on page 23. If you used different names, replace the directory names in the following steps with the names of the directories that you created.

1. Copy the Installer file that you downloaded in [Register Your Development Kit](#) on page 25, step 10 into the `$HOME/Installer` directory.
2. Change to the `Installer` directory and unzip the installer file. Use the following commands:

```
cd $HOME/Installer
unzip DVD*.zip
```

3. Start the Wind River Host Tools Installer with the following command:

```
./setup_linux
```

The Wind River Installer screen opens.

If instead you see the following screen indicating new Linux packages are required, complete the steps below the figure.

**Figure 13. Wind River Installer Package Updates**

```
ilabuser@Ubuntu-14-04-x64-BASE:~/idp_ear203$ ls
idp_xt_203_ear2.zip installer mediaId setup.ini setup_linux setup_linux32
ilabuser@Ubuntu-14-04-x64-BASE:~/idp_ear203$ ./setup_linux
Warning: error launching the Wind River Installer.
Please consult the readme.txt file on the install media or the
product release notes on the Wind River Online Support (OLS) web site
for the package requirements for your Linux distribution.

This is ubuntu 14.04 - 64 bit

# Mandatory for running the installer
sudo apt-get install libstdc++6:i386 libgtk2.0-0:i386 libxtst6:i386
ilabuser@Ubuntu-14-04-x64-BASE:~/idp_ear203$
```

- a. To perform the updates, using the following command:

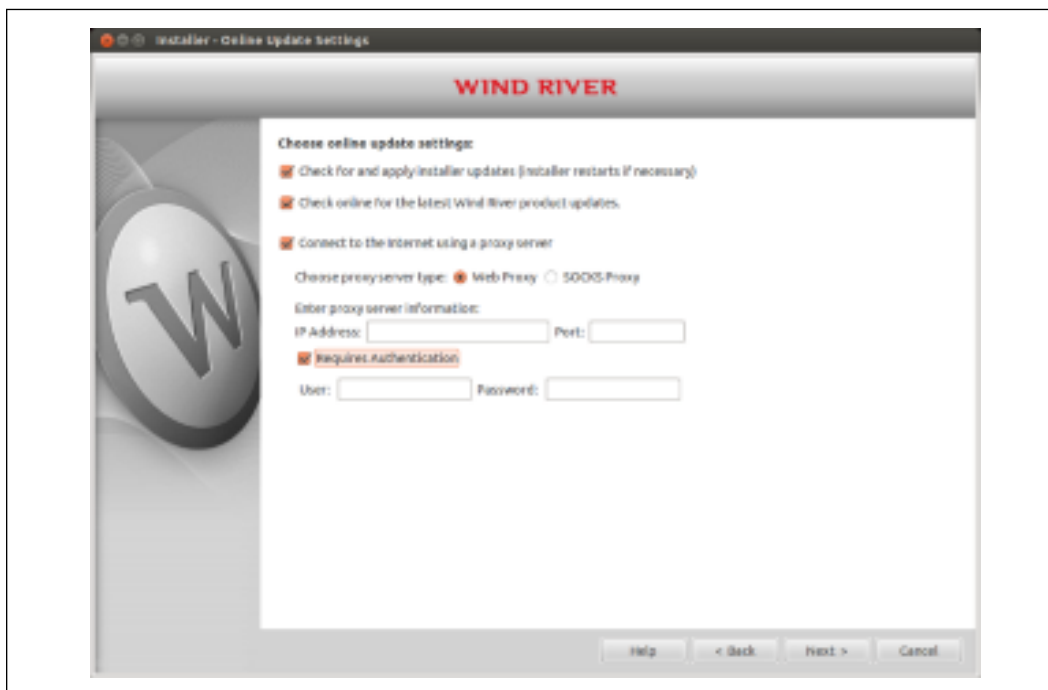
```
sudo apt-get install libstdc++6:i386 libgtk2.0-0:i386 libxtst6:i386
```

- b. After the update command completes, repeat the `./setup_linux` command.
4. In the Installer window, select the **Wind River Host Tools** installation location. The `WindRiver` directory displays by default. If not, use the **Browse** button to select the `$HOME/WindRiver` directory. Then click **OK**.
  5. On the page **Online Update Settings**, perform the following actions:
    - If you are not using a proxy server to connect to the internet, go to step 7.
    - If your network requires a proxy server, check the box **Connect to the internet using a proxy server** and provide your proxy information.

If you receive error messages, double-check your proxy settings and work with your IT department for the appropriate settings.



Figure 14. Online Update Settings, Part 1



6. On the next **Online Updates Settings** page, leave the defaults selected, as shown:

Figure 15. Online Update Settings, Part 2







The Wind River Installer checks for updates. This takes about 2 minutes.

7. On the page **Install or Download**, choose between installing right away from the internet, or to copy the product files to the Host System and perform the installation later.
8. On the page **Choose Activation Type**, select **Temporary activation (requires License Authorization Code and internet connection)**.

*Note:* Although your Wind River Host Tools license is a permanent license, you must select **Temporary Activation** to use the license number and License Authorization Code that you received from Wind River.

**Figure 16. Activation Type**



9. On the page **Host Information**, choose the Ethernet adapter that will be used for downloading the Host System tools from the internet. This is used to link your Wind River software license with your Host System. Click **Next**.
10. On the page **User Information**, type in the following information:
  - The Wind River Software License Authorization Code (LAC) that you received via email when you registered your product. See the highlighted area in example email message below.
  - Enter your user information.



Figure 17. License Authorization Code Location

Dear Intel Customer

Thank you for your recent purchase of an Intel® Development Toolkit. We appreciate your business.

The license request for your Intel® Development Toolkit software has been fulfilled. Details about your software license are provided below.

**Order Information**  
Customer Name : Intel Corp

**Products Ordered**  
Your order includes the following products:

Product Description	Quantity	License Type
-----Wind River® Intelligent Device Platform XT 2.0	1	NL

In order to install the Wind River® Intelligent Device Platform XT 2.0 software and you will need the below License Authorization Code, and the attached license file.

**License Information**  
1. Wind River License\* # : XXXXXX  
License Authorization Code: XXXXXX-XXXX-XXXX

**Intel® Premier Support**  
Your product purchase and registration entitles you to access Intel® Premier Support. To access support please go to [businessportal.intel.com](https://businessportal.intel.com) and use the login ID and password you supplied during the registration process.

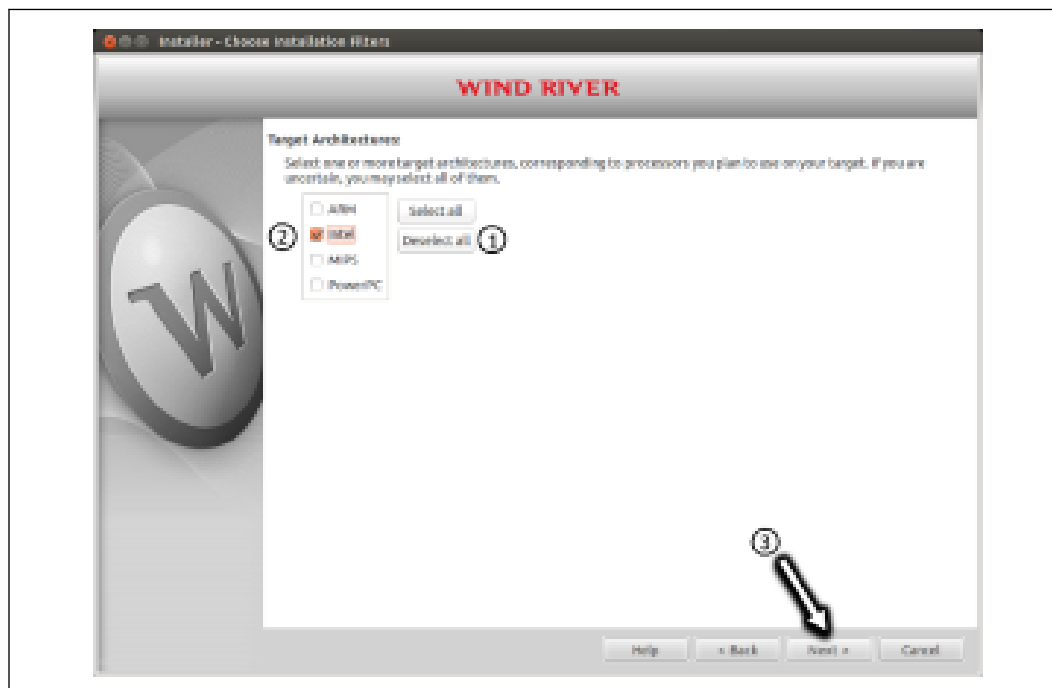
If you are unable to access Intel® Premier Support, please contact your field sales representative for assistance

Thank you for your business.

Best regards,  
Intel Corporation

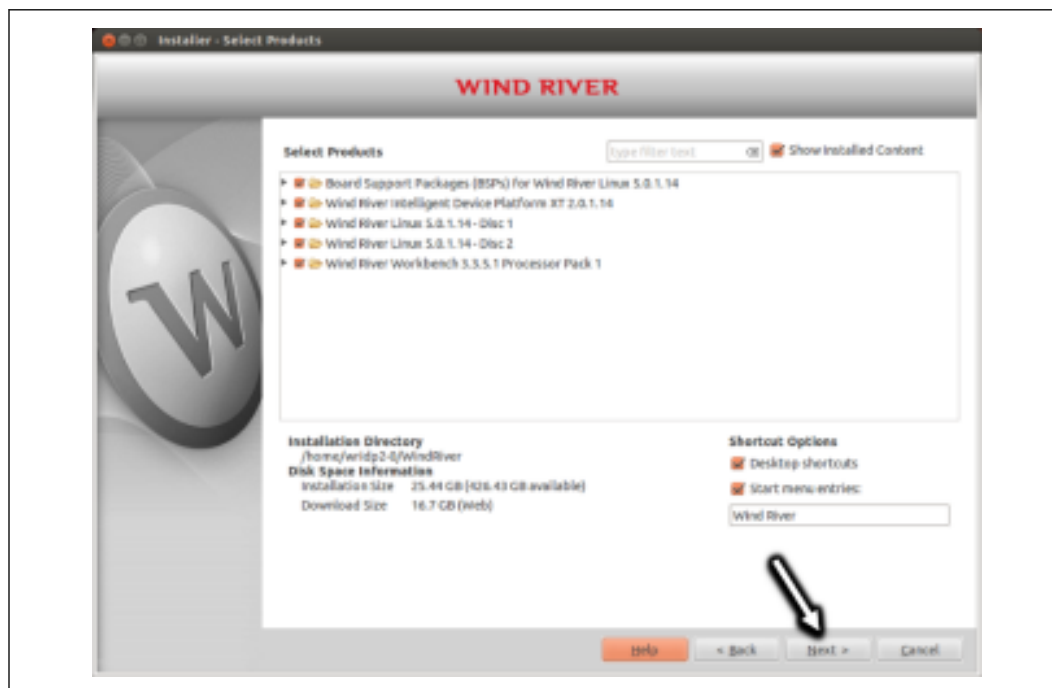
11. Click **Next**. A progress bar displays while the installer contacts Wind River to verify your Wind River License Authorization Code and register your Host System. This will take about 1 minute.  
*Note:* The MAC address of eth0 for your Host System is the only address allowed to use this license.
12. On the page **Choose Installation Filters**, click **Deselect all**, and then select only **Intel**. Click **Next**.

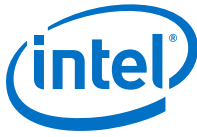
**Figure 18. Choose Installation Filters**



13. On the **Select Products** page, keep the default selections. Your screen will look similar to the following.

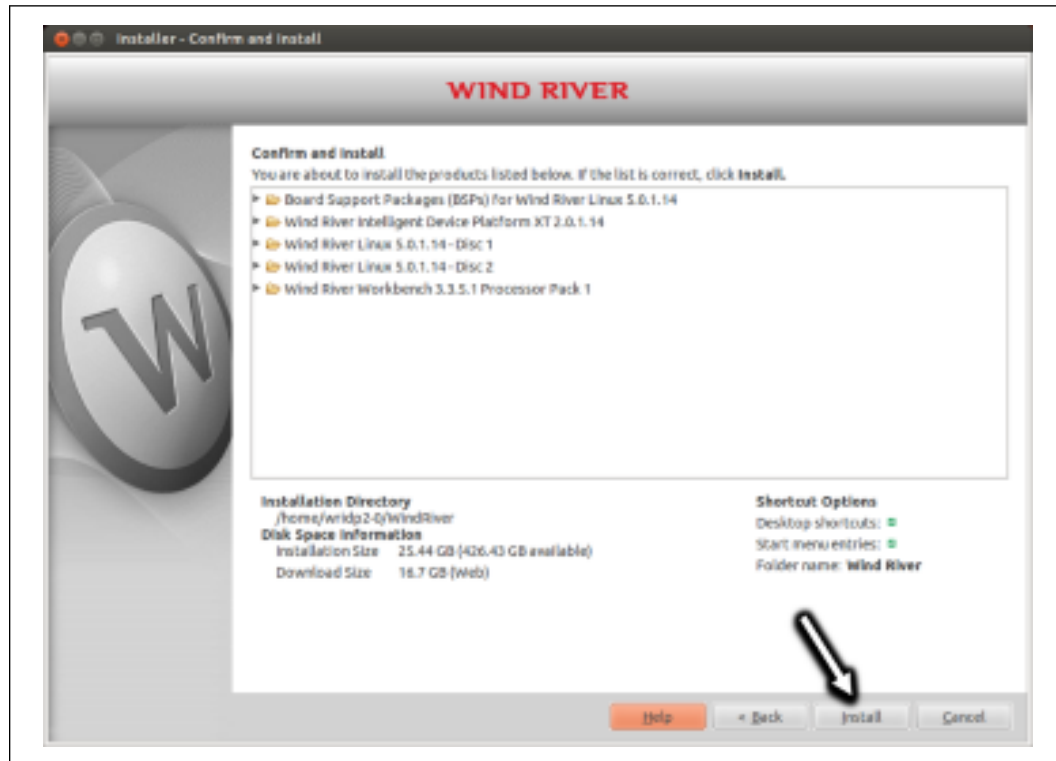
**Figure 19. Select Products**





14. Click **Next**. The **License Agreement** displays. Review it, and then click **I ACCEPT** if you agree to the terms of the agreement.
15. On the page **Confirm and Install**, click **Install**.

**Figure 20. Confirm and Install**



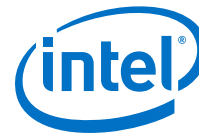
*Note:* The download and install might take several hours depending on the speed of your Internet connection.

When the installation is complete, the top of the screen displays **Installed Content** and the **Next** button is again available.

16. Click **Next**. A thank you message displays with a link to a readme file. Recommended: Leave the default check next to the readme file.
17. Click **Finish** to exit the Installer window. The readme file opens in a browser and the installation application closes.

If you encounter installation issues, provide your Intel support contact with the following files from the directory: `$HOME/WindRiver/`

- `setup.log`
- `setup_install_failure.log`



## Verify All Required Linux Packages Are Installed

These steps verify that all Linux operating system packages required for using the Wind River Host Tools are present. If any are not present, this section guides you through installing them.

1. Change to the directory `$HOME/WindRiver/wrlinux-5/scripts`. Use the following command:

```
cd $HOME/WindRiver/wrlinux-5/scripts
```

2. Use the following command to verify all packages have been installed:

```
./host_package_install.sh
```

3. Choose the correct path:
  - Continue to [Build Intelligent Device Platform XT Runtime Software](#) on page 38 if you receive the response: All required host packages are installed.
  - Continue with the steps below if you receive a response similar to the following: Following packages need to be installed: [package #1] [package #2].
4. You should already be in the `$HOME/WindRiver/wrlinux-5/scripts` directory. If not, go to this directory.
5. Use the following command to install the additional package(s), replacing the package number with the information in the response you received in step 3:

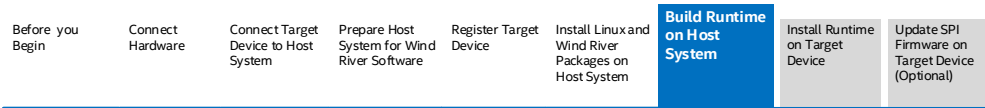
```
sudo apt-get install [package #1] [package #2] [etc]
```

where you replace `[package #1]` with the first item listed in step 3, `[package #1]` with the second item, and so on.

You may need to type your password at the prompt: `[sudo] password for [username]`



## 7.0 Build Intelligent Device Platform XT Runtime Software



[Install Linux Packages and Wind River Linux Host Tools on the Host System](#) on page 30 guided you through installing the Wind River Host Tools and Intelligent Device Platform XT software on your Host System. With the software installed, you are now ready to develop the applications and runtime operating system that will run on your Target Device. This guide does not cover application development. For guidance, see the documents listed in [Reference Documents](#) on page 13.

This section explains how to build an Intelligent Device Platform XT runtime file system and operating system. This runtime file system and operating system are built on the Host System and then installed on the Target Device.

If you use Eclipse\* or if you prefer a GUI-based development environment to build your Target Device runtime file system and operating system, then see [Building an Intelligent Device Platform Project Using Wind River Workbench](#) on page 52.

The steps in this section will take several hours to complete. If possible, begin these steps at the end of the day and in a location that can be unattended so you can allow the build process to run overnight.

### What you need to do

**Note:**

You may have used different directory names when you created directories in [Create Directories and Confirm Disk Space](#) on page 23. If you used different names, replace the directory names in the following steps with the names of the directories you created.

1. Begin this procedure in your `Project` directory. Use the following command:

```
cd $HOME/Project
```

2. Use the Wind River Linux `configure` command to configure the build. See the command below for a typical `configure` command. Use `configure --help` to explore supported configuration options, and see the *Wind River® Intelligent Device Platform XT 2.0 – Programmer's Guide, Part II (Key Related Tasks)* for help with generating your own keys and for additional configuration options and details.



**Note:** By default the runtime operating system is built with the latest version of the Wind River Host Tools that you installed on your Host System. To use an earlier version, specify the desired "RCPL" version like this:

```
--with-rcpl-version=XXXX
```

where XXXX is the 4-digit RCPL version number.

**Note:** In the option for `--enable-parallel-pkgbuilds=4` use the number of process threads available in the CPU of your Host System. For example, when using a CPU with two cores and hyperthreading, four process threads are available, so specify "4" for optimal performance.

```
../WindRiver/wrlinux-5/wrlinux/configure \
--enable-board=intel-quark \
--enable-kernel=standard \
--enable-rootfs=glibc-idp \
--enable-addons=wr-idp \
--enable-bootimage=ext3,hdd \
--enable-jobs=6 \
--enable-parallel-pkgbuilds=4 \
--enable-patchresolve=noop \
--enable-rm-work=yes \
--enable-checkout-all-layers=yes \
--with-layer=wr-prosyst-mbs-smarthome-sdk-ia,wr-exegin-zigbee-ia,\
wr-digi-idigiconnector,wr-wks-oneagent-oma-dm-ia,\
wr-wks-oneagent-tr069,wr-ieee11073,wr-intel-support \
--with-template=feature/vlan,feature/opc,feature/recovery,\
feature/opc_demo,feature/ipsec_vpn,feature/l2tp,\
feature/openjdk-bin,feature/online_updates,feature/bluetooth,\
feature/boot_delay_network,feature/pptp_vpn,\
feature/intel-wilkinpeak2,feature/webif
```

The `configure` command will take several minutes to complete. You will see progress hash-marks at the bottom of the screen through most of the process. Upon completion, your terminal prompt will return.

3. Build the runtime operating system using the command below. This builds the Linux runtime system and generates the runtime components that can be installed on your Target Device.

```
make fs
```

**Note:** This command will take 3 - 5 hours to complete. The completion time is highly dependent on the processing speed of your Host System.

At the end of the make process the Target Device runtime operating system is compressed into a single file that is a USB flash drive image. The flash drive image is created in the directory `$HOME/Project/export`. The file has a `.bz2` extension.

## 8.0 Deploy Image to Micro-SD Flash Card

Install Linux Packages and Wind River Linux Host Tools on the Host System on page 30 guided you through building the Intelligent Device Platform XT runtime image on your Host System. You are now ready to deploy the image to the micro-SD flash card and then boot from the SD flash card on the Target Device.

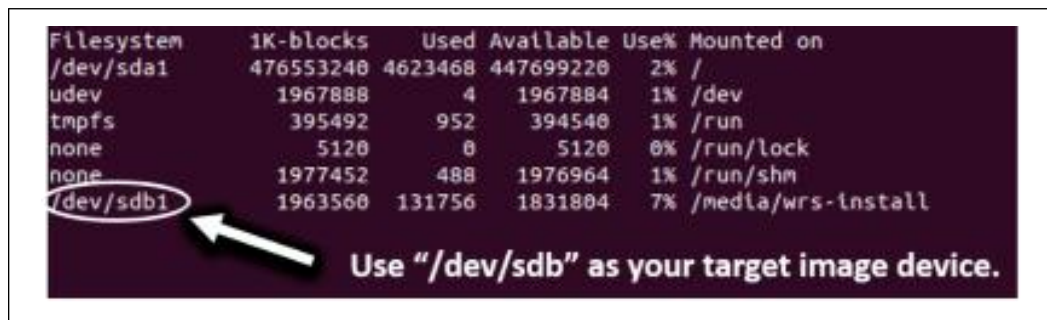
### BootPut Image on Micro-SD Flash Card

1. Insert the micro-SD Flash Card into a USB Flash Card reader on your Host System.
2. From the Host System \$HOME directory, use the following command to display the mounted devices:

```
df
```

Your output will look similar to the following. Look for the micro-SD flash card drive designator on your screen in the area circled in the example. In the example below, the micro-SD flash card drive designator is /dev/sdb1. To identify it on your system, look at the right heading column that says Mounted on. In this column, look for the row that begins with /media. The micro-SD flash card drive designator is in the left column of this row.

**Figure 21. USB Flash Drive File System Name**



The example screen displays /dev/sdb1. The 1 at the end of sdb1 indicates the partition. In the step below, do not include the partition. In the example, only /dev/sdb is used for the file system name. Write down the file system name that is displayed on your screen. You will use it in the next step,. If you accidentally include the partition in the command, you will receive an error message: ERROR: Device mode should be set to -d option.  
e.g.: /dev/sdb

3. Change to the directory \$HOME/Project.





4. Use the following commands to place the new runtime system onto the micro-SD flash card. Substitute your micro-SD flash card drive designator for `/dev/sd?` in the command.

```
sudo ./deploy.sh \  
-f export/intel-quark-glibc-idp-standard-dist.tar.bz2 \  
-y -u -d /dev/sd? -b galileo
```

Confirm this command does not return an error message. Correct any typographic errors in the command and repeat it if necessary.

### Edit `grub.conf`

You must edit `grub.conf` to correctly boot from your micro-SD Flash Card. `grub.conf` located in the vfat partition on your micro-SD Flash Card. Use the following instructions:

1. Mount the vfat partition with the following commands:

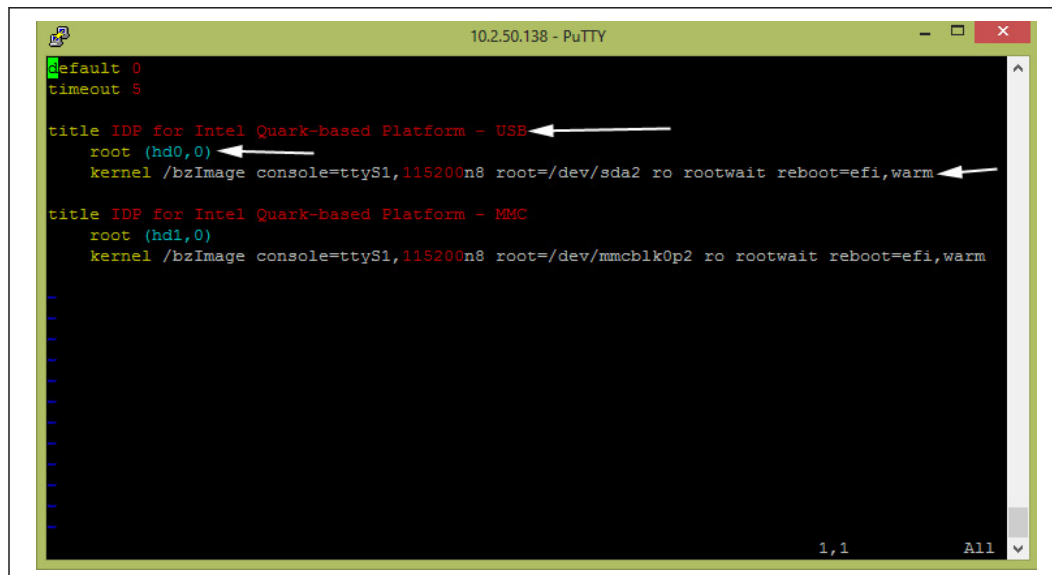
```
mkdir -p /mnt/sdb1  
sudo mount /dev/sdb1 /mnt/sdb1
```

2. Use the following commands to go to the directory where `grub.conf` is located and open it for modifications:

```
cd /mnt/sdb1/boot/grub  
vi grub.conf
```

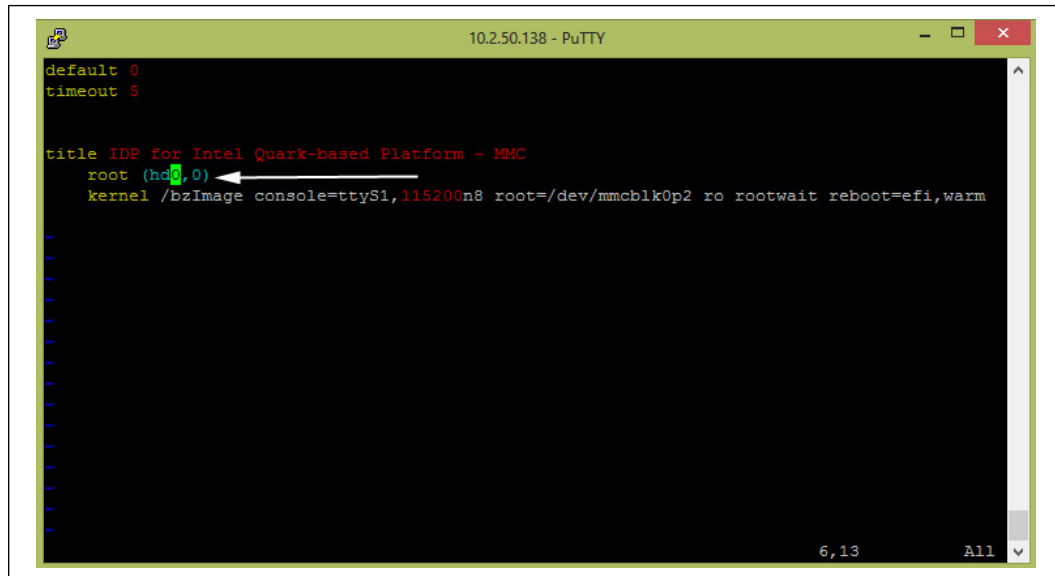
3. Delete three lines indicated in the following figure:

**Figure 22. Remove `grub.conf` Lines**



4. Change root (hd1,0) to root (hd0,0) as shown in the figure below:

**Figure 23. Change grub.conf Line**



The screenshot shows a PuTTY terminal window titled "10.2.50.138 - PuTTY". The terminal displays the following text:

```
default 0
timeout 5

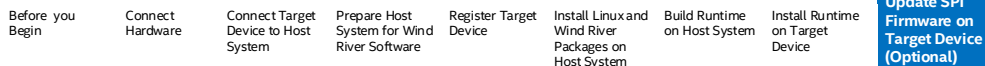
title IDP for Intel Quark-based Platform - MMC
  root (hd0,0)
  kernel /bzImage console=ttyS1,115200n8 root=/dev/mmcblk0p2 ro rootwait reboot=efi,warm
```

A white arrow points to the text "(hd0,0)" on the line "root (hd0,0)". The status bar at the bottom right of the terminal shows "6,13" and "All".

5. Save grub.conf
6. Remove the micro-SD flash card from the Host System.
7. Insert the micro-SD flash card in your target system.
8. Power on your Target Device.



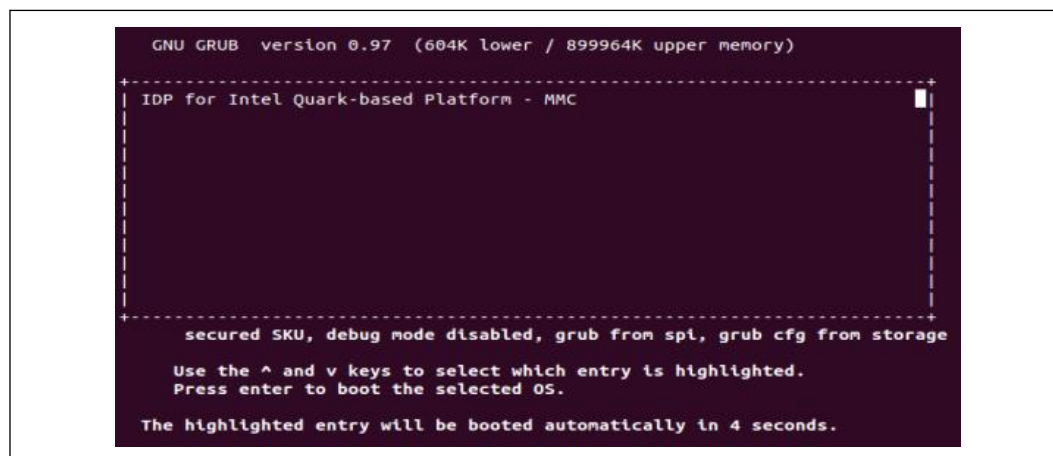
## 9.0 Update SPI Firmware on Target Device



You may want to update the SPI firmware on your Target Device. The steps in this section walk you through the firmware update. You will use the PuTTY Virtual Terminal to complete these steps.

1. In the PuTTY Virtual Terminal, boot your Target Device to MMC.

**Figure 24. PuTTY Virtual Terminal Screen, Request to Boot from MMC**



It will take about 2 minutes for the Target Device to boot.

2. At the login prompt, use `root` for both the login ID and password.
3. While still in the PuTTY Virtual Terminal session, copy the `.cap` file the `/opt` directory on your Host System to the `firmware` directory on your Target Device, and then enable Target Device to update the firmware on the next boot. Use the following commands:

```

modprobe efi_capsule_update
cp /opt/Flash-galileo-8M-secure.cap /lib/firmware
echo -n Flash-galileo-8M-secure.cap > /sys/firmware/efi_capsule/capsule_path
echo 1 > /sys/firmware/efi_capsule/capsule_update
reboot
  
```

4. After the firmware has updated, power down the Target Device by issuing the following command:



```
poweroff
```



## Appendix A Intel® IoT Gateway Knowledge Forum

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In addition to the technical support through Intel® Premier Support, an online community knowledge forum is available for the Intel® IoT Gateway Development Kit. The forum is located at <https://ask.intel.windriver.com>. On this forum, you can ask how-to questions and search for answers related to Wind River® Linux and the Wind River development tools.

Intel will continue to offer hardware and software technical support through Intel® Premier Support; you can use this knowledge forum as an additional support option. Questions on this forum are typically related to installation and usage of Wind River Linux, the Intelligent Device Platform XT, and compilers and development tools, such as the Wind River Workbench.

In using the forum, be aware that this is an open support model and the following bullets apply:

- Wind River hosted Knowledge Forums (Wind River Knowledge Forum and the Intel® IoT Gateway Knowledge Forum) are open support repositories that are accessible to Intel, Wind River employees, and customers who have active Support Maintenance Agreements.
- Questions posted on the forums are visible to all users. All users can contribute answers. Both questions and answers can be edited by any user on the Knowledge Forums.
- Refrain from posting proprietary, confidential, or controlled information on the Knowledge Forums. Intel Corporation and Wind River Systems are not responsible for ensuring the privacy of data on the Knowledge Forums.

This section guides you through accessing and using the Intel® IoT Gateway Knowledge Forum.

### Accessing the Forum

Use the following steps to create a Wind River account and log in to the forum.

**Note:** You might already have a Wind River support account. If you have an account, disregard Step 1 and begin with Step 2.

1. To create a Wind River support account you must fill out a short form at <https://support.windriver.com/selfservicewebapp/register.action>. This form requires you to enter your license and LAC keys. You received this information after you registered your Development Kit.
2. Login at <https://ask.intel.windriver.com>. Use your Wind River Online Support account user name and password.
3. If you have not yet done so, then when prompted, set up a screen name. This is the identity you will use in the online community. Other users will see you by this identity. Do not use your email address for your screen name.



## Using the Forum

After you are registered and logged in, you can use the forum to ask questions and search for topics of interest. Submitted questions are posted on the forum and are accessible to all forum users. Forum moderators and Wind River product experts regularly monitor the forum to answer questions. If necessary, your question will be escalated.

**Note:** If your issue is urgent or related to BSP development on a specific project, create an issue ticket through Intel® Premier Support instead of relying on this forum for answers.

The screen looks like this after you register and log in:

**Figure 25. Knowledge Forum Opening Screen**





## Submitting Questions

Use the following steps to ask a question on the forum.

1. Click **ASK YOUR QUESTION**. See the red box in the following figure.

**Figure 26. Ask Question**



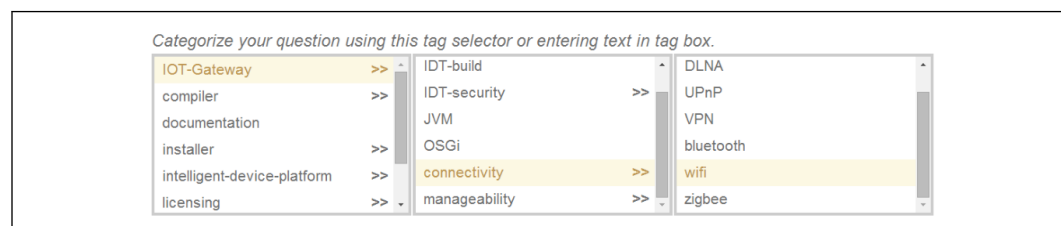
2. Title your question in the field provided, as shown:

**Figure 27. Title Question**



3. Provide details about your question. To help the support staff to provide accurate and timely guidance, include details about your test / development environment, including:
  - Detailed information about your question.
  - Software, such as Intelligent Device Platform XT release, Wind River Linux version, BIOS, FW, etc.
  - Hardware, such as board, processor SKU, memory, I/O etc.
4. Categorize your question. Add **IOT-Gateway** as a tag in addition to specific product tags. This will allow the support team to track issues related to Intel® IoT Gateway. See the following figure.

**Figure 28. Categorize Question**





Your selected tags display in a list. You can add or remove tags as necessary. See the following figure.

**Figure 29. Tagged Question**

Tags

IOT-Gateway x connectivity x wifi x

5. Click **Ask Your Question** to submit the question. See the red box in the following figure.

**Figure 30. Submit Question**

Categorize your question using this tag selector or entering text in tag box.

IOT-Gateway >> compiler >> documentation >> installer >> intelligent-device-platform >> licensing >>

Tags

Select language  
English

Ask Your Question





## Subscribing to Tags

You can choose to subscribe to specific tags to receive email alerts for issues and updates to questions related to that tag/category. Use the following steps.

1. Select your preferred email setting. See the red box in the following figure.

**Figure 31. Subscribe to Forum Tags**



2. Click **Change frequency of emails** to set up how often you receive email messages.



## Appendix B Use Wind River WebIF to Configure the Target Device (Optional)

This appendix guides you through using the Wind River WebIF application. WebIF is a web-based interface used to manage wired, wireless, and 3G connectivity on Intelligent Device Platform XT Target Devices.

### How to use WebIF

1. On the Host System, open an internet browser.
2. Choose the correct path:

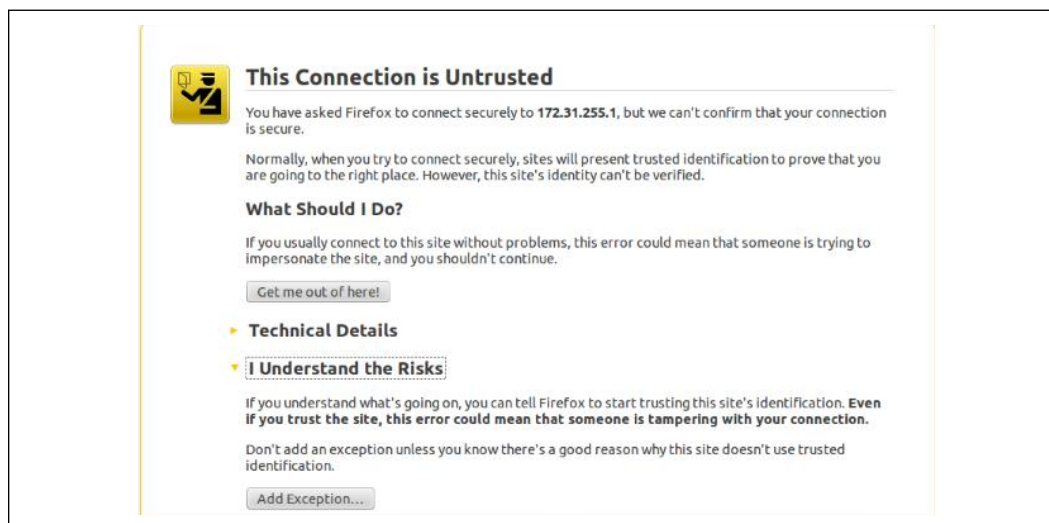
*Note:* Be sure to use `https` (not `http`) for either path.

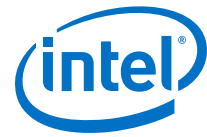
- If you used a **wireless** network connection from your Host System to your Target Device, type the following URL into the internet browser on your Host System: `https://192.168.1.1`
- If you used a **wired** network connection from your Host System to your Target Device, type the following URL into the internet browser on your Host System: `https://<TARGET_DEVICE_IP_ADDRESS>`, where `<TARGET_DEVICE_IP_ADDRESS>` is the IP address of your target device.

*Note:* The Host System and the Target Device must be on the same subnet.

3. Most browsers present a pop-up warning box stating that the security certificate is not recognized. Select the option to tell the browser to disregard the certificate and connect to the Web site. In the following example, you would click **I Understand the Risks**, and then **Add Exception**:

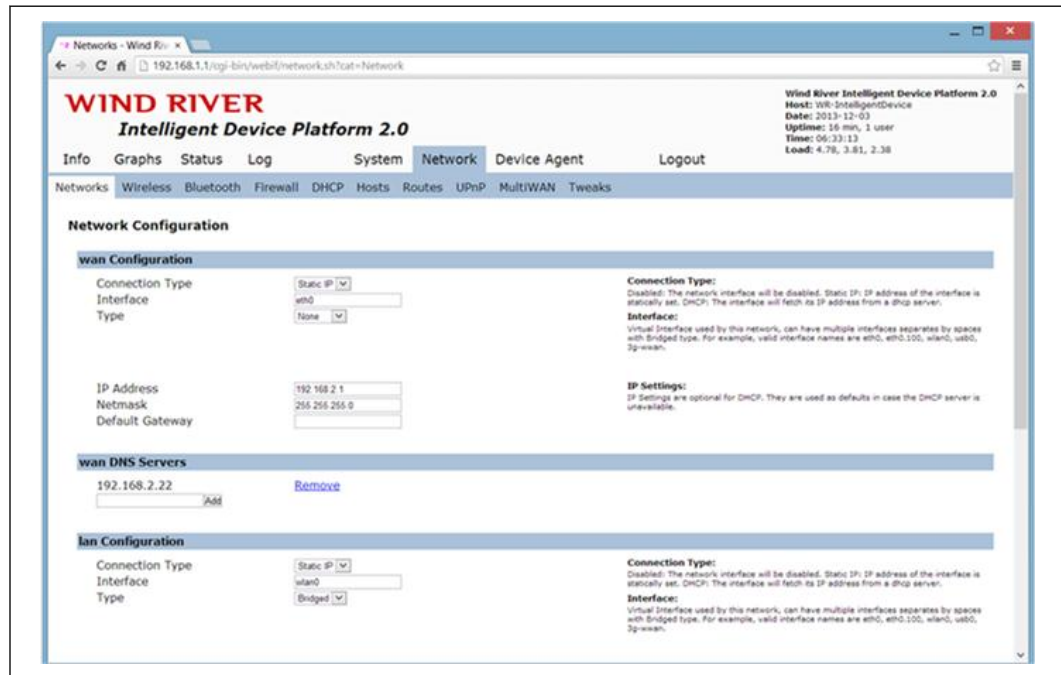
Figure 32. Untrusted Certificate





4. Login with user name: `admin` and password: `admin`. The Wind River® Intelligent Device Platform XT 2.0 Web Interface (WebIF) console opens. See the figure below.

**Figure 33. WebIF Application**



The WebIF menus provide a simple interface to allow you to configure the hardware and I/O features of the Target Device. If you are interested in things you can do through this interface, see the *Wind River® Intelligent Device Platform XT 2.0 – Programmer's Guide* at <https://www-ssl.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-xt2-programmers-guide.html?wapkw=wind+river>

See also the *Wind River® Intelligent Device Platform XT 2.0 – Release Notes* at <http://www.intel.com/content/www/us/en/embedded/design-tools/evaluation-platforms/gateway-solutions/wind-river-idp-release-notes.html>.

## Appendix C Building an Intelligent Device Platform Project Using Wind River® Workbench

This appendix provides step-by-step instructions to build a Wind River Intelligent Device Platform project using Wind River Workbench. The steps below guide you through tasks such as selecting configuration options and adding different layers to your project.

This appendix assumes the following:

- Your Host System is running Ubuntu 14.04, 64-bit.
- You used the directory names indicated in [Create Directories and Confirm Disk Space](#) on page 23. If you used different directory names, replace the directory names in the steps below with the directories that you created.
- You followed the instructions in [Installing the Wind River Host Tools](#) on page 30.
- You know how to deploy a runtime image on your Target Device. See [Deploy Image to Micro-SD Flash Card](#) on page 40.

**Note:** These steps will take 2 - 4 hours to complete.

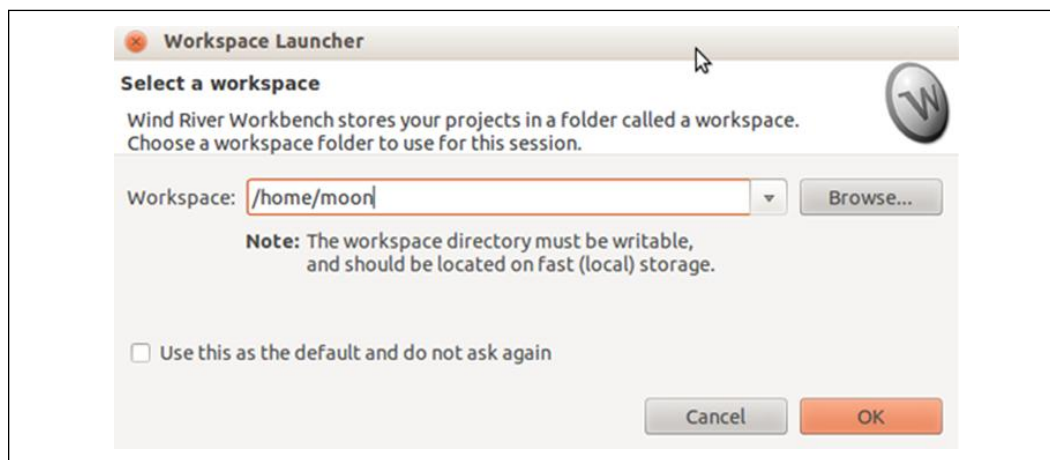
### Create the Project

1. Use the following commands to launch Workbench:

```
cd $HOME/WindRiver
./ startWorkbench.sh
```

2. Upon launching, Workbench asks for a workspace folder. Type the path or browse to your workspace folder. Suggestion: Use your home folder. See the following figure:

**Figure 34. Workspace Location Selection**

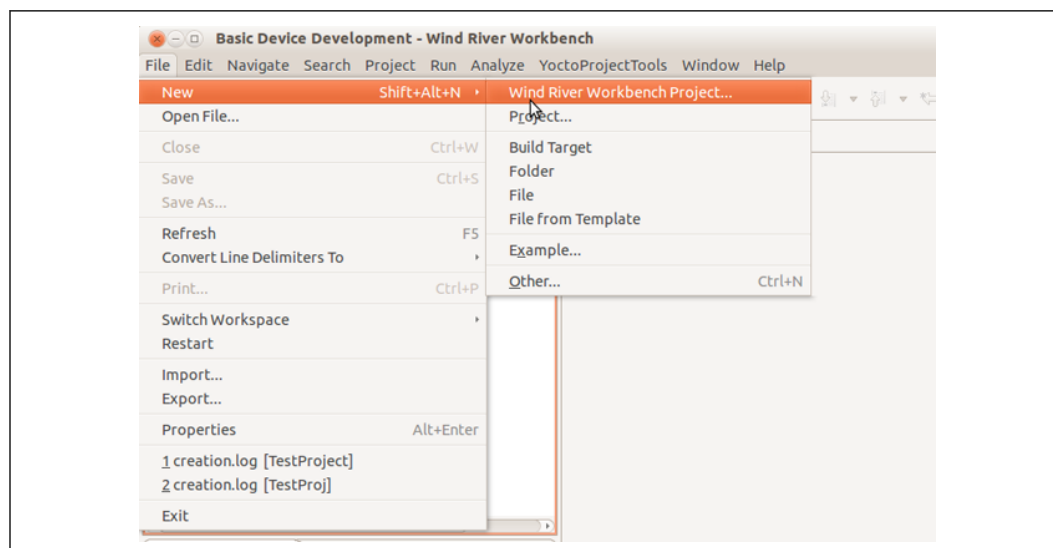




The application launches.

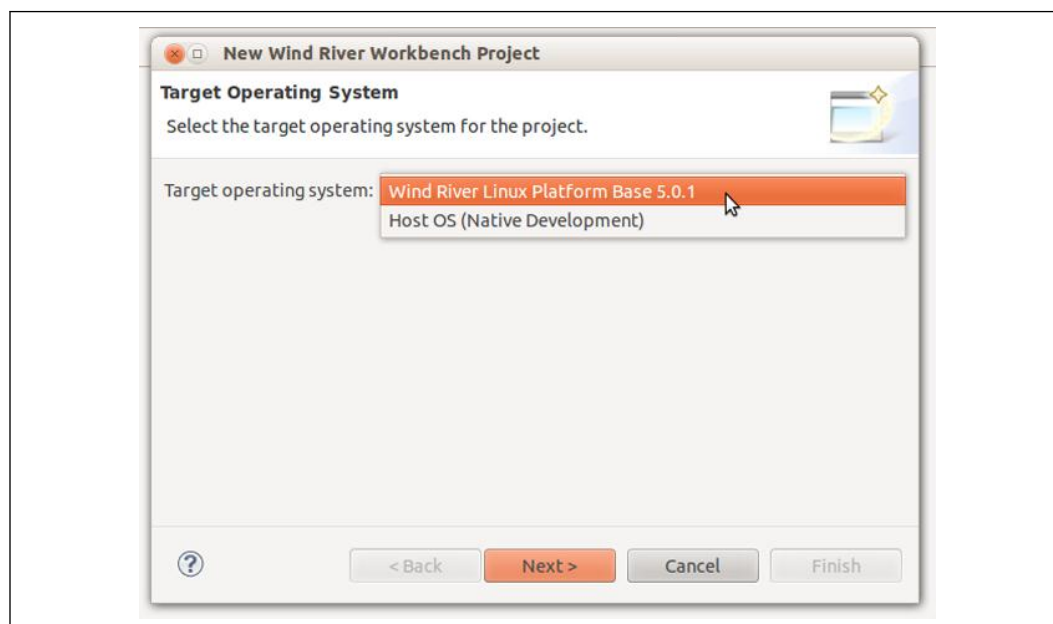
3. From the main menu, click **File > New > Wind River Workbench Project**, as shown:

**Figure 35. Create a New Workbench Project**



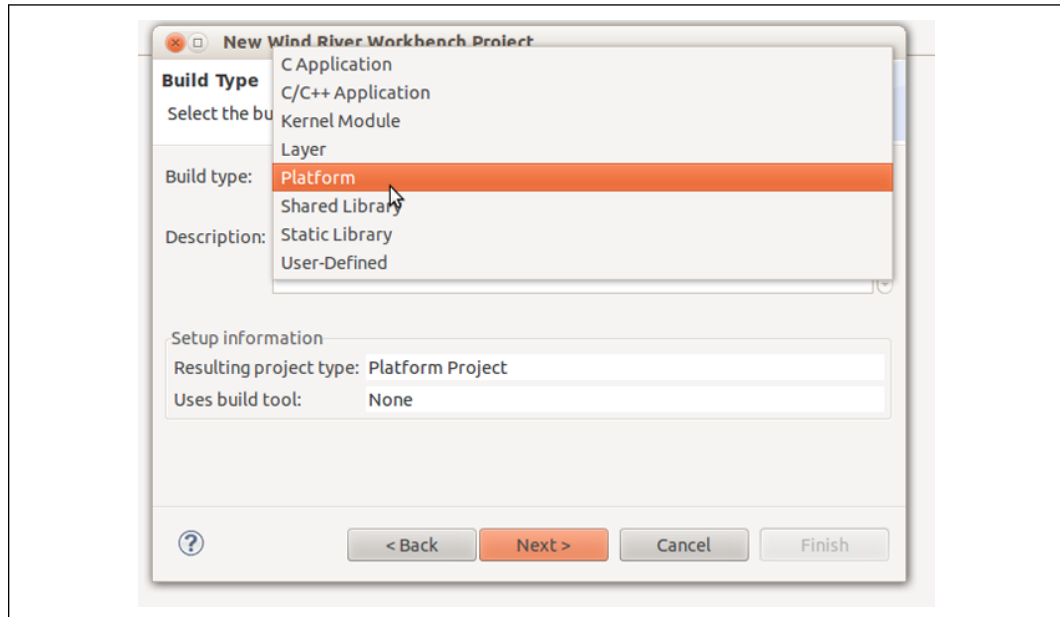
4. Select the target operating system. Choose **Wind River Linux Platform Base 5.0.1**, as shown, and then click **Next**.

**Figure 36. Selecting Target Operating System**



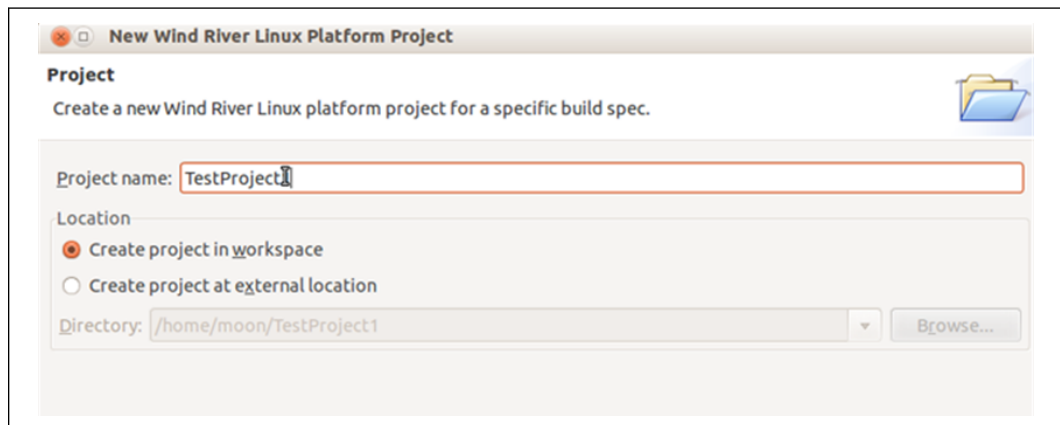
5. Select **Platform** as the build type as shown, and then click **Next**.

**Figure 37. Select Build Type**



6. Type a name for your project, and then click **Next**.

**Figure 38. Specify Project Name**

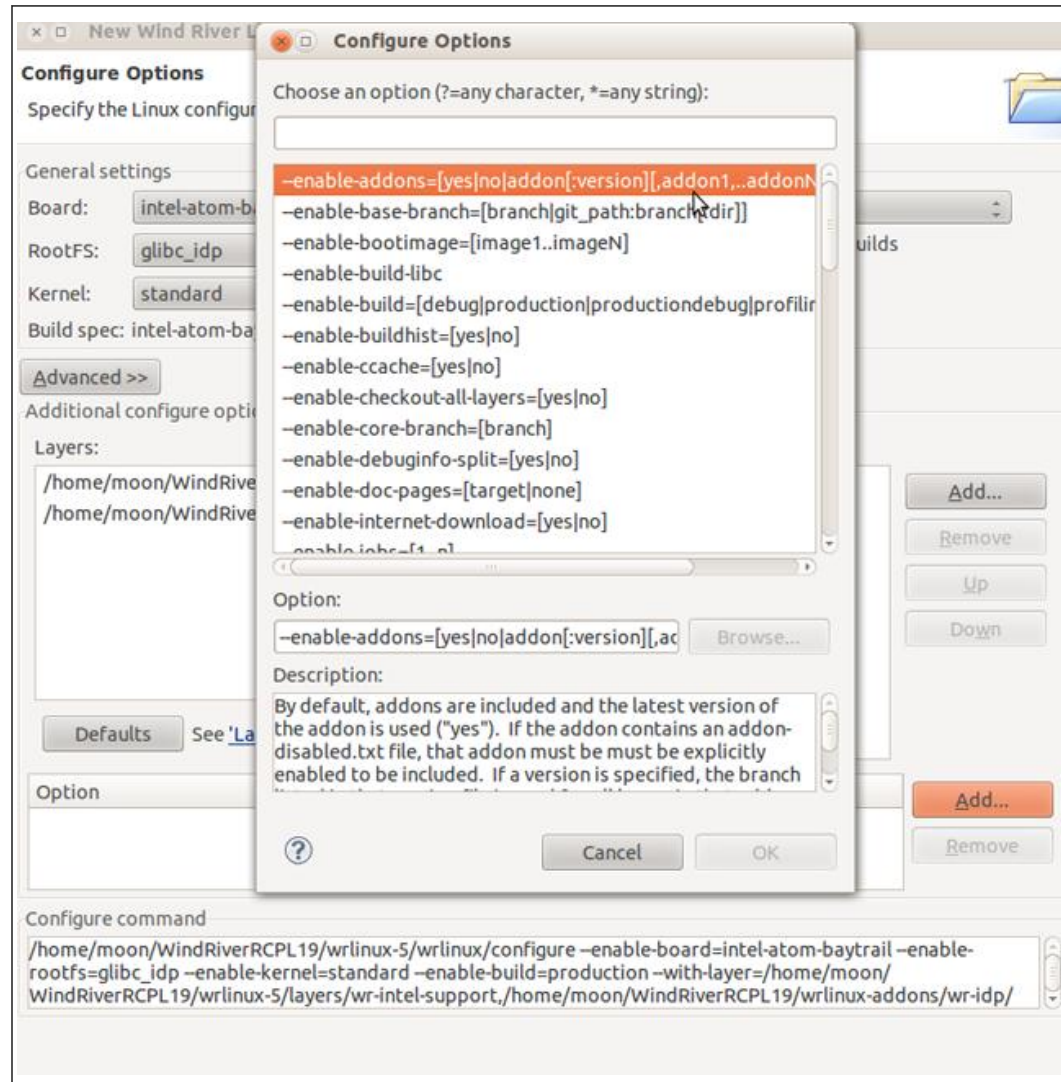


*Important:* You must enable `wr-idp` as an addon before selecting the RootFS type. Make sure you correctly complete steps 7 - 8.



7. Click **Add** and select `-enable-addons=[yes|no|addon[:version]][,addon1,...addonN]` as shown below.

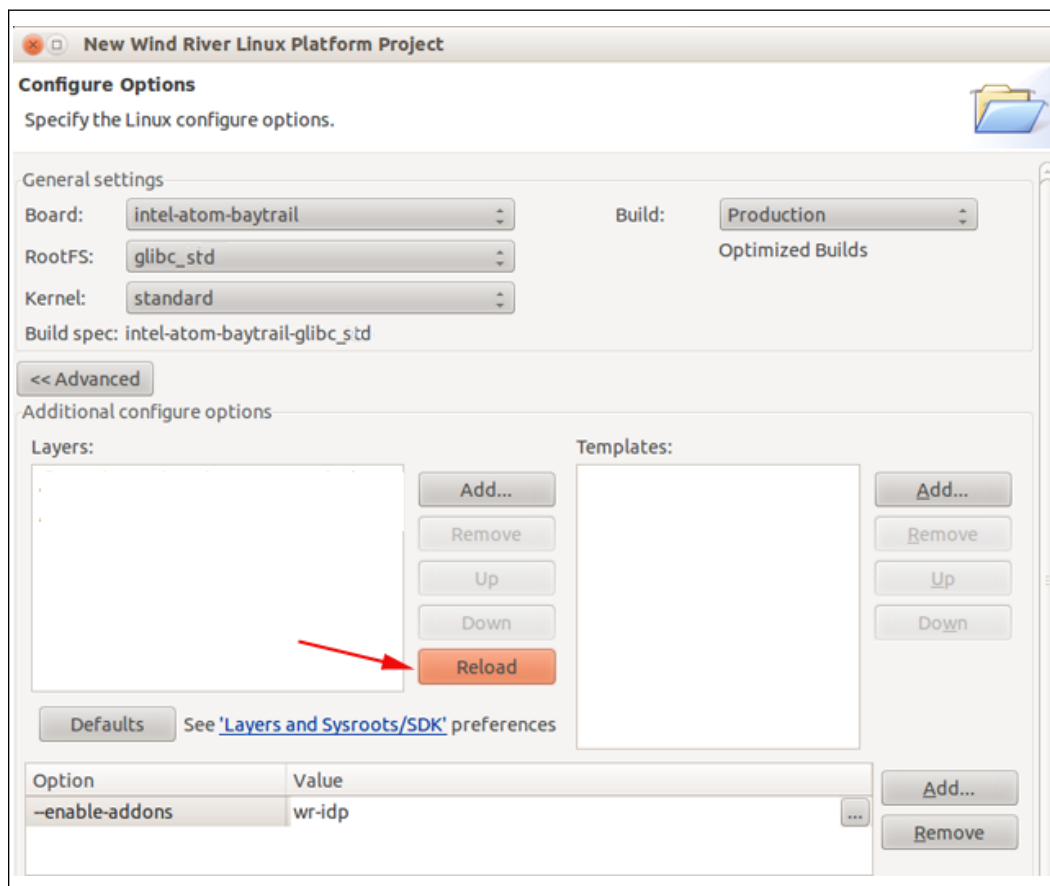
**Figure 39. Enable Addons**



8. Edit the **Value** field near the bottom of the screen to add wr-idp, and then click the **Reload** button. See the following figure.

*Note:* If you do not click **Reload**, you cannot use glibc-idp as the RootFS type.

**Figure 40. Reload Configurations**

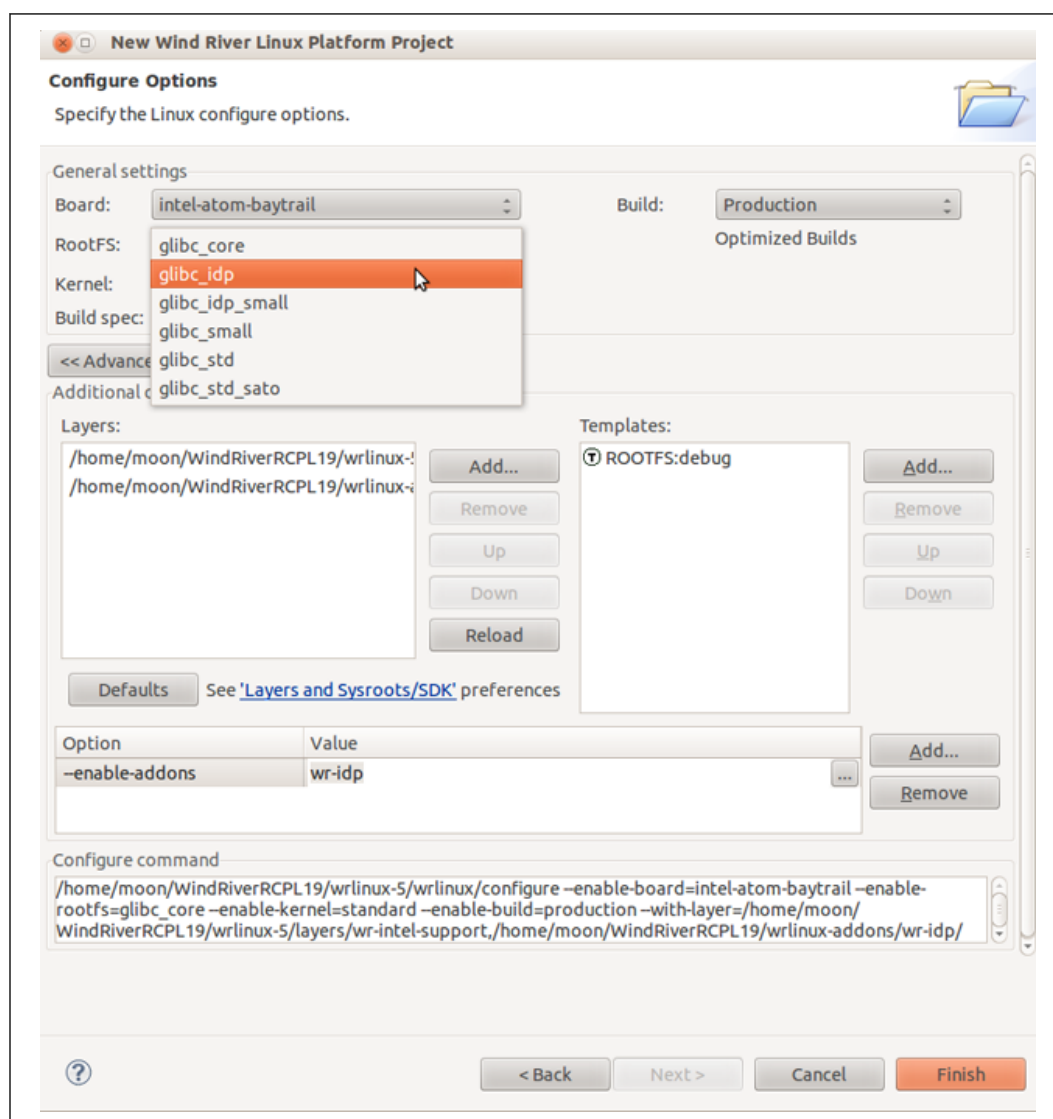




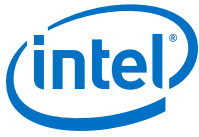


9. For **RootFS**, select **glibc\_idp** as shown:

**Figure 41. glibc\_idp Option Available**

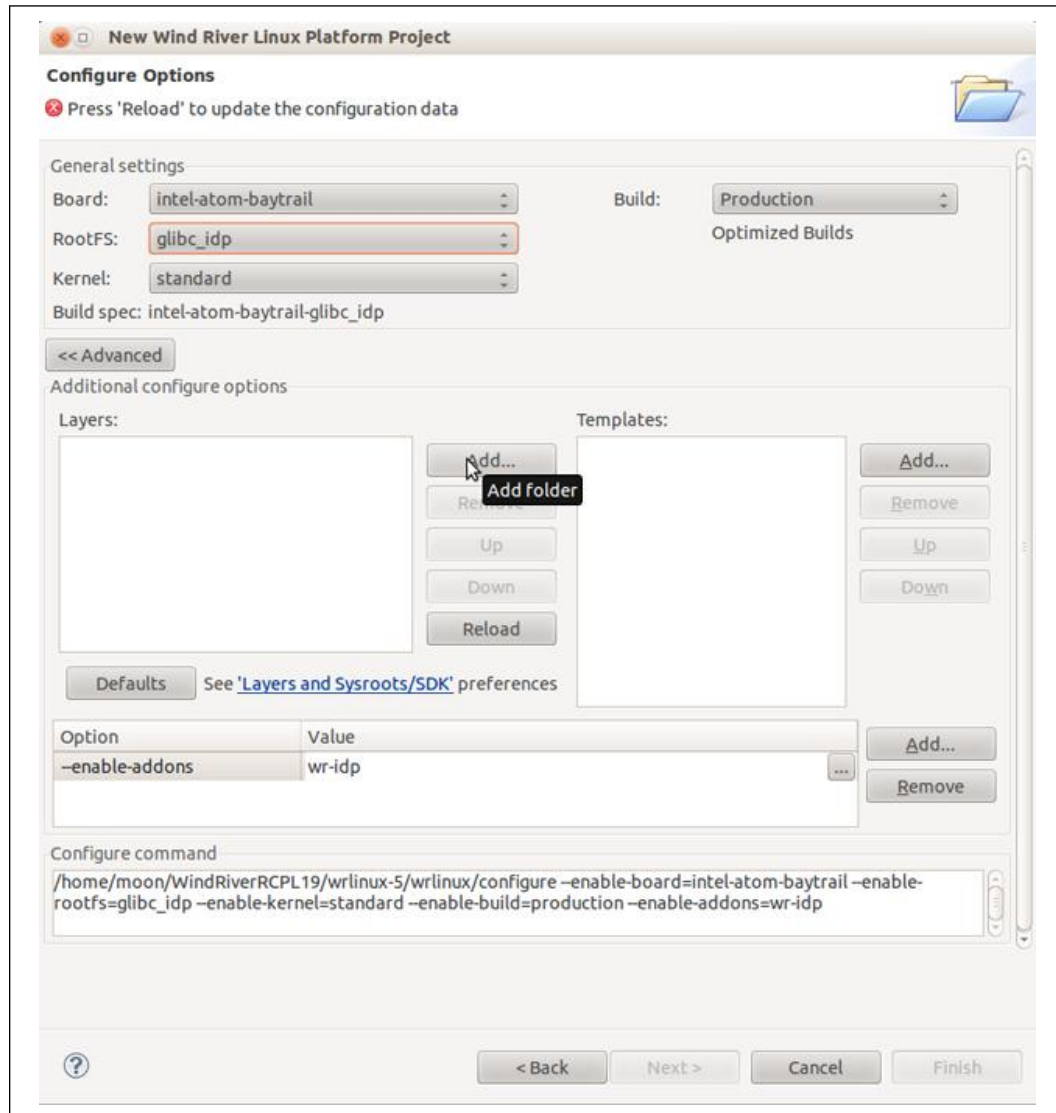


10. For **Board**, select the board type appropriate for your Target Device. If your Target Device has an Intel® Atom™ processor, select **intel-atom-baytrail**. If your Target Device has an Intel® Quark™ processor, select **intel-quark**.
11. For **Kernel**, select **standard**.



12. You are ready to add layers. Click **Add...** as shown below.

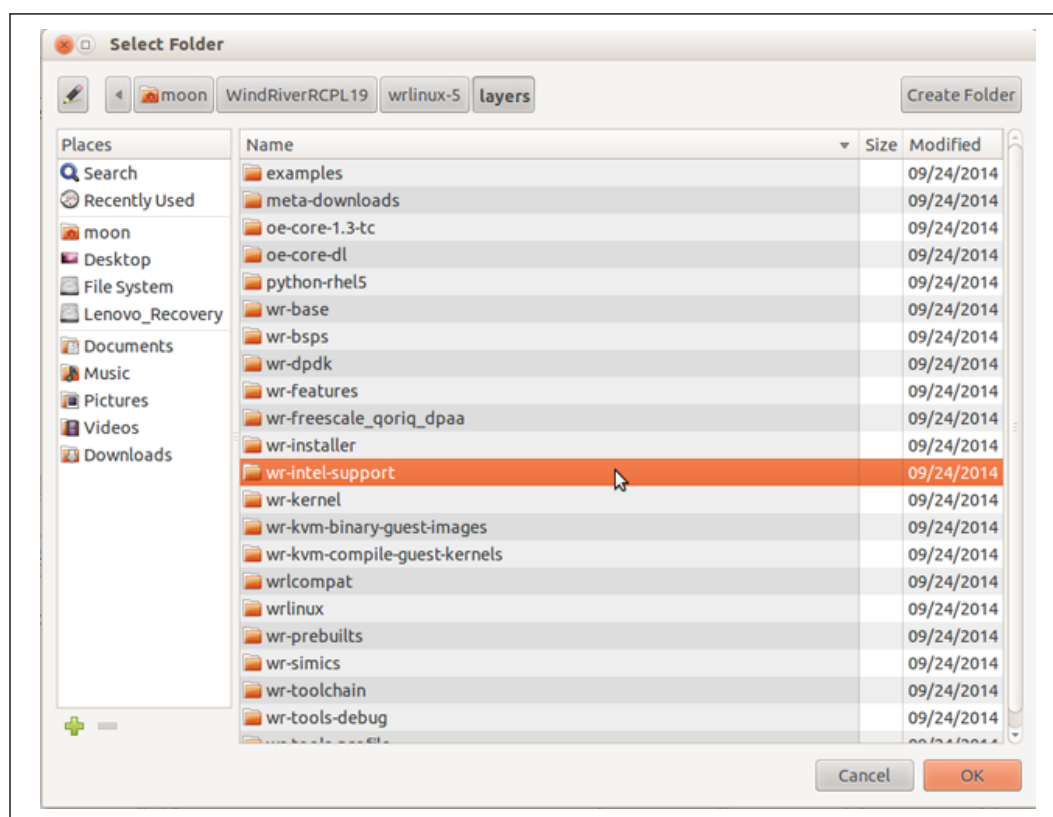
**Figure 42. Add Layers**





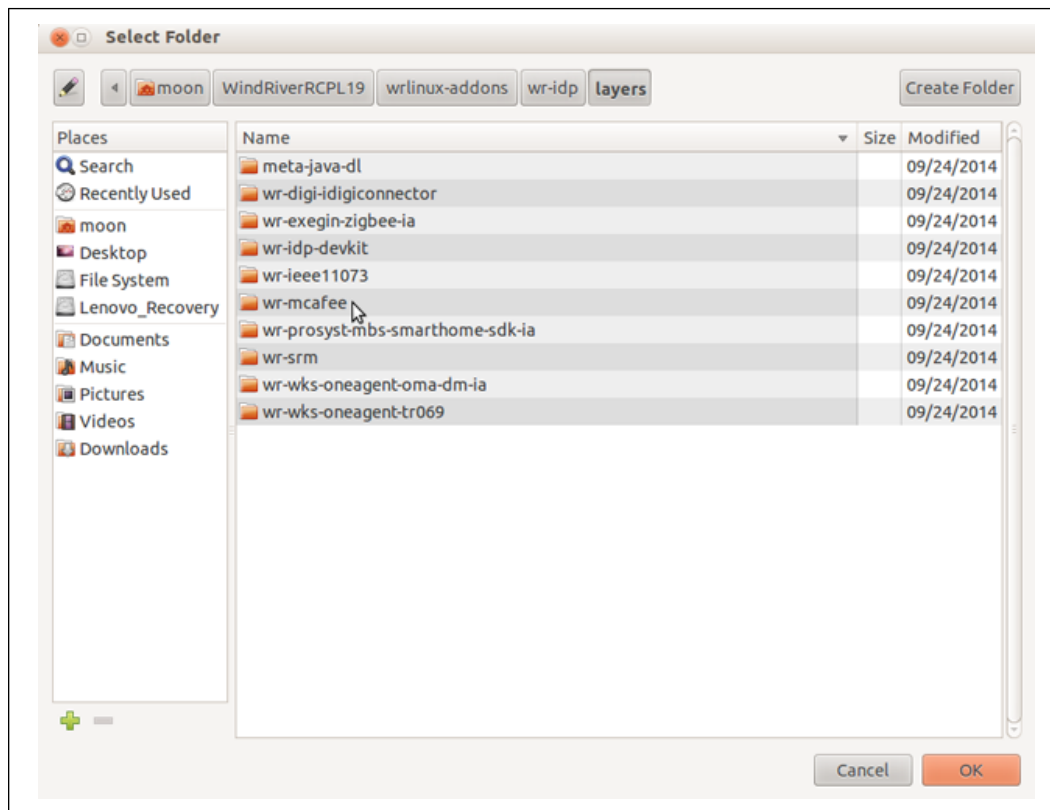
13. Select **wr-intel-support** as shown below, and then click **Reload**.

**Figure 43. Add wr-intel-support**



14. Select to add the **wr-mcafee** layer as shown:

**Figure 44. Add wr-mcafee Layer**



15. Add additional layers as needed.

16. Click the **Add** button in the **Option** group as shown in figure below:

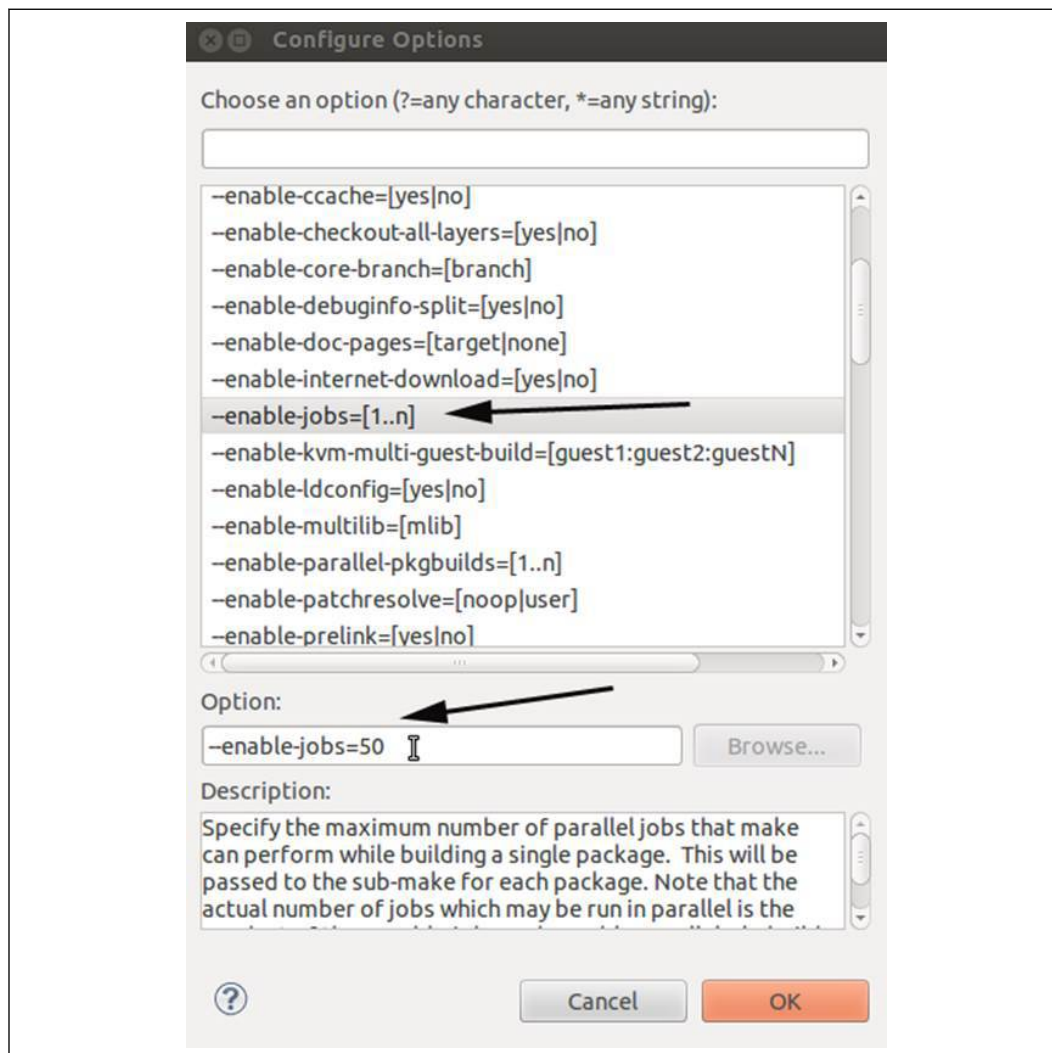
**Figure 45. Adding Options**





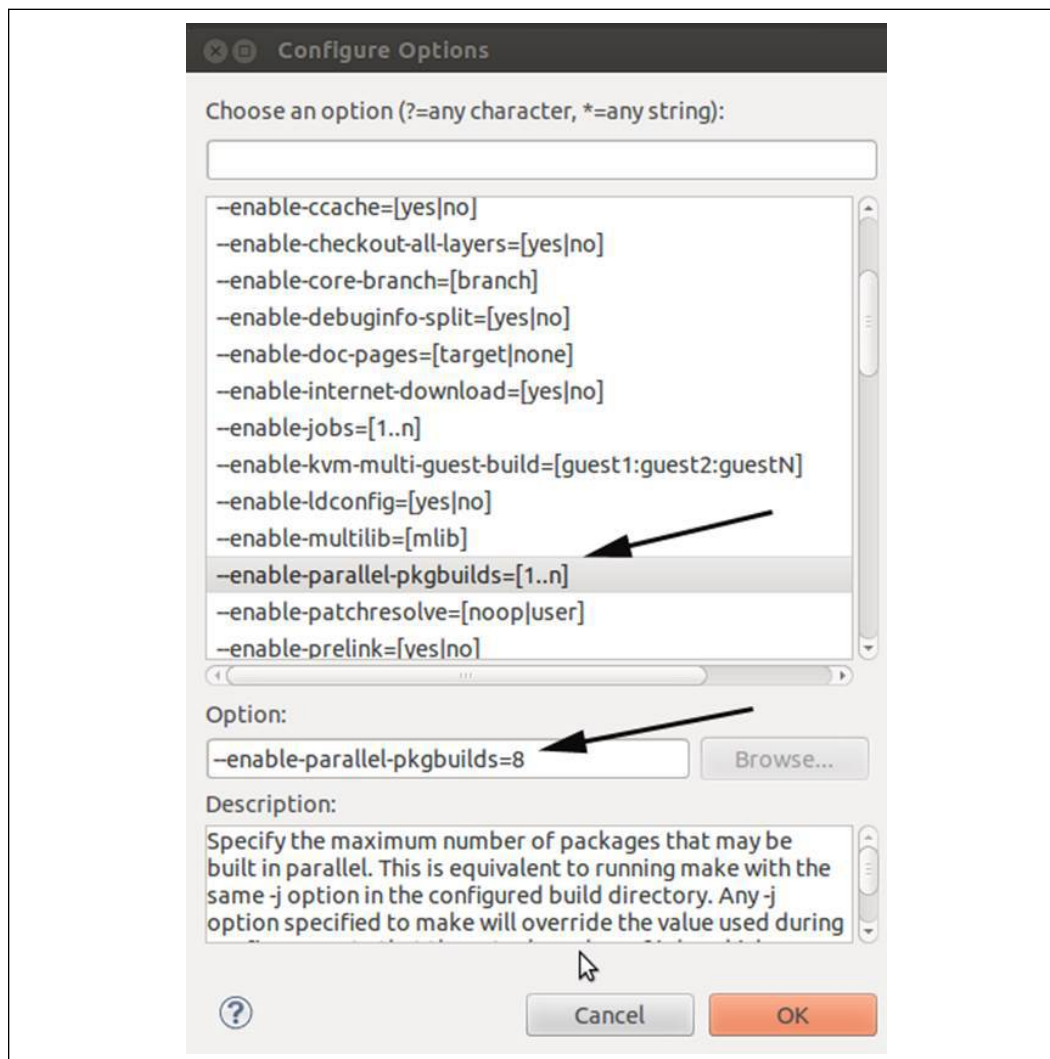
17. Add an option to `-enable-jobs=50`, as shown below. Then click **OK**.

**Figure 46.** `enable jobs=50`



18. Click **Add** in the **Option** group again.
19. Add an option to `-enable-parallel-pkgbuilds=<number of CPUs>`, where `<number of CPUs>` is the number of CPUs in your system. See the following figure. Then click **OK**.

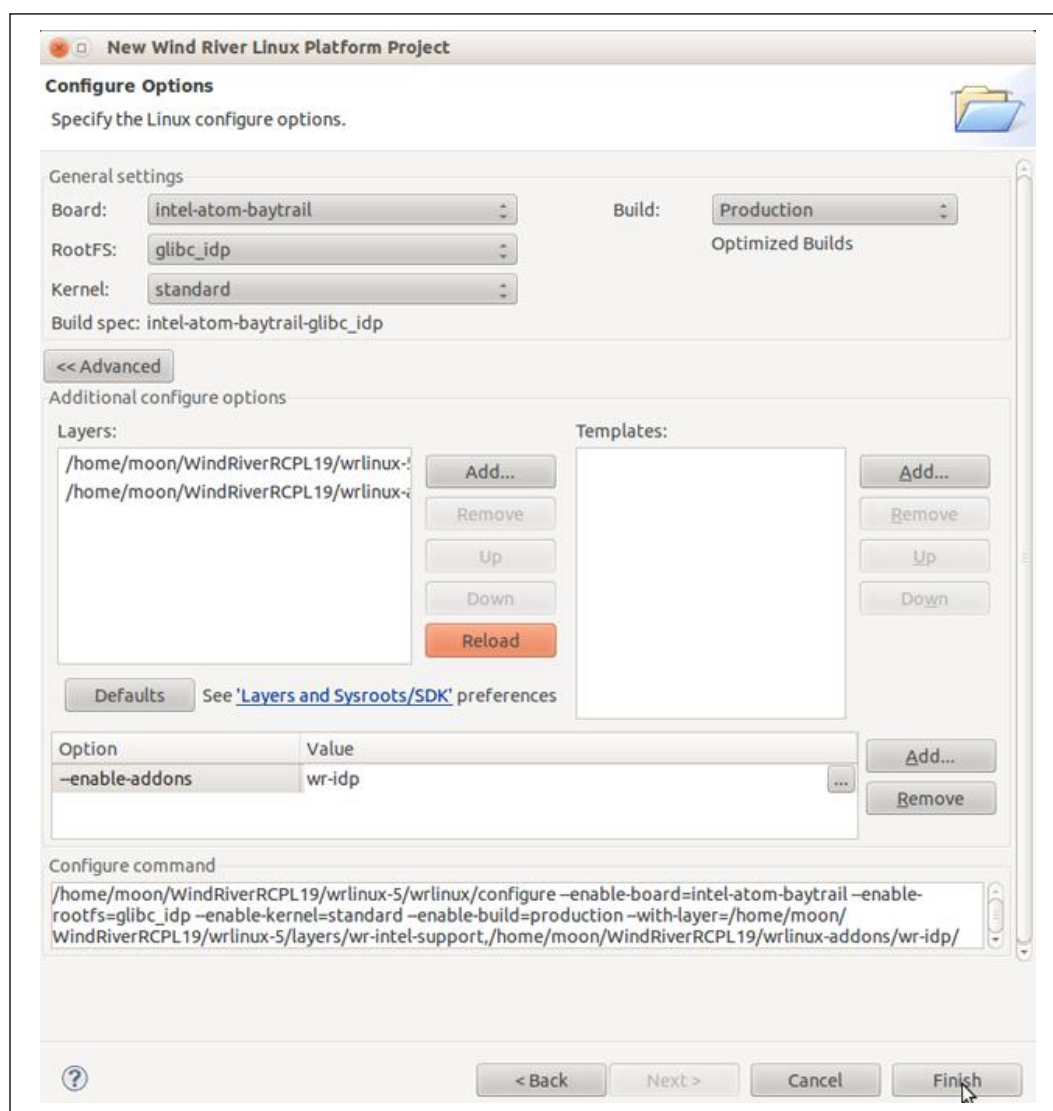
**Figure 47.** `-enable-parallel-pkgbuilds=<number of CPUs>`





20. Click **Finish** to finalize your configuration.

**Figure 48. Finalize Configuration**

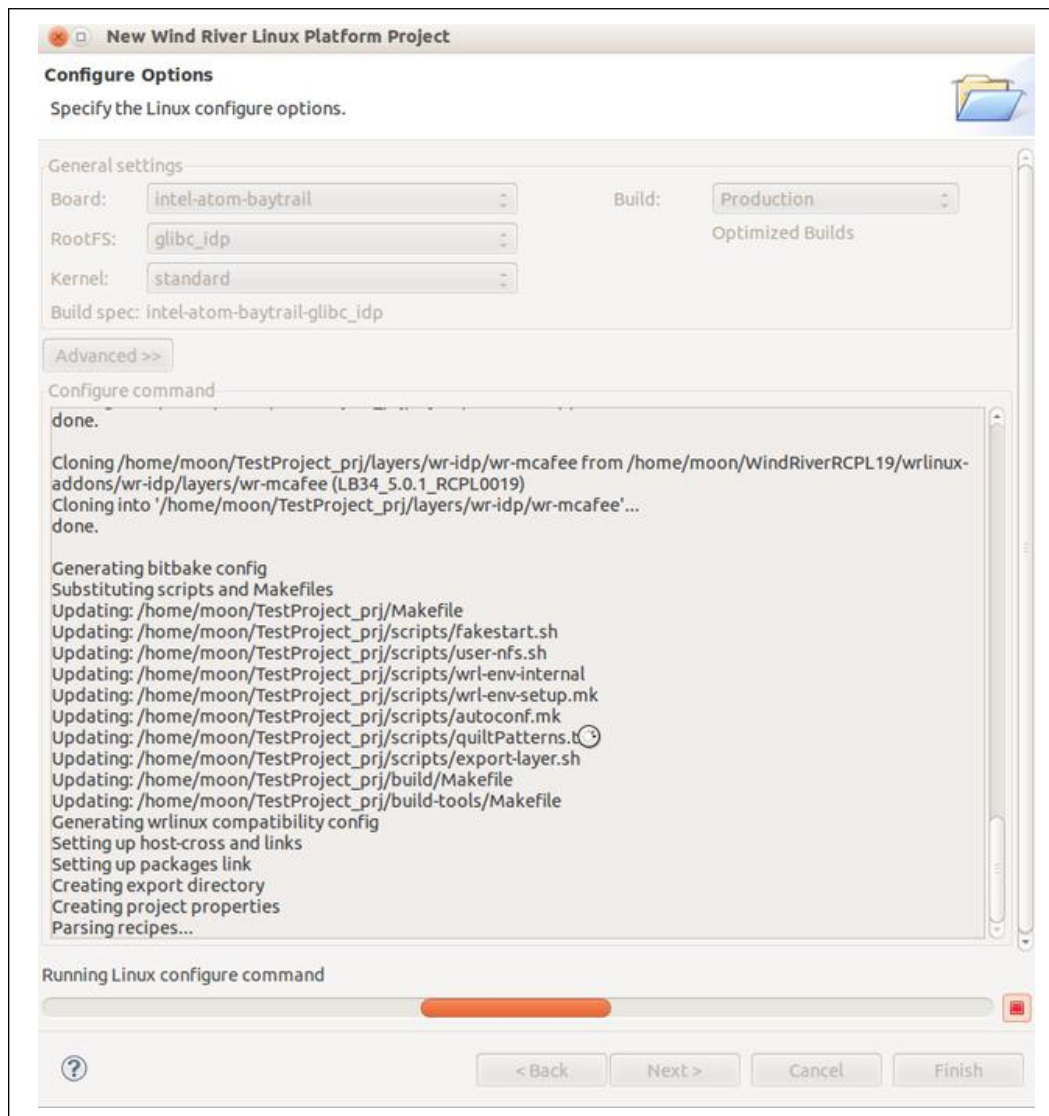






The configuration script will show a progress screen similar to the following while it executes. Execution will take a few minutes.

Figure 49. Configuration Script Progress

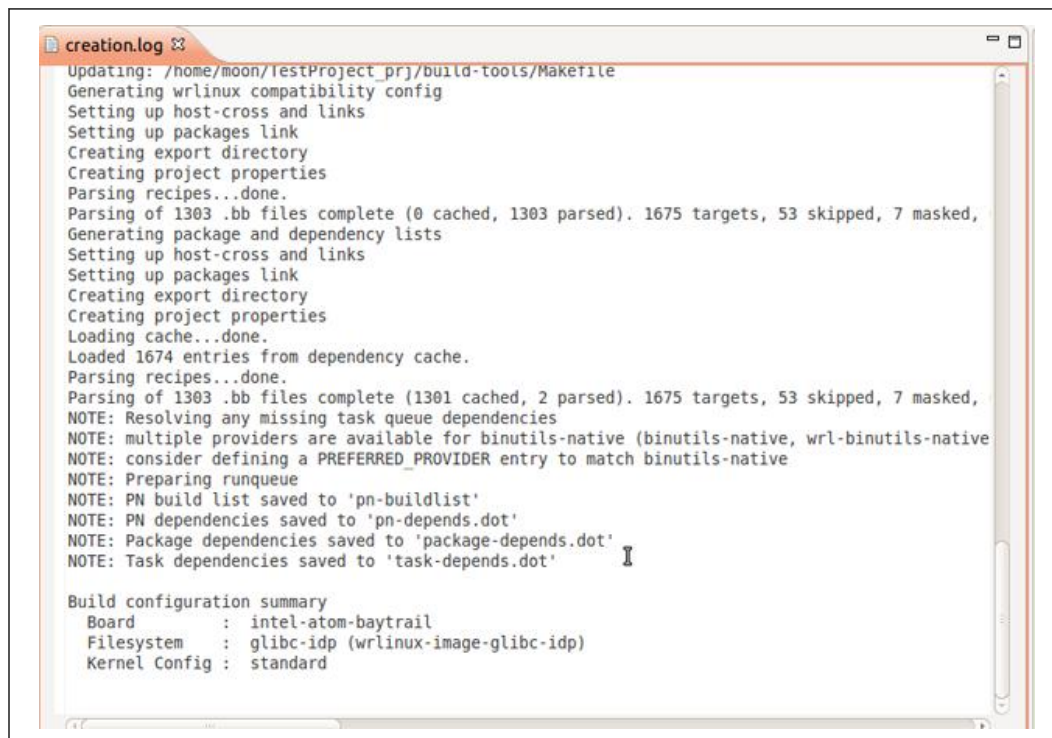






Upon completion you will see a summary screen similar to the following:

**Figure 50. Build Configuration Completed**



```
creation.log
Updating: /home/moon/testProject_prj/build-tools/Maketile
Generating wrlinux compatibility config
Setting up host-cross and links
Setting up packages link
Creating export directory
Creating project properties
Parsing recipes...done.
Parsing of 1303 .bb files complete (0 cached, 1303 parsed). 1675 targets, 53 skipped, 7 masked,
Generating package and dependency lists
Setting up host-cross and links
Setting up packages link
Creating export directory
Creating project properties
Loading cache...done.
Loaded 1674 entries from dependency cache.
Parsing recipes...done.
Parsing of 1303 .bb files complete (1301 cached, 2 parsed). 1675 targets, 53 skipped, 7 masked,
NOTE: Resolving any missing task queue dependencies
NOTE: multiple providers are available for binutils-native (binutils-native, wrl-binutils-native
NOTE: consider defining a PREFERRED_PROVIDER entry to match binutils-native
NOTE: Preparing runqueue
NOTE: PN build list saved to 'pn-buildlist'
NOTE: PN dependencies saved to 'pn-depends.dot'
NOTE: Package dependencies saved to 'package-depends.dot'
NOTE: Task dependencies saved to 'task-depends.dot'

Build configuration summary
Board      : intel-atom-baytrail
Filesystem : glibc-idp (wrlinux-image-glibc-idp)
Kernel Config : standard
```

You are ready to build your project. Follow the steps in the next section.

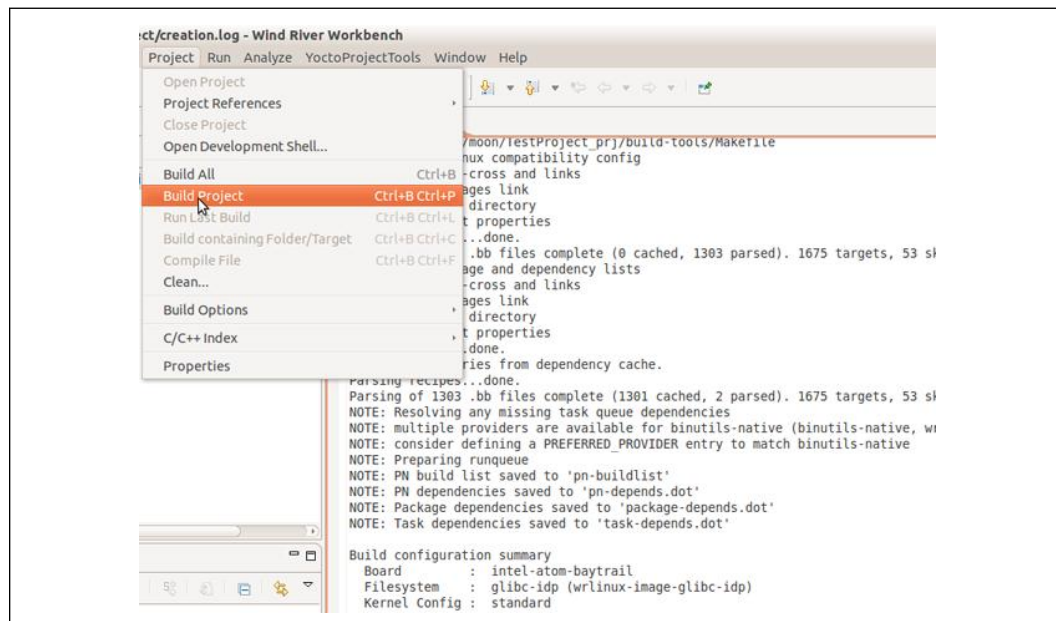


## Build Project

Depending on your configuration items, your selected layers and the processing power of your development system it will take 2 to 4 hours to build your project. The build took approximately 4 hours on a test system that was running an Intel® Core™ i7-4900 processor at 2.8 GHz with Intel® Hyper-Threading technology, and 8 GB RAM.

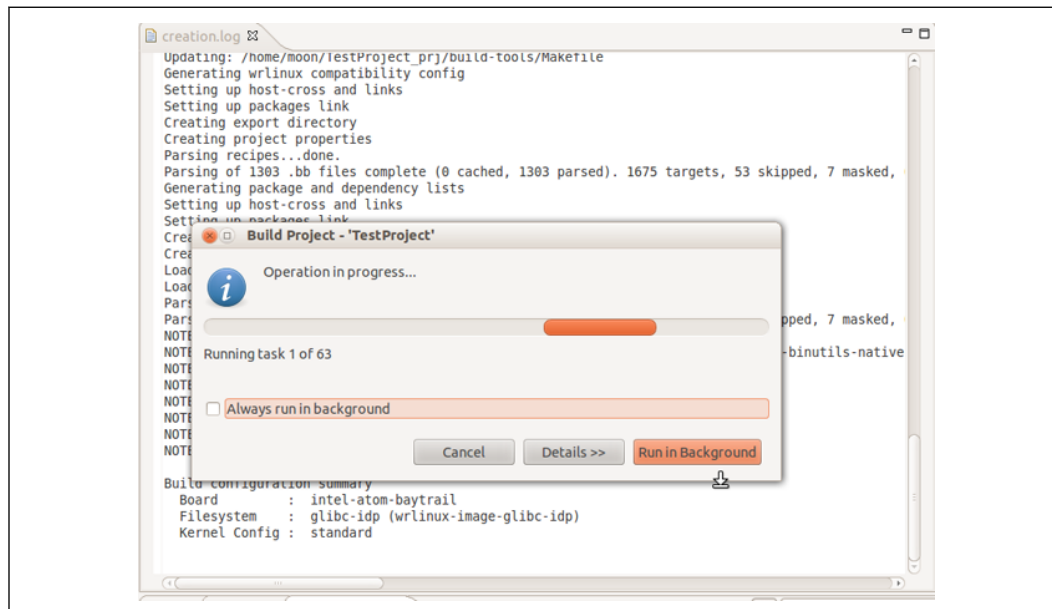
1. From the main menu, select **Project > Build Project**.

Figure 51. Build Project



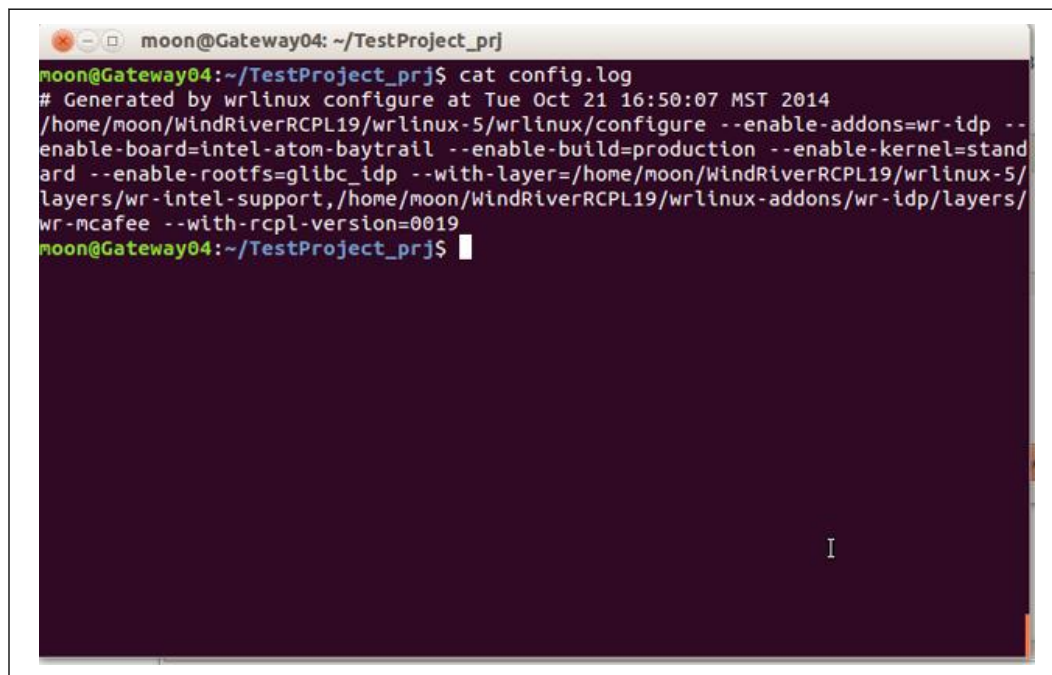
The project build begins and the progress displays as follows:

### Figure 52. Build Project Progress Window



- Optional: Open a terminal window to examine the config file generated by Workbench. The config file looks similar to the following:

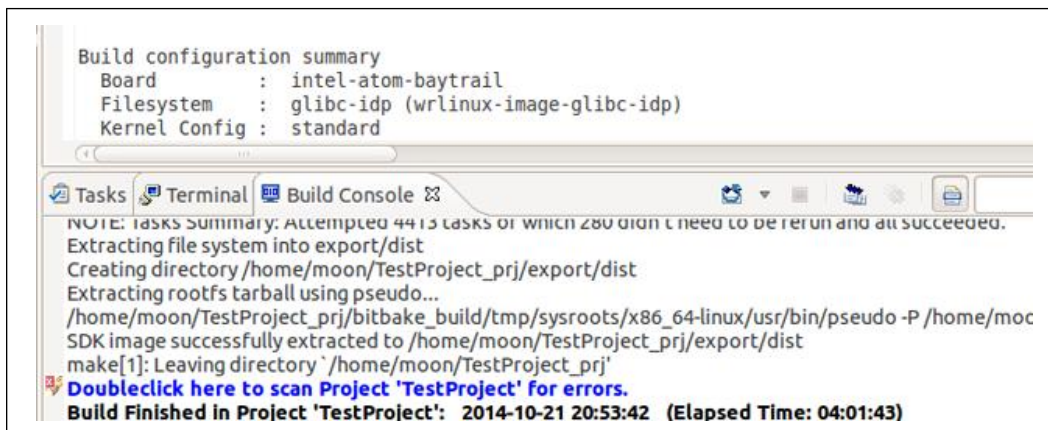
### Figure 53. Config File





Upon completion, the Build Console displays as follows:

**Figure 54. Build Console Displaying Project Completion**



3. Deploy your project to your Target Device.

## Appendix D Firmware Backup with DediProg

Use the following steps to make a backup copy of the firmware that is on the micro-SD card.

You need the following items to program the firmware:

- DediProg SF100. See the figure below.
- DediProg software, available from <http://DediProg.com>
- Flash image file in .bin format

### What you need to do

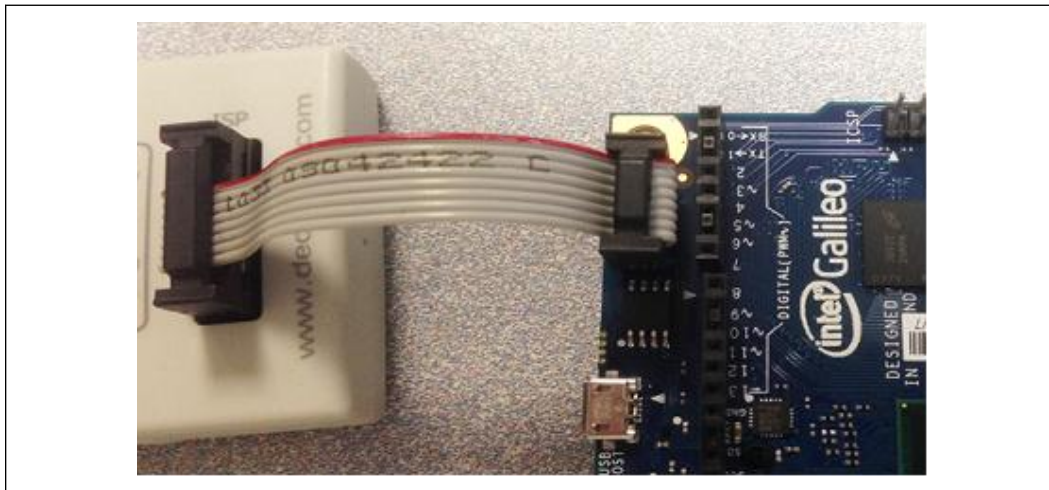
1. Install the DediProg software on the Host System. See <http://DediProg.com>.
2. Disconnect the power supply from the Target Device.
3. Identify the 7-pin SPI header on the Target Device. See the red arrow in the figure below.

**Figure 55. DediProg Header on the Target Device**



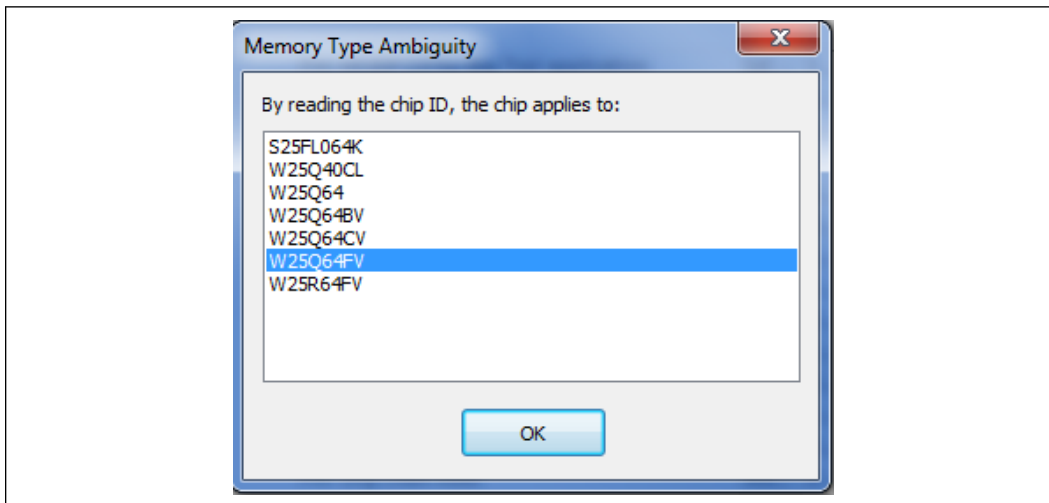
4. Connect the DediProg to the Target Device as shown in the figure below.

**Figure 56. Connection from DediProg to Target Device**

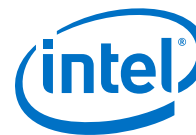


5. Plug in the USB connection of the DediProg Flash Programmer to the Host System. You will see a message similar to the following figure. Select **W25Q64FV** and click **OK**

**Figure 57. Flash Memory Selection**

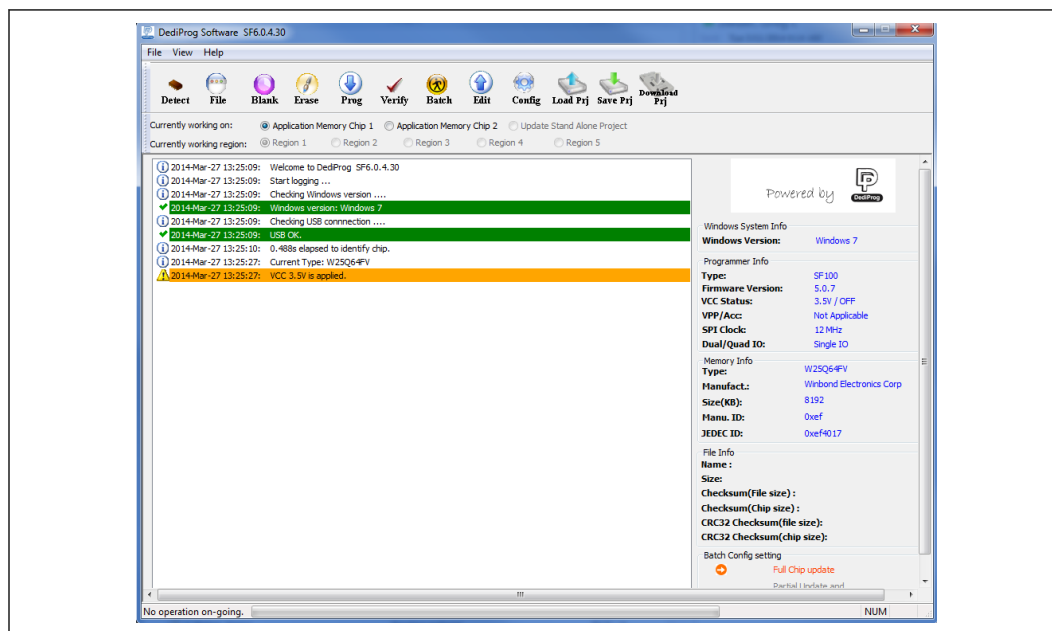






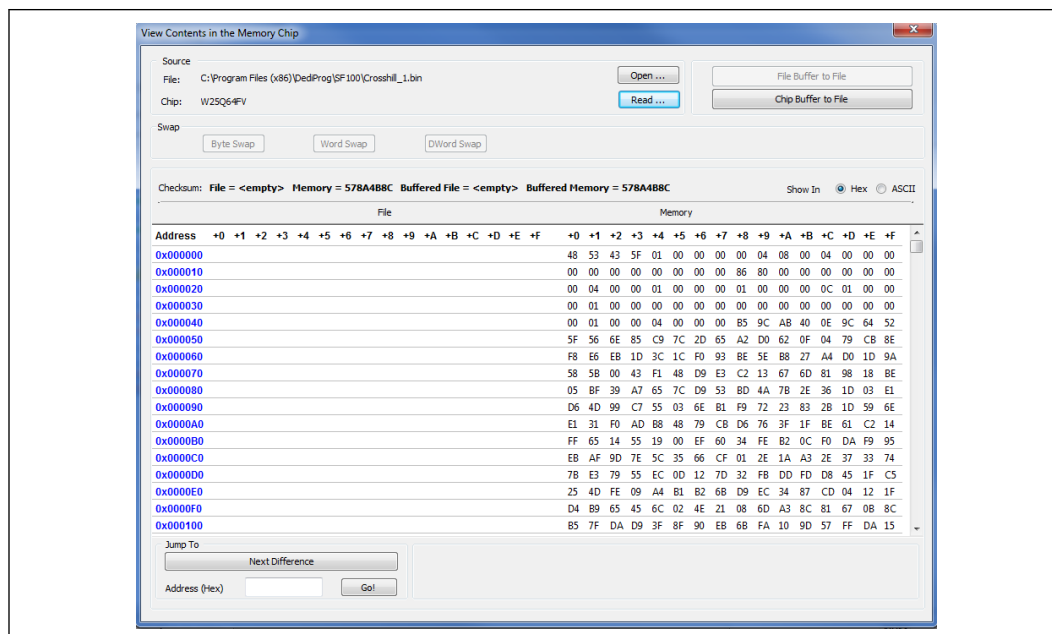
The DediProg GUI starts as shown:

**Figure 58. DediProg Programming Software Graphical User Interface (GUI)**



- Click the **Edit** button. The **View Contents in the Memory Chip** window pop-up is shown in the figure below.

**Figure 59. DediProg Edit Screen with SPI Flash Contents Displayed**



- Click **Read**. The DediProg software reads the contents of the SPI flash memory and displays them in the window.



8. Click **Chip Buffer to File**.
9. Enter a file name when prompted. The chip image is saved to the file.



## Appendix E Programming the SPI Flash Firmware with DediProg\*

During application development, it may be necessary to modify or reprogram the firmware contained in the SPI Flash of the Target Device. The recommended method is to program the SPI Flash is by using a DediProg\* programmer.

A backup copy of the firmware for the Development Kit is on the USB flash drive in the `backup` directory.

You need the following items to program the firmware:

- DediProg SF100. See the figure below.
- DediProg software, available from <http://DediProg.com>
- Flash image file in `.bin` format

### DediProg Programmer Information

See <http://DediProg.com> to purchase a DediProg SPI Flash programmer. The SF100, SF600, and SF600Plus models are compatible with the Target Device. The Target Device uses a 2X4 2.54mm ISP pin header on the board. Obtain the cables necessary to plug into this header.

**Figure 60. DediProg SF100 Flash Programmer**





## Programming the Firmware

**Attention:** Before updating your firmware, save a backup copy of the existing firmware. See [Firmware Backup with DediProg](#) on page 69.

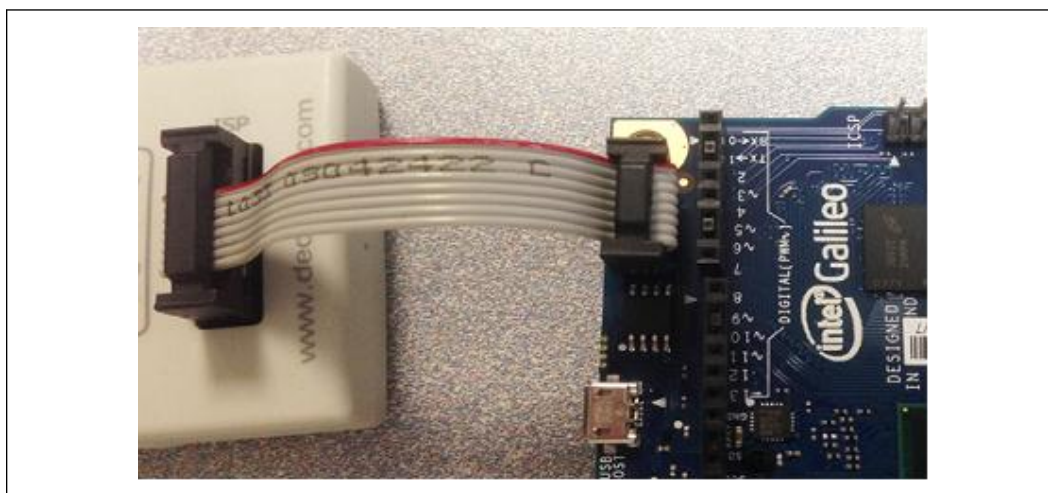
1. Install the DediProg software on the Host System.
2. Disconnect the power supply from the Target Device.
3. Identify the 7-pin SPI header on the Target Device. See the red arrow in the figure below.

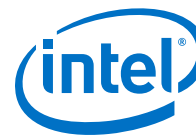
**Figure 61. DediProg Header on the Target Device**



4. Connect the DediProg to the Target Device as shown in the figure below.

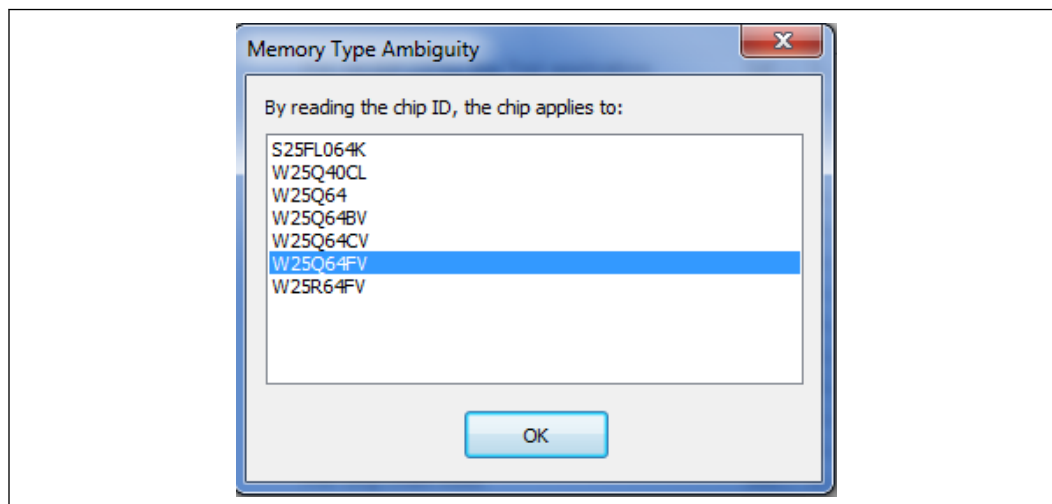
**Figure 62. Connection from DediProg to Target Device**





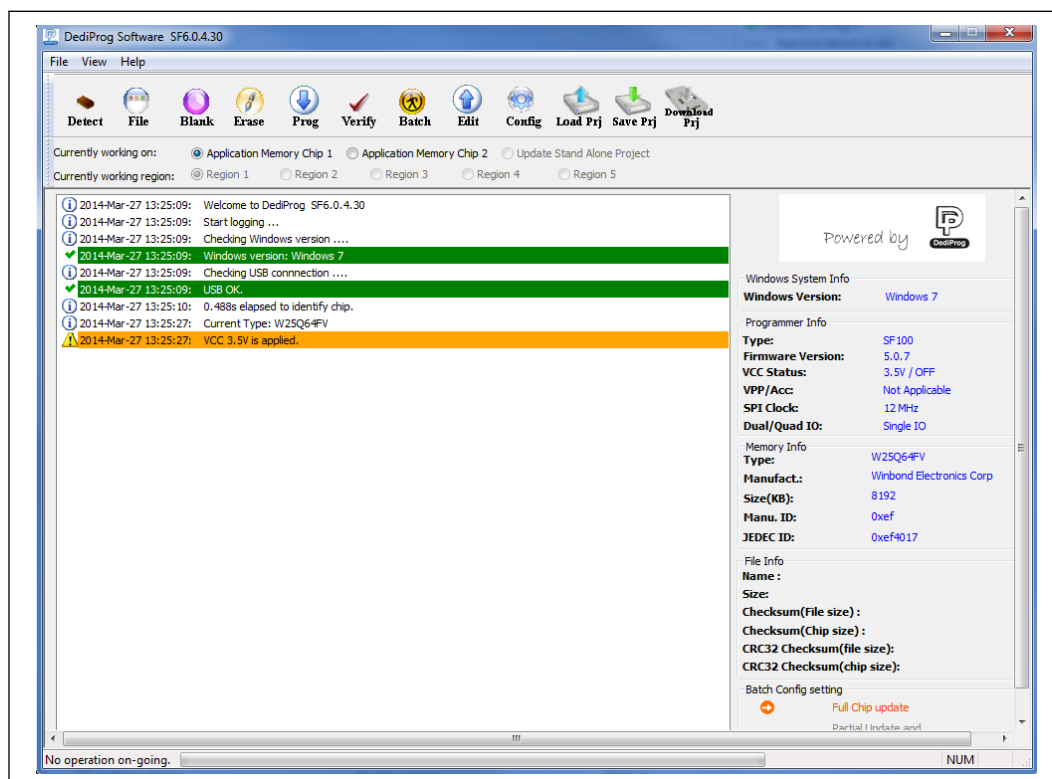
5. Plug in the USB connection of the DediProg Flash Programmer to the Host System. You will see a message similar to the following figure. Select **W25Q64FV** and click **OK**.

**Figure 63. Flash Memory Selection**



The DediProg GUI starts as shown:

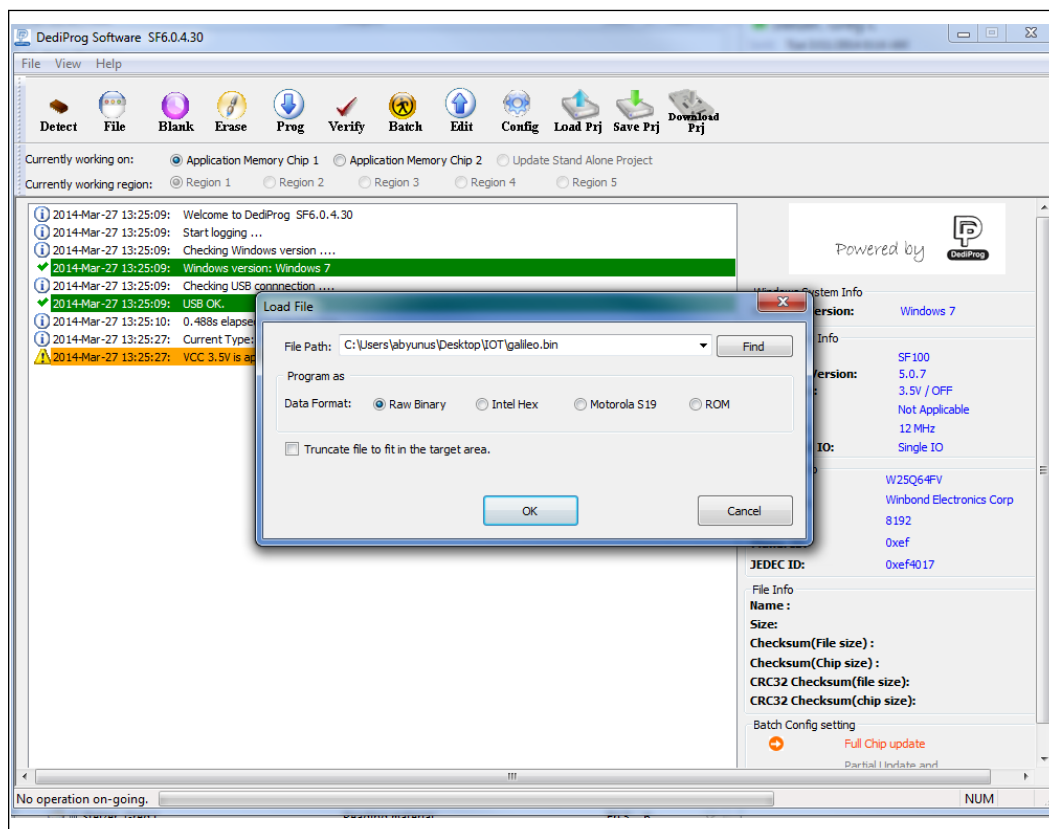
**Figure 64. DediProg Programming Software Graphical User Interface (GUI)**

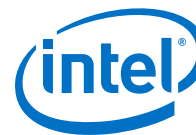




6. Save a copy of the existing firmware. See [Firmware Backup with DediProg](#) on page 69
7. Click **File**.
8. Select the binary image that you want to flash. The figure below shows the file `galileo.bin` is selected. Click **OK**.

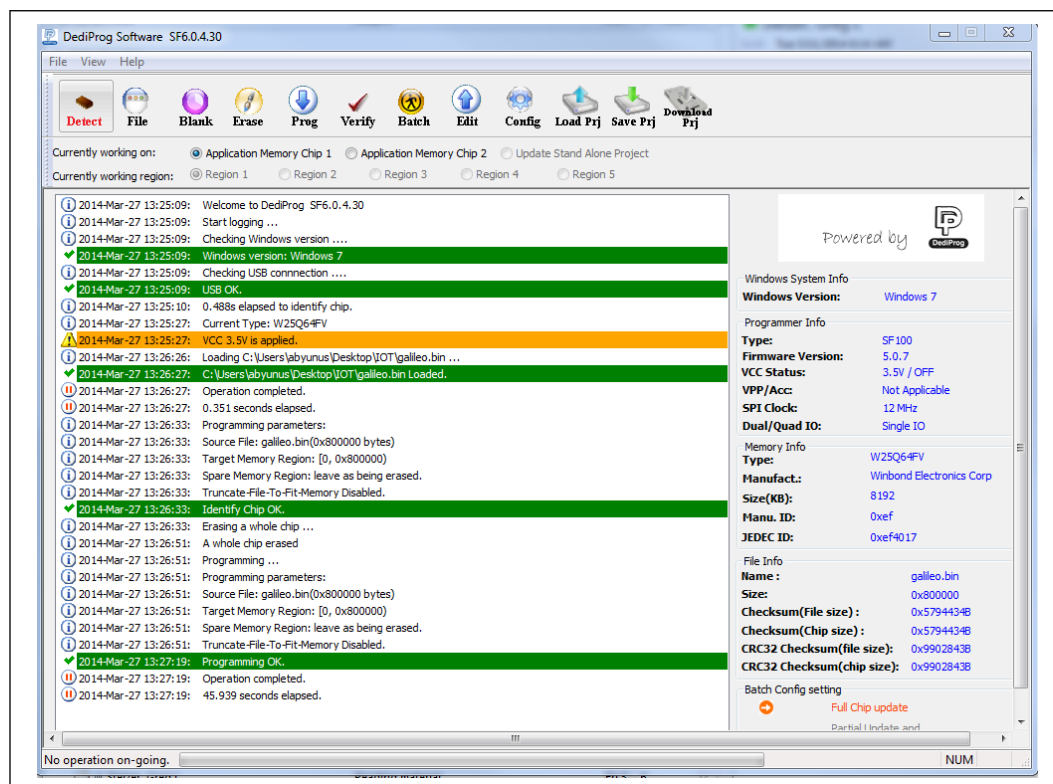
**Figure 65. Load File Dialog**





9. Click **Batch** to begin the programming. an 8 MB file will take about 45 seconds to complete. See the following figure:

**Figure 66. DediProg Programming Complete**



10. Disconnect the USB cable from the Host System.
11. Disconnect the DediProg cable from the Target Device Header.



## Appendix F Triage Tool

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The Triage Tool is a set of shell scripts designed to collect customer's hardware and software information for efficient issue debugging. One set of scripts is for the host development environment and second set of scripts is for the Target Device. The scripts know the location of information, such as log files, and they know the commands to run to gather the details. The output is a compressed tar file that can be provided to Intel's support team for quick issue resolution. Attach your Triage Tool outputs to Intel® Premier Support issues for faster resolution.

### Host System Location and Usage

On your Host System, the script is in the project directory. The example below shows the usage. In the example:

- `-i <install dir>` is the path to Wind River Intelligent Device Platform installation directory
- `-b <Project>` is the path to where you build your project, such as `$HOME/Project`

```
$HOME/Project$ sudo sh ./trriage_tool_host.sh -i <install dir> -b <Project>
```

The output is a tar file in your current working directory.

### Target Device Location and Usage

On the Target Device the script is in the `/root/examples` directory. The example below shows the usage:

```
root@WR-IntelligentDevice:~/examples# ./trriage_tool_target.sh
```

The output is a tar file in your current working directory.



## Appendix G Installing and Configuring PuTTY

This section guides you through installing and configuring a Secured Shell (SSH) / Telnet network protocol utility, named PuTTY. PuTTY is an open source virtual terminal that is available in the Ubuntu 14.04 release.

1. From your Host System \$HOME command prompt type the following command to install PuTTY.

*Note:* PuTTY is also available from <http://ubuntu.com>

```
sudo apt-get install putty
```

2. Type your password at the prompt: [sudo] password for [username]
3. Type `y` at the prompt: Do you want to continue [Y/n]?

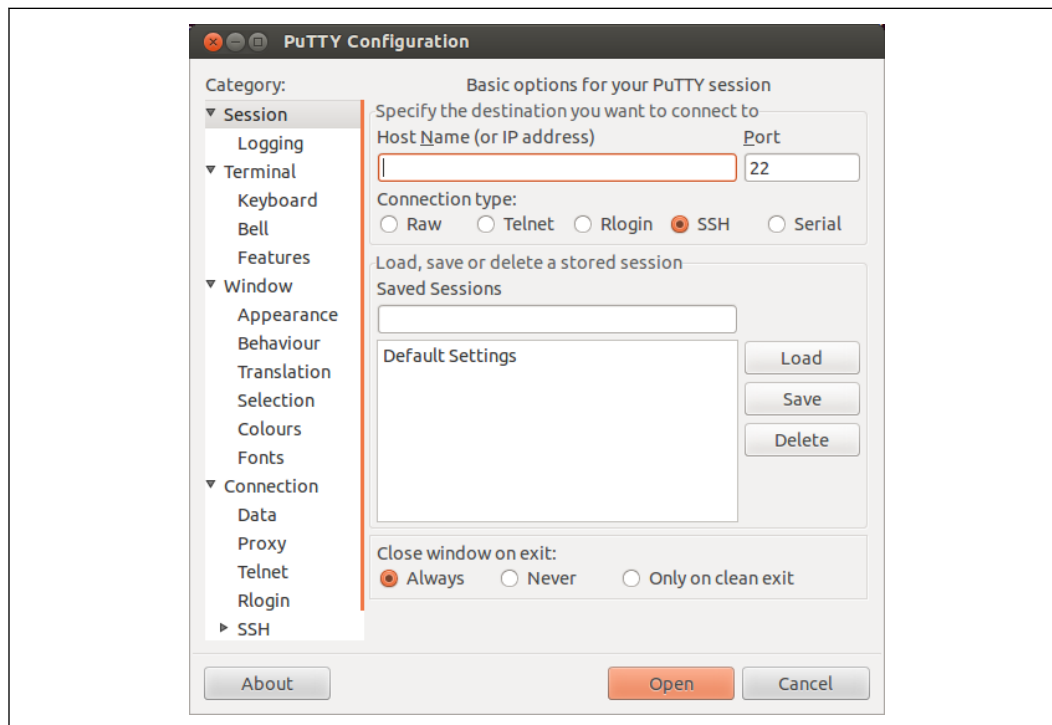
### Starting and Configuring PuTTY

1. From your Host System \$HOME command prompt, start PuTTY:

```
putty
```

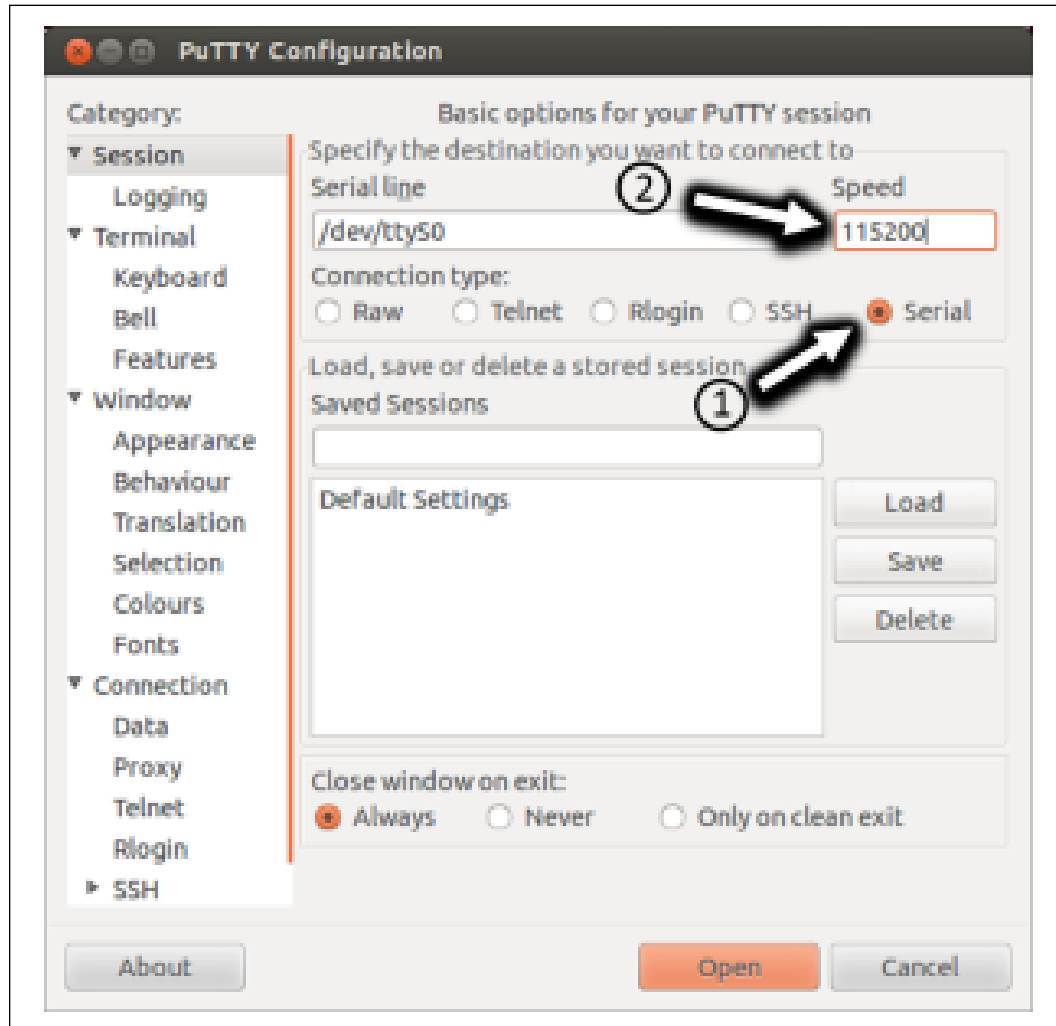
The PuTTY Configuration screen is displayed, as shown below:

**Figure 67. PuTTY Configuration Screen**



2. Make the following changes on this screen:
  - Change **Connection type** to **Serial**. See number 1 in the following figure.
  - Change **Speed** to **115200**. This option will be available after you change the Connection type to Serial. See number 2 in the following figure.

**Figure 68. Change to Serial with Speed of 115200**

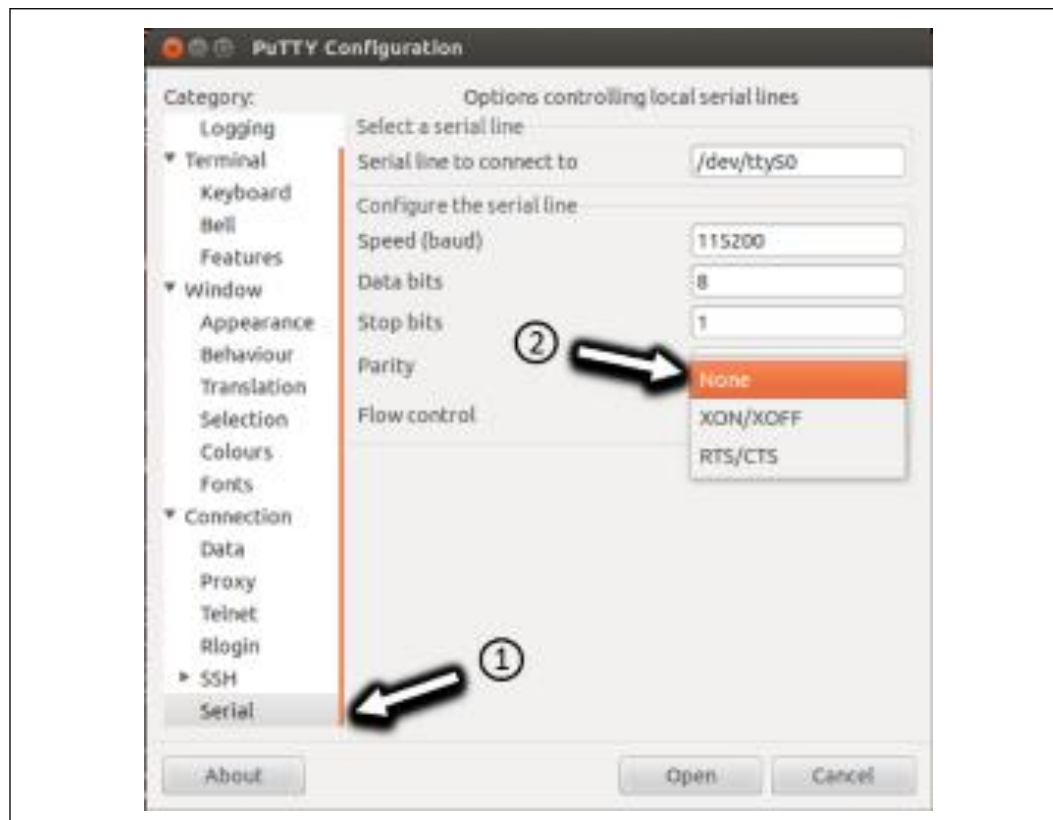






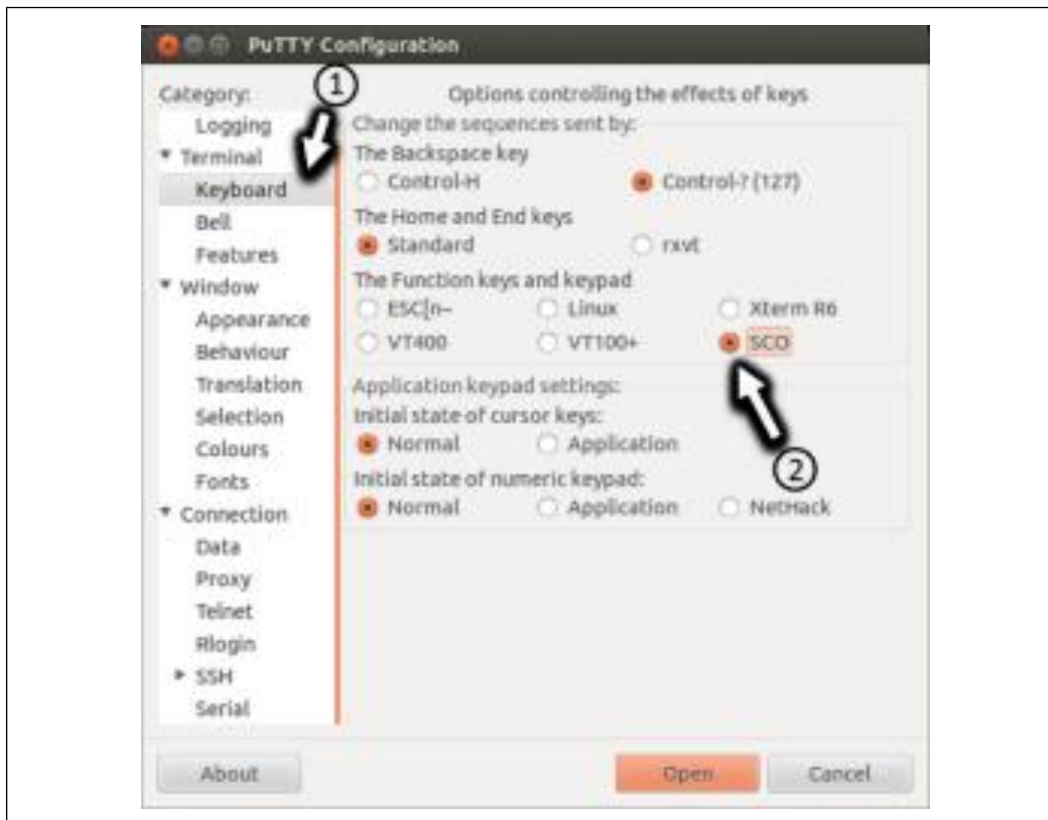
3. Under the **Category** menu on the left side of your screen, select **Serial** and change the **Flow control** to **None**. See number 1 and 2 in the following figure:

**Figure 69. Change Flow Control**



4. Under the **Category** menu on the left side of your screen, select **Keyboard** and change the **Function keys and keypad** to **SCO**. See number 1 and 2 in the following figure:

**Figure 70. Change to SCO Function Keys**

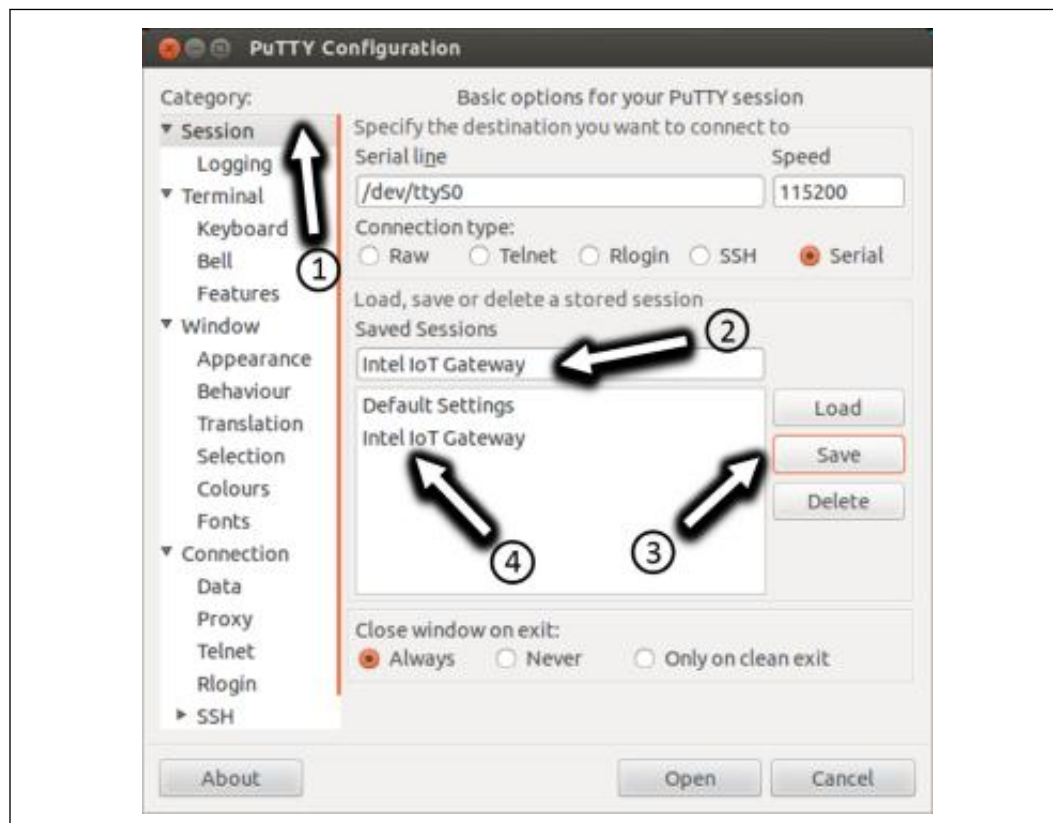




### Saving a Session

1. Under the **Category** menu on the left side of your screen, select **Session**. Name your session as **Intel IoT Gateway**, and then click **Save**. Your session name will be displayed in the **Saved Sessions** list. See the numbered items in the following figure.

**Figure 71. Save Settings**



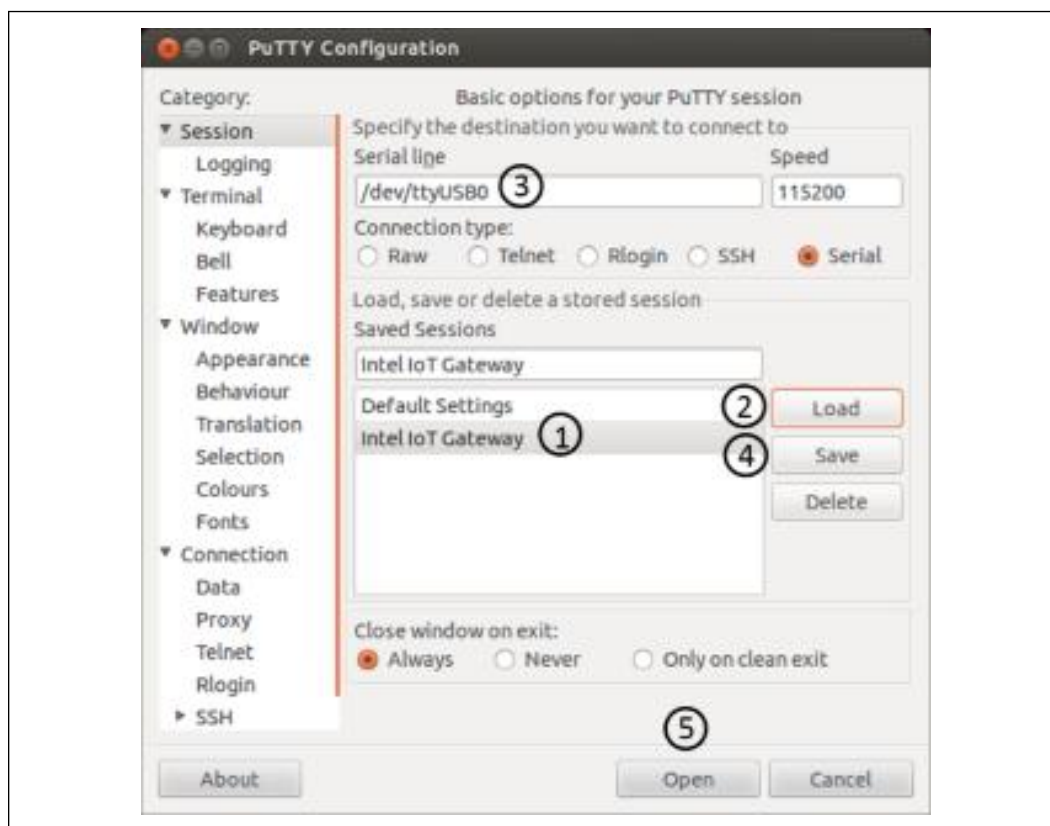
2. Click **Cancel** to return to your Host Development System command prompt.

## Loading Saved Session

This section guides you through loading the Intel IoT Gateway session.

1. Click **Intel IoT Gateway** under **Saved Sessions**. See number 1 in the following figure.
2. Click **Load** to display the Intel IoT Gateway settings. See number 2 in the figure.
3. Change the **Serial line** to **/dev/ttyUSB0** and then click Save. See numbers 3 and 4 in the figure.
4. Click **Open** to open a PuTTY Virtual Terminal session. See number 5 in the figure.

**Figure 72. Update Session with Correct tty Port**



A PuTTY Virtual Terminal session displays as a black screen with a cursor in the upper left corner.



## Appendix H Troubleshooting

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The errata for this version of the platform are shown in the following table.

**Table 5. Target Device Errata**

Errata Description	Workaround
The Wi-Fi Access Point or Ethernet WAN interface may exhibit functional instability when loaded with concurrent traffic from multiple Wi-Fi and/or Ethernet clients.	Fixed in Wind River® Intelligent Device Platform XT 2.0.4 (March 2015)