Speedway® Revolution Embedded Development Kit

Installation Guide

REV 2.0 2010-07-15

www.impinj.com

Table of Contents

1 Introduction

The Impinj Speedway Revolution® Embedded Developers Kit® (EDK) provides the tools and environment to develop embedded applications for Speedway Revolution. The EDK® provides a unified environment where programmers can create, build, test, debug, and deploy C++ embedded applications for Revolution based Readers from their host windows® PC.

Configuring an environment for embedded development is sometimes difficult and time consuming. The Linux® environment required for Speedway Revolution is not readily available in many Windows-based enterprises. The Impinj Revolution EDK is delivered as a Linux virtual machine (VM) to simplify this task. The Impinj Revolution EDK includes a Linux environment with all the open source and proprietary tools required to build embedded Revolution Applications.

The EDK VM is an implementation of an x86® CentOS® Linux® PC. The VM runs entirely within the Operating System environment of the host PC via a VM application like VMware Player®. This enables you to use your host platform while simultaneously running the VM to access the custom platform required for Speedway Revolution development.

2 Prerequisites

Confirm that you have the appropriate pre-requisites **before** beginning the EDK installation. The EDK requires:

- Experience with C and C++ programming
- Experience with Linux/Unix programming
- Window 7® or Windows XP® Operating System
- Minimum 6 GB free disk space, 8 GB recommended
- Minimum 2 GB RAM, 3 GB RAM recommended
- An Impinj Customer/Partner Account to download the EDK components, and supplemental material. To obtain an Impinj Customer/Partner Account, visit http://support.impinj.com.

2.1 Host PC Required Components

The following software components are required to install and run the Revolution EDK. Install the following components **before** beginning the EDK installation:

- **Your Host PC must be hooked up to a working Ethernet network**. We recommend disabling WiFi on your host when running the VM.
- **VMware Player 3.0 or later** —VMware player provides the VM environment in which the EDK executes. Download the latest VMware player at http://www.vmware.com/products/player/. Visit http://www.vmware.com/pdf/GuestOS_guide.pdf for detailed instructions on VMware player installation.
- **A zip file compatible archive tool—**The Revolution EDK comes as an archived folder and requires an archive extraction tool to unpack its contents.

2.2 Host PC Supplemental Components

The following components are recommended, but not required, when developing an embedded application using the Revolution EDK:

- **Impinj Multi-reader Application** — Multi-reader is Impinj's test and evaluation tool for Speedway readers. It may be helpful during application development to evaluate the reader performance and settings. The installer for the latest version of the Impinj Multi-reader application is available at http://revolution.impinj.com/MultiReader_6_4_0.zip.
- **A Telnet or SSH client**—It is best to have a telnet and/or ssh client for communicating with the reader from the **host PC**. Downloaded a suitable ssh/telnet client to improve reader-host communication.

3 Installing

The Revolution EDK download is available via http://revolution.impinj.com/EDK/. The download file is larger than 1 GByte and may take 30 minutes or more depending on your internet connection speed.

3.1 Extract Files

Extract the downloaded files from the .zip archive using WinZip® or other archive extraction tool. Figure 1 displays the EDK zip file opened with WinZip®. Figure 2 displays the extraction with the native Windows archive utility.

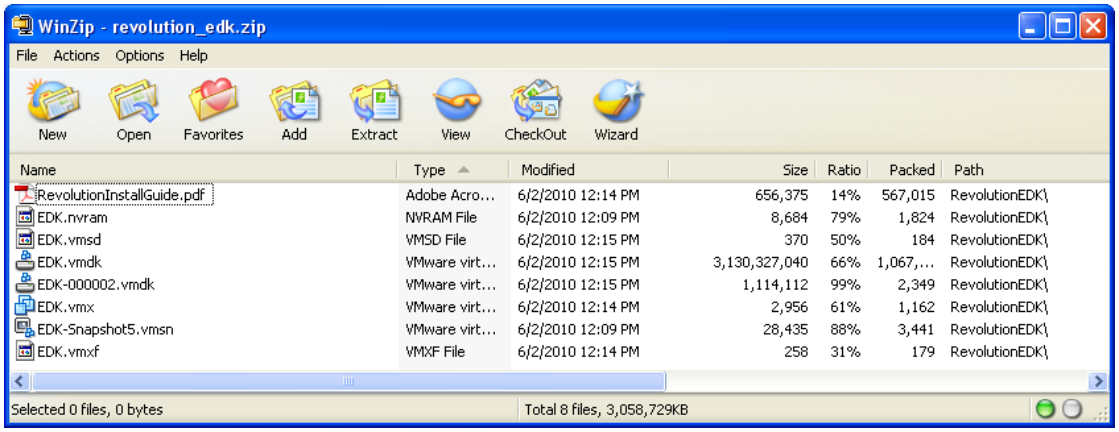

Figure 1 EDK Archive File (Winzip)

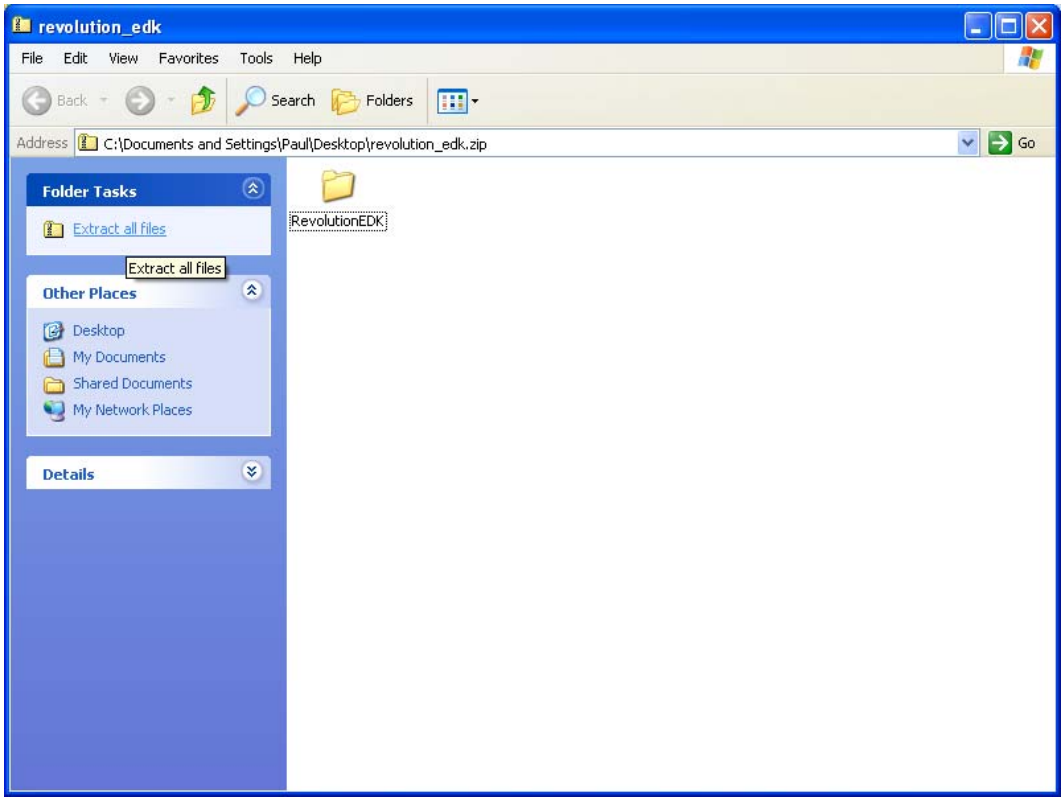

Figure 2 EDK Archive File (Windows)

1. Extract **all** the files, complete with folder names, onto your PC hard drive. VMware recommends extracting the files into the '**`My Documents\My Virtual Machines`**' directory. Figure 3 shows the extraction dialog in WinZip. Figure 4Figure 3 shows the extraction dialog in the native windows archive utility. The files include the VM configuration (*.vmx) and the set of virtual disks (*.vmdk) and the snapshot files (EDK-Snapshot*.vmsn). All of these files are required for proper VM operation. Snapshot files contain VM snapshots for restoring the VM to a known state (see Section 7.1.2.2).

   ***NOTE**: Be sure to check "Use Folder Names".*

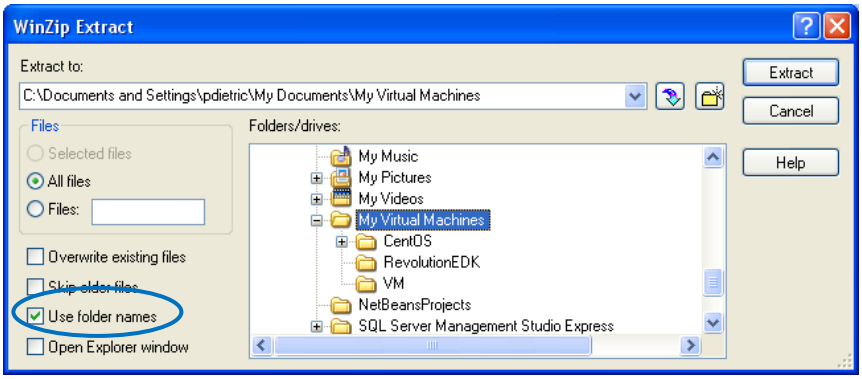

Figure 3 Select EDK Unzip Location (Winzip)

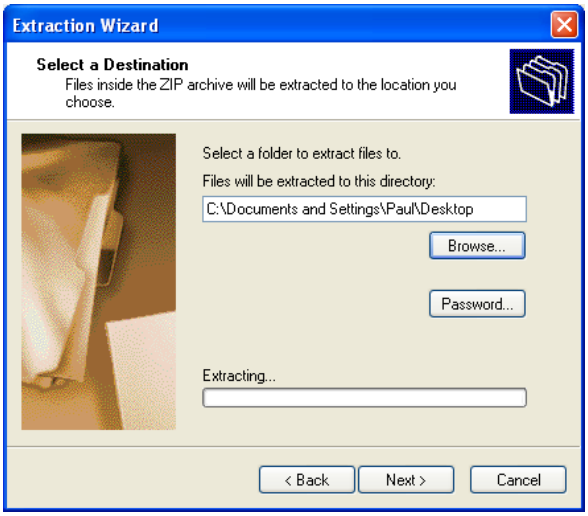

Figure 4 Select EDK Unzip Location (Windows)

2. Extracting may take a few moments. Wait until the dialog in Figure 5 is complete.

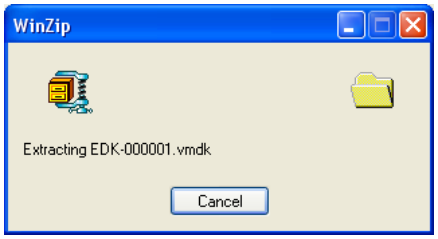

Figure 5: EDK File Extraction

4 Opening

1. Launch VMware Player® via the Windows® start menu or type **`vmplayer`** into the Start→Run dialog box as shown in Figure 6.

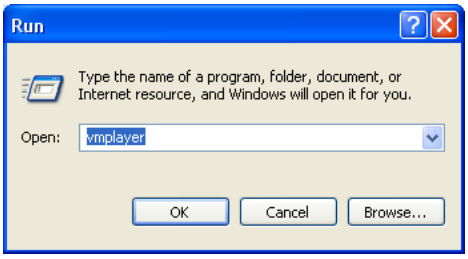

Figure 6: Running VMPlayer

The VMware player start screen (Figure 7) displays.

2. Select **Open a Virtual Machine**.

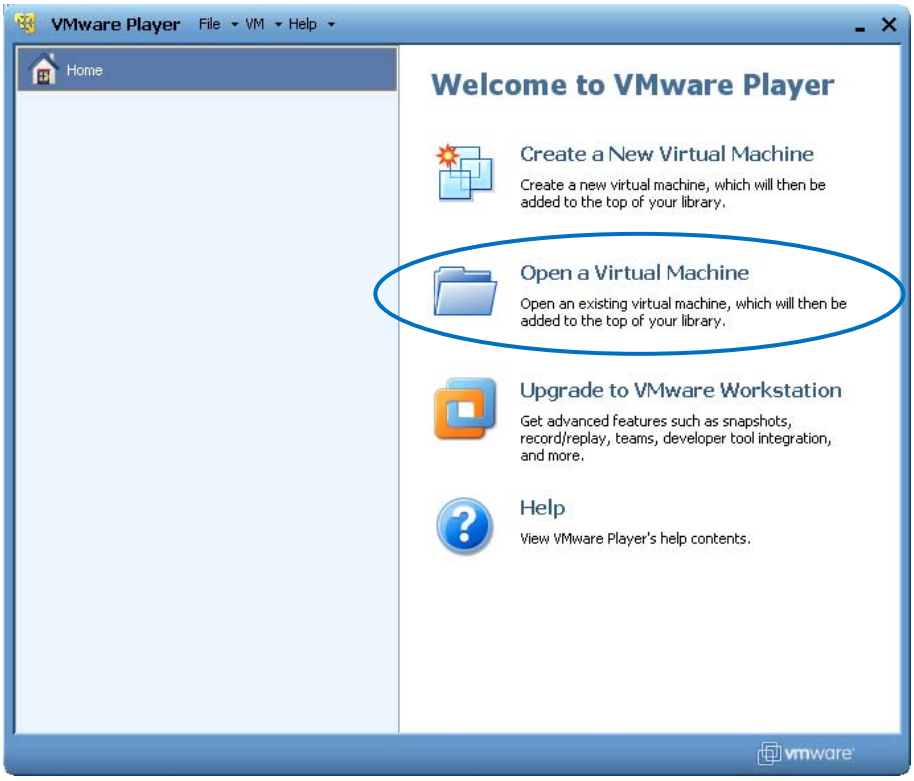

Figure 7: Starting VMWare Player

3. Browse for the EDK VM files in the Open dialog box. These are the Revolution EDK files you installed in Section 3.

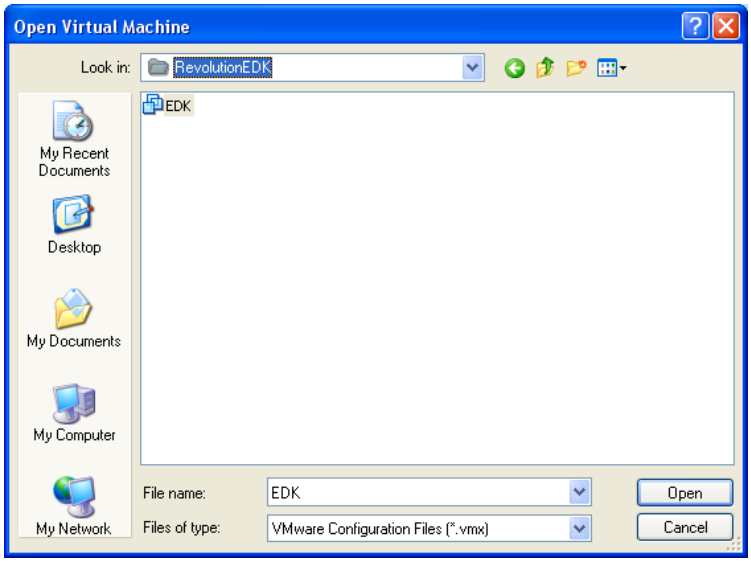

Figure 8: Opening a Virtual Machine

VMware will read the Revolution EDK VM files and give you information on the EDK VM as shown in Figure 9.

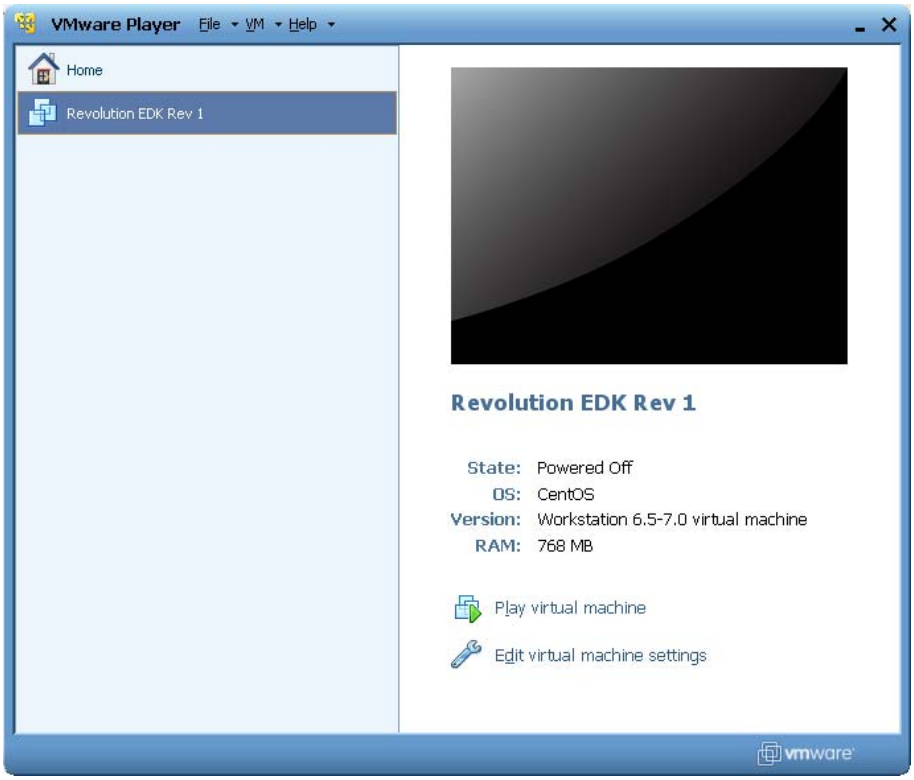

Figure 9: Virtual Machine

***NOTE**: In new installations of VMware, the player may ask you to install the VMware tools as shown in Figure 10 below:*

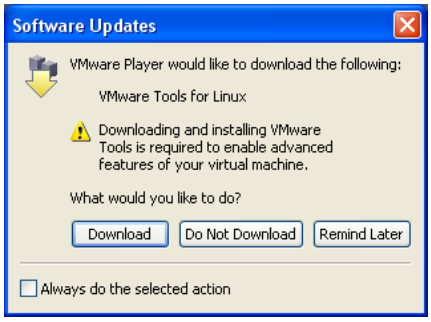

Figure 10: VMWare Tools for Linux

VMware tools are already installed in the Revolution VM. This dialog prompts you to install tools on your host PC.

4. Choose **Do Not Download**.
5. Check **Always do the selected actions**.

5 Running

To start the EDK VM

1. Select The Revolution EDK VM from the list of VMs in the upper left.
2. Select **play Virtual Machine** on the screen as shown in Figure 9.

Figure 11: Virtual Machine Booting

Linux starts with a few warning message as shown in Figure 12. These can be ignored.

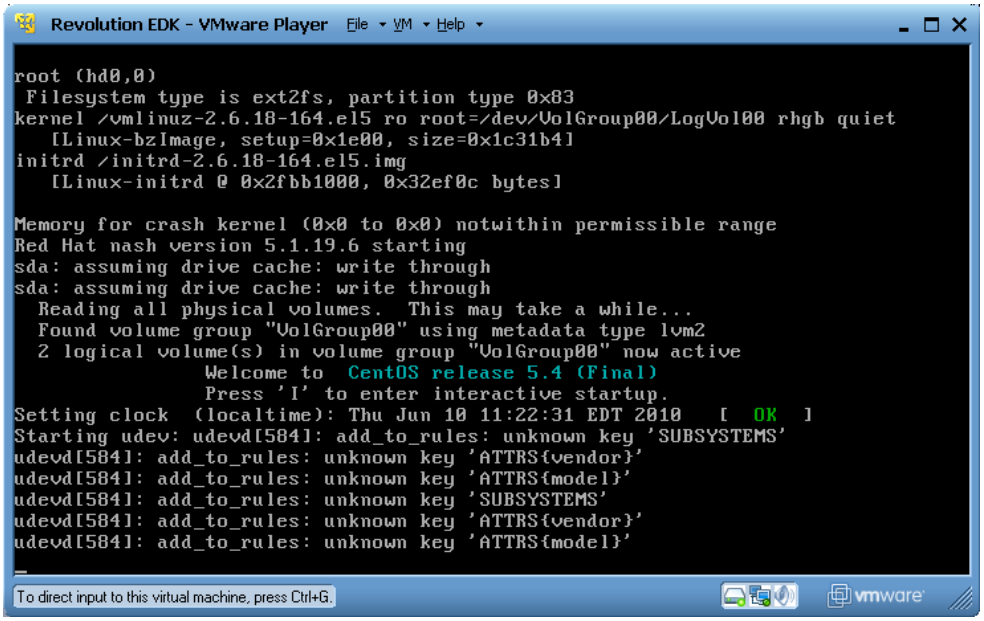

Figure 12: Linux Warning Messages

The machine will take a few minutes to boot. When complete, the user login screen displays as shown in Figure 13.

Figure 13: Virtual Machine Login

Figure 14 displays the user names and passwords for the accounts available on the Revolution EDK.

Figure 14: Revolution EDK User Accounts

Revolution EDK Login	Revolution EDK Password	Comments
revolution	(no Password)	Use this account for development and testing of your Revolution applications.
root	edk	Use this account for updating EDK software or configuring new services.

1. Type the "**revolution**" user name in the username dialog box to Log in (Figure 1).
2. Press **enter**. After a few seconds, the workspace for user "revolution" will display (Figure 15).

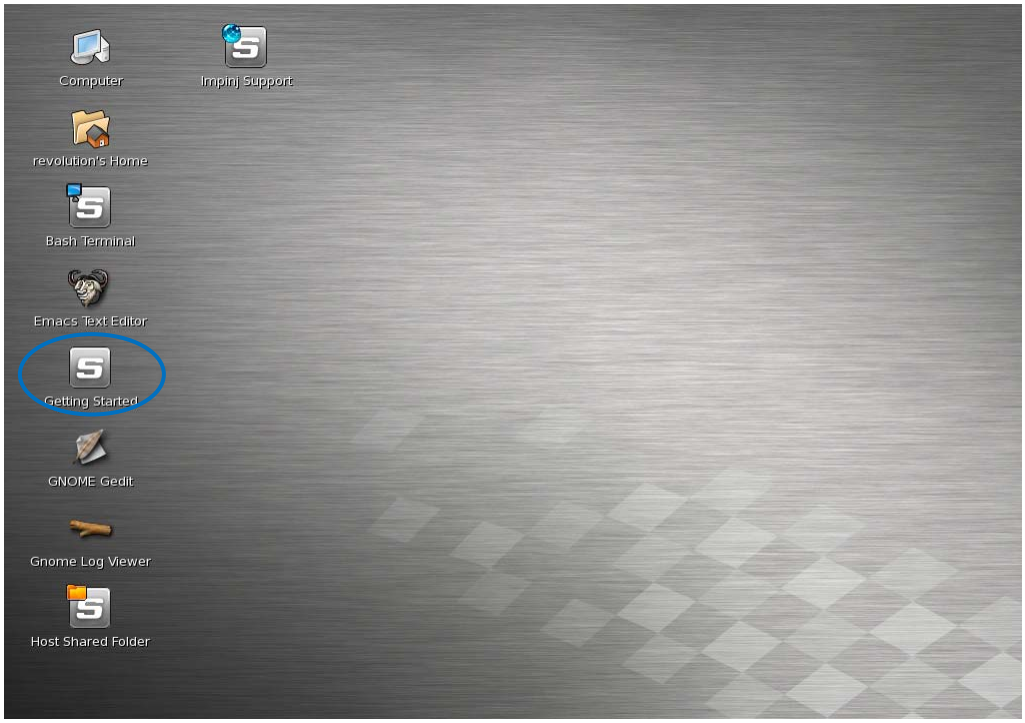

Figure 15: Revolution Desktop

Congratulations! You are now ready to develop applications for the Speedway Revolution reader family.

6 Develop Applications

1. Open the “Getting Started” desktop icon to begin development.
2. Follow the instructions on the web page to begin your embedded application development.

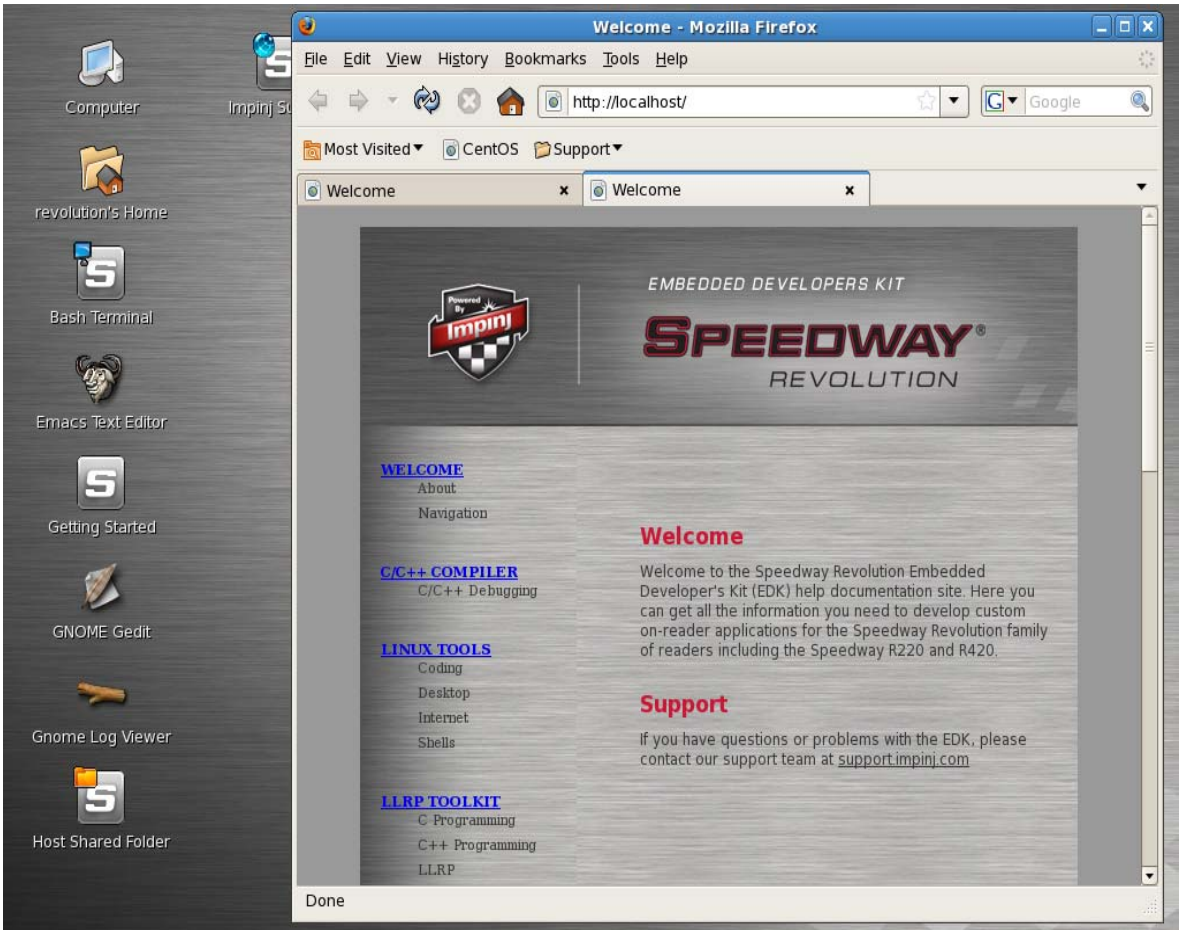

Figure 16: Revolution Web Documentation

7 Advanced Installation/Configuration

7.1.1 Adjusting the VM Screen Resolution

Before starting the VM, it may be helpful to adjust the video display size and other VMware settings for your host PC. Shut down the VM before adjusting the screen resolution.

1. Select **settings** from the “VM” Menu in Figure 9 or select “Edit Virtual Machine Settings”. This opens the settings dialog for this VM as shown in Figure 17.

2. Set the display size of the EDK VM to match your development preferences.(Default settings are typically adequate.)

   If you want to run the VM in **full screen mode**, set your VM display resolution **equal to the host** PC resolution

   If you want to run the VM **within a window**, set your VM display resolution **slightly smaller than host** PC resolution.

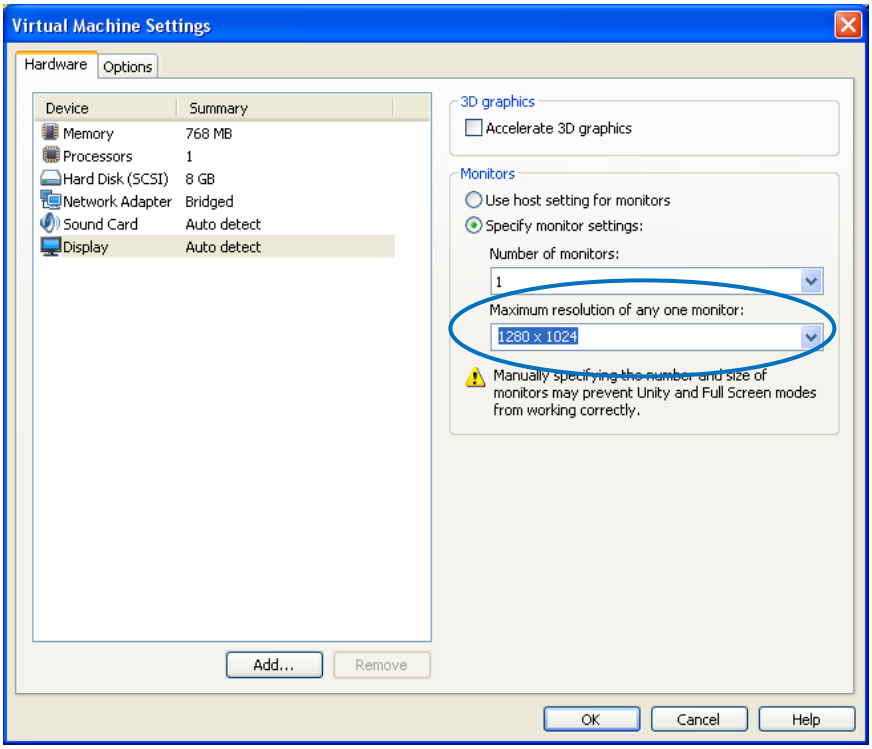

Figure 17: Virtual Machine Settings

7.1.2 Restoring your EDK VM to Factory Configuration

The Revolution EDK ships with a VM Snapshot, an exact image of the VM when it leaves the factory at Impinj. Changes you make to your copy of the EDK are persistent. That is, the next time you power up your VM, any changes you've made will still be available.

If your EDK VM becomes unusable or unstable due to changes made, you have several options. **Save the work from your old VM onto the shared folder, network or other disk before using any of the following options. Restoring your VM to factory defaults will cause loss of data.**

7.1.2.1 Download a new copy of the VM

Visit the Impinj support portal and download a new copy of the VM. You can overwrite or delete the old VM once your changes have been saved.

7.1.2.2 Install VMware Workstation

VMware Workstations allows you to quickly revert a VM back to one of its saved snapshots. This has the same effect as downloading a new EDK VM and is faster. In addition, you can make your own snapshots to revert to known working configurations.

7.1.3 Installing multiple EDK versions on one host machine

It is simple and possible to install multiple VMs on the same host PC. For example, one may want to install multiple VMs to simultaneously develop with multiple versions of the EDK tools to support different embedded application products in different stages of their lifecycle. Follow the

instructions above for each EDK VM with one exception. Each VM **must** be installed in its own directory.

VMware Player allows only one running VM at any given time. If you require more than one active VM on a single host, consider installing VMware Workstation®. **You must change the hostname of one of your EDKs.** See Section 137.1.5 for instructions.

***NOTE**: All VMs will share the same work folder with the host PC.*

7.1.4 Installing multiple EDKs on different host machines

Installing multiple VMs on the same network is simple. Follow the instructions above for each EDK VM. VMware Player will assign each VM its own unique network MAC address. However, you will have to manually change the hostname of the EDK so conflict does not occur on your network. See Section 137.1.5 for instructions.

7.1.5 Changing the EDK hostname

Do not use the **`hostname`** command to change the system hostname. Use the procedure below also shown in Figure 18.

1. Log into the system as **root** or from a terminal, type **su root** and enter the password**.**
2. Edit file **`/etc/sysconfig/network`** from the terminal using an editor (e.g. **`gedit`**).
3. Change **`HOSTNAME=RevolutionEDK`** to **`HOSTNAME=YourNewName.`**
4. Save the file and reboot the VM.

***NOTE:** Hostnames can only contain letters, numbers and the '-' character. Your hostname should be shorter than 22 characters and cannot start with a '-'.*

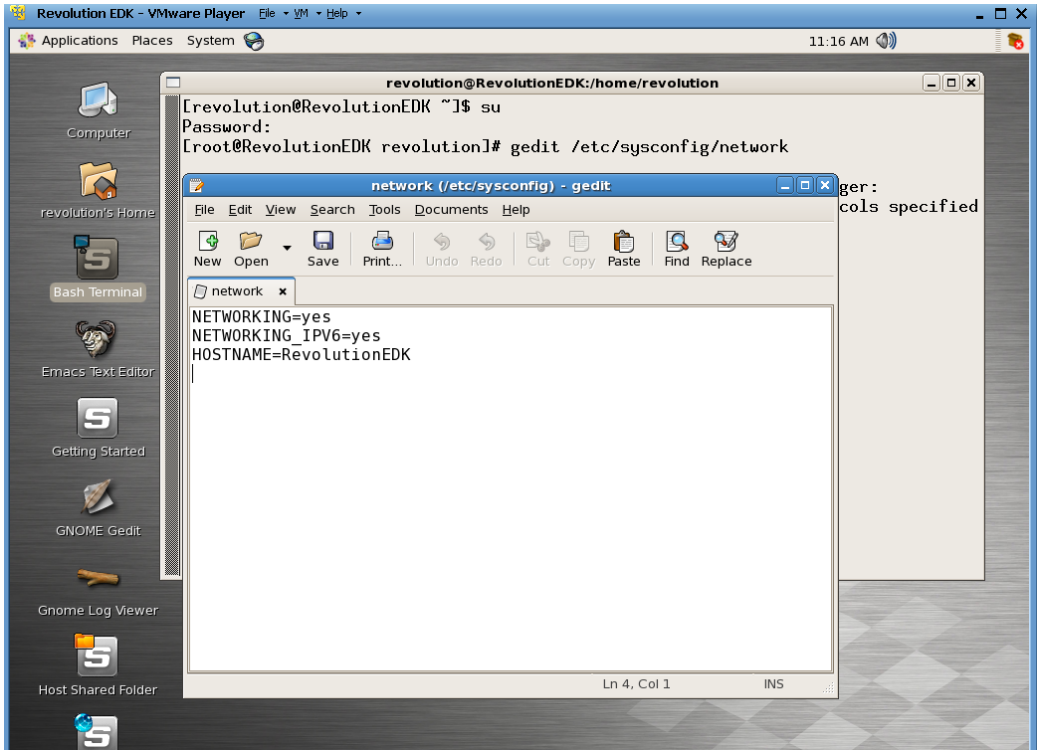

Figure 18: Changing System Hostname

7.1.6 Enabling Serial Port Access by the EDK VM

Communicating directly with the Speedway Revolution reader via serial port can be useful. To minimize impact on the host system, the EDK VM does not use the host serial port by default. See the VMware Workstation user manual for enabling serial ports.

7.1.7 Enabling CD-ROM Access by the EDK VM

Transferring files to the VM via a CD-ROM drive directly can be useful. The EDK VM does not use the host CD-ROM drive by default to minimize impact on the host system. See the VMware Workstation user manual for enabling CD-ROM access.

7.1.8 Enabling USB Access by the EDK VM

Sometimes it is useful to transfer files to the VM via a USB flash drive directly. By default, the EDK VM does not use the host PCs USB port to minimize impact on the host system. For enabling USB access, see the VMware Workstation user manual.

7.1.9 Creating a shared folder between the EDK VM and Host

Creating shared folders between the EDK VM and the host PC is helpful. For mechanisms to share folders between the VM and the host PC, see the VMware Workstation user manual.

8 Revision History

Date	Revision	Comments
04/13/2010	1.0	Draft Release
04/26/2010	1.1	First edit
6/10/2010	1.2	Edits from FAE Workshop
7/15/2010	2.0.0	Final Revision to Accompany EDK 2.0.0.240

Notices: