
Quick Start Guide

December 2011


Introduction

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## Revision History

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<tr>
<td>326555</td>
<td>001</td>
<td>Initial release.</td>
<td>December 2011</td>
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1 Introduction

This document provides guidance for installing Microsoft* Windows* 7 and Windows Embedded Standard 7 operating systems on platforms based on the Intel® Atom™ Processor Z670 (or Z650) with Intel® SM35 Express Chipset. This document also gives step-by-step instructions on where to download the chipset, I2C, wireless and graphics driver package from Intel and how to properly install the GMA600 graphics and chipset drivers from Intel under the aforementioned Microsoft operating systems.

The information in this document has been validated with the Intel Customer Reference Board (CRB), codenamed 'Alpine Bay', which is included in the Intel Atom Processor Z670 (or Z650) with Intel SM35 Express Chipset Development Kit. However, the recommendations in this quick start guide are applicable to any Intel platform integrating the Intel Atom Processor Z670 (or Z650) paired with Intel SM35 Express Chipset (codenamed 'Oak Trail') and based on Windows 7 or Windows Embedded Standard 7.

For customers evaluating or using the Development Kit as a basis for their embedded design, and Windows 7 or Windows Embedded Standard 7 as their operating system, this document is the primary guidance Intel provides for installing the drivers and operating system to deliver optimized performance.

Three additional and crucial components are common in an Intel Atom Processor Z670 (or Z650) with Intel SM35 Express Chipset design: one or two ranks of DDR2-800 memory devices, an embedded controller (the Nuvoton* NPCE791EA0DX is highly recommended) and a Power Management IC (PMIC) solution. The following block diagram shows the Intel Atom Processor Z670/Z650 with Intel SM35 Express Chipset hardware platform and device options:
Notes:

1. Validated DDR2-800 memory devices can be found in the Intel® Atom™ Processor Z670/Z650 with Intel® SM35 Express Chipset-Based Platform Third-Party-Validated DDR-800 Memory Components Technical Advisory posted here: http://edc.intel.com/Link.aspx?id=5347

2. Details on the Nuvoton NPCE971EA0DX embedded controller and firmware required for it can be found in the Intel® Atom™ Processor Z670/Z650 with Intel® SM35 Express Chipset-Based Platform BIOS Development Vendors and Contacts Application Note posted here: http://edc.intel.com/Link.aspx?id=5744
The following table explains terms used in this document.

### Acronyms and Terminology

<table>
<thead>
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<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>CRB</td>
<td>Customer Reference Board (e.g., ‘Alpine Bay’ or ‘Fox Lake’ that includes the Intel® Atom™ Processor Z670 or Z650 along with the Intel® SM35 Express Chipset and many third-party components described in this document); also known as the Reference Validation Platform (RVP)</td>
</tr>
<tr>
<td>GMA600</td>
<td>Intel graphics driver that supports 2D/3D graphics and video playback from the PowerVR® SGX535 core inside the Intel® Atom™ Processor Z670 (or Z650). The GMA600 driver is the official graphics driver for this platform when using MeeGo 1.2, Windows 7, Windows Embedded Standard 7 or Android Honeycomb.</td>
</tr>
<tr>
<td>ISO</td>
<td>File system format defined by the International Standards Organization in Standard 9660 used to store directory and file structures on CDs or DVDs. Often used to refer to a file in that format without using the standard number.</td>
</tr>
<tr>
<td>SATA</td>
<td>Serial Advanced Technology Attachment. Bus interface used by the chipset for connecting to mass storage devices such as a hard disk or SSD.</td>
</tr>
<tr>
<td>SP</td>
<td>Service Pack. This is typically a Windows software update downloaded from the Internet that helps make the Windows operating system more reliable.</td>
</tr>
<tr>
<td>SSD</td>
<td>Solid State Drive. Platforms based on the Intel® Atom™ Processor Z670 often incorporate a 40 GB Intel® Z-U130 USB Solid-State Drive or similar SSD for memory storage.</td>
</tr>
<tr>
<td>TGZ</td>
<td>Tar GZip’ed file. Tar is the tape archiving program, so called because it stores files and directory structures in a single, sequentially written file suitable for output to a tape drive. When the tar file is compressed using the gzip program the file is typically given the suffix “tgz” to signify its format for future extraction requirements.</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
<tr>
<td>WES7</td>
<td>Windows Embedded Standard 7. This is a Windows 7 compatible operating system from Microsoft.</td>
</tr>
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2 Installing Windows* 7 and Intel Drivers

Windows 7 is the 2009 release of Microsoft Windows which is a series of operating systems produced by Microsoft for use on all different types of personal computers, including home and business desktops, laptops, netbooks, tablet PCs, and media center PCs. Windows 7 reached general retail availability in Q4 2009.

Windows 7 is an officially supported operating system for platforms based on the Intel® Atom™ Processor Z670 (or Z650) and Intel® SM35 Express Chipset. Windows 7 Starter, Home Basic and Home Premium are the most preferred versions of this operating system for this platform but Windows 7 Ultimate, and Enterprise are also supported. Note that Ultimate and Enterprise are Windows 7 operating system versions that utilize Aero and thus may experience some performance limitations since Aero may not be fully implemented on Intel Atom based platforms.

Note: Three additional plan of record operating systems exist for this platform as well: Android Honeycomb, MeeGo 1.2 and Windows Embedded Standard 7 (see next section for how to download and install WES7 and related Intel drivers).

Hardware and software required for installation of Windows 7 and the drivers made by Intel on an ‘Oak Trail’ based platform include:

- Customer Platform containing Intel Atom Processor Z670 (or Z650) paired with Intel SM35 Express Chipset (codenamed ‘Oak Trail’) and most of the third-party silicon recommended by Intel
- 40 GB or larger SATA-compatible blank hard disk drive (HDD) or SSD
- USB DVD-ROM drive (or USB flash drive depending on how Microsoft Windows 7 is downloaded and installed)

[1] Installing Windows 7 onto the Target SSD/HDD

Windows 7 is a closed source platform that includes the kernel, core OS, UI libraries and tools, reference user experiences for multiple devices and applications, a standard set of APIs across all target device types, and the flexibility to support add-ons and applications. Since Windows 7 is the exclusive property of Microsoft, Intel cannot redistribute the OS with all the required drivers already integrated. You will need to obtain a valid copy of the Windows 7 operating system from Microsoft first. This document provides instructions for downloading and installing the Microsoft provided Windows 7 image and then provides directions to download, install and configure several platform-specific drivers. These drivers (provided by Intel) are a critical additional component to ensure the optimal platform performance. The purpose of this document is thus to provide the instructions necessary for download and create the
Microsoft Windows 7 operating system and then installing the drivers created by Intel for this platform under Windows 7.

First obtain a SATA based HDD or SSD (recommended size = 40 GB or more) and choose one of the following acceptable methods to install Windows 7 from scratch:

<table>
<thead>
<tr>
<th>If you want to do this:</th>
<th>Go here for more information:</th>
</tr>
</thead>
</table>
Follow the instructions under the “Using the Custom installation option and formatting the hard disk” topic. |
Follow the instructions under the “Using the Custom installation option if no operating system is installed” topic. |
Follow the instructions under the “Using a USB flash drive to install Windows 7” topic. |

NOTE: Instructions in the table above courtesy of Microsoft Corporation.

Once the SSD/HDD contains a fresh version of Windows 7, customers should download and install the latest service pack for your version of Windows from the Microsoft Service Pack Center.

A service pack (SP) is a Windows update, often integrating previously released updates, that helps make Windows more reliable. Service packs, which are provided free of charge by Microsoft, can include security and performance improvements and support for new types of hardware. Installing the latest service pack helps keep Windows 7 up to date.

The easiest way to get any necessary service packs is to use the target platform’s Windows 7 and turn on Windows Update for Windows 7. Step by step instructions on how to do this are posted here from Microsoft in their Learn how to install Windows 7 Service Pack 1 (SP1) section:

http://windows.microsoft.com/en-US/windows7/learn-how-to-install-windows-7-service-pack-1-sp1

As of December 2011, the most recent service pack available for manual download is R2 SP1 (Service Pack 1). Download Windows 7 R2 SP1 from the Microsoft Download Center here:


It is optional whether to turn on Automatic Updating or not. If you are creating a golden image for prototyping or production purposes, having explicit control over if and when operating system updates are done is most recommended.
[2] Downloading and installing Intel GMA600, chipset, processor, and I²C drivers on Windows 7 Based Platform

Though the standard Windows 7 operating system may contain several drivers compatible with the Intel® Atom™ Processor Z670 and/or Intel® SM35 Express Chipset, it is imperative that you install the most recent GMA600 graphics driver and SM35 Express Chipset drivers. These are included in the Intel® Graphics Media Accelerator (GMA) 600 for Windows 7* & Windows Embedded Standard 7* (32-bit) Software Package found on the Embedded Design Center here:


(On the Tools & Software tab, under the Software Downloads section)

- These drivers are also available in the same package format from [http://platformsw.intel.com](http://platformsw.intel.com); please see your Intel field representative for access.

This package provides the graphics and chipset (I²C and I/O are integrated into the chipset driver) drivers installable via executable files. When you have downloaded the package file to your target platform, if it is in ZIP format, extract the contents of the file using a file decompression program such as WinZip* or PKZip*.

**Installing the Intel® GMA600 Graphics Driver**

The extracted package will contain a file hierarchy contained within a directory as shown in Figure 1.
Navigate below the top level directory to find the directory entitled Windows 7 Graphics Driver and enter that directory. Inside is an installation readme text file, and an archive containing the driver installer, titled Win7.zip as shown in Figure 2.
Figure 2. Intel GMA 600 Windows 7 Directory Contents
Unzip this archive and run the Setup.exe program contained inside. Right-click on the executable and choose Run as Administrator as shown in Figure 3.

**Figure 3. Running the Intel GMA600 Graphics Driver Installer as Administrator**

Follow the onscreen prompts to install the driver.

**Installing the Intel® SM35 Express Chipset Drivers for HDMI and I2C**

As explained above, the extracted package will contain a file hierarchy contained within a directory. Navigate below the top level directory to find the directory entitled Intel Chipset Software Installation Utility and enter that directory. Inside is an installation readme text file, several other associated files, and a zipped archive titled infinst_autol.zip. Unzip this archive by choosing **Extract All...** as shown in Figure 4.
Figure 4. Extracting Intel SM35 Chipset Driver Files
Right click on the executable, called Setup, and choose **Run as Administrator** as shown in **Figure 5**.

**Figure 5. Running the Intel SM35 Chipset Driver Installer as Administrator**

Follow the on-screen prompts to install the chipset driver, which includes HDMI, I²C and I/O capabilities.
3 Installing Windows Embedded Standard 7 (WES7)* and Intel Drivers

Windows Embedded Standard 7, abbreviated WES7, is a Windows 7 compatible operating system from Microsoft designed specifically for use in embedded systems. With WES7 the software developer and system engineer have the ability to customize the operating system by selecting components they most need to run their advanced commercial and consumer devices and existing Windows applications and drivers.

Developers can use WES7 and the component selection menu built into it to create a custom, segment specific and highly space conscious operating system build for a variety of connected, and service-oriented advanced commercial or consumer devices. Examples include operating system customizations for set-top boxes, full featured point of service appliances, gaming devices, industrial controls, multimedia internet devices, kiosks, digital signage, monitoring devices, and thin clients.

According to Microsoft, Windows Embedded Standard 7 is based on Windows 7. WES7 includes Windows Vista and Windows 7 features such as Aero, SuperFetch, ReadyBoost, BitLocker Drive Encryption, Windows Firewall, Windows Defender, Address space layout randomization, Windows Presentation Foundation, Silverlight 2, and Windows Media Center among several other packages. Windows Embedded Standard 7 is x86 compatible and applications that run under Windows 7 should perform equivalently under WES7.

Hardware and software required for installation:

- Customer Platform containing Intel® Atom™ Processor Z670 (or Z650) paired with Intel® SM35 Express Chipset (codenamed ‘Oak Trail’) and most of the 3rd party silicon devices recommended by Intel
- 40 GB or larger SATA-compatible blank hard disk drive (HDD) or SSD
- USB DVD-ROM drive (or USB flash drive depending on how Microsoft Windows Embedded Standard 7 is downloaded and installed)
- Windows Embedded Standard 7 DVD Image

[1] Downloading, burning, and installing the WES7 DVD Image

A DVD image for Windows Embedded Standard 7 with registration instructions for trial and full licenses can be found at:

Download the image per the instructions provided by Microsoft on the page and burn to a DVD-R disc.

[2] Install WES7

Ensure that the hard disk or SSD to be used is not bootable to any operating system, and that the USB DVD-ROM drive is connected to your Atom Z670/Z650 platform.

1. Boot the system with the WES7 DVD-R you have created. Choose Build an Image as shown below.

2. Read and accept the license as shown below. Click Next.
WES7 allows you to choose from several pre-configured templates when creating your image. Each selection has a different set of driver support and potentially different look and feel for the user interface. The default is Application Compatibility, which installs many of the basic Windows applications (Media Player, Internet Explorer, etc.) and drivers necessary for broad application support with the default windows desktop look and feel. Intel recommends that you click **Use a template** on each as shown below.

The template view will show you a list of the applications, drivers, and feature packages offered by each template. An example of the Application Compatibility template view is shown below. When you are satisfied with your choice of template, click **Close**. Intel recommends that you thoroughly review each of the templates before clicking **Next**.
You may also choose Do not use a template to create your own customized image with only the drivers and features that you need for your specific product implementation. In that case, select the desired features that you need, and click Next.

3. Select your preferred language and keyboard region as shown below and click Next.
4. Select a disk install location as shown below. You may want to delete any existing partitions that appear in the list. If not, you can use an unallocated section or create one using the options. Note that you will likely need at least 8 GB of free space for an install depending on which image options and features you chose in [3] above. When you are finished, click **Next**.

5. The installation will run for several minutes. During this time, the system may restart a number of times.
6. When the install process completes, you will be presented with a login screen, where you can establish a user account and name for your system.

![Login Screen](image)

[3] Downloading and Installing the Intel Drivers

Though the standard Windows Embedded Standard 7 operating system may contain several drivers compatible with the Intel® Atom™ Processor Z670 and/or Intel® SM35 Express Chipset it is imperative that you install the most recent GMA600 graphics driver and SM35 Express Chipset drivers. These are included in the Intel® Graphics Media Accelerator (GMA) 600 for Windows 7* and Windows Embedded Standard 7* (32-bit) Software Package found on the Embedded Design Center here:


These drivers are also available in the same package format from [http://platformsw.intel.com](http://platformsw.intel.com). If you need access, please see your Intel field representative to obtain access.

This package provides the graphics and chipset (I²C and I/O are integrated into the chipset driver) drivers installable via executable files. When you have downloaded the package file to your target platform, if it is in ZIP format, extract the contents of the file using a file decompression program such as WinZip* or PKZip*.
Installing the Intel® GMA600 Graphics Driver

The extracted package will contain a file hierarchy contained within a directory as shown in Figure 1.

Navigate below the top level directory to find the directory entitled Windows 7 Graphics Driver and enter that directory. Inside is an installation readme text file, and an archive containing the driver installer, titled Win7.zip as shown in Figure 2.

Unzip this archive and run the setup.exe program contained inside. Right click on the executable and choose Run as Administrator as shown in Figure 3.

Installing the Intel® SM35 Express Chipset Drivers for HDMI and I²C

As explained above, the extracted package will contain a file hierarchy contained within a directory. Navigate below the top level directory to find the directory entitled Intel Chipset Software Installation Utility and enter that directory. Inside is an installation readme text file and a zipped installer with associated files titled infinst_autol.exe. Unzip this archive by choosing Extract All... as shown in Figure 4.

Right click on the executable, called Setup, and choose Run as Administrator as shown in Figure 5.