

White Paper
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Effective Migration of Windows* 7 Graphics Driver on Intel® SCH US15W Platform

Replacing Intel® GMA 500
with Intel® EMGD for
Windows* 7

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Executive Summary

Intel® Embedded Media Graphics Driver (Intel® EMGD) for Windows* 7 [1] is a new, improved embedded graphics driver that is validated on Intel® System Controller Hub US15W, US15WP, US15WPT and Intel® Atom™ processor E6xx series platforms. It is officially launched by Intel® Embedded and Communication Group (ECG) in July 2011. Intel® EMGD replaces the existing graphics driver for Windows 7, Intel® GMA 500 [2], as termination is required to end the “as-is” support of Intel® GMA 500 in the embedded market. Hence, customers in the embedded market are encouraged to use Intel EMGD for Windows 7 on their latest product design to get full support from Intel.

[Intel® EMGD Windows 7 replaces the existing graphics driver, Intel® GMA 500, as termination is required to end the “as-is” support of Intel® GMA 500 for Windows 7 in the end of year 2011.](#)

This white paper explains migration for the Windows 7 embedded graphics driver (Intel® EMGD for Windows 7) and introduces the steps to migrate from Intel® GMA 500 to Intel® EMGD for Windows 7. It also covers new, unique embedded graphics features that were added to Intel® EMGD for Windows 7 by comparing the graphics features between it and Intel® GMA 500. With step-by-step guidance for Intel® EMGD for Windows 7 setup, customers can configure the driver and EMGD vBIOS with Configuration Editor (CED). With better understanding of the new software features, customers can effectively migrate from Intel® GMA 500 to Intel® EMGD for Windows 7.



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Introduction

This white paper describes the migration plan of Intel® GMA 500 to Intel® EMGD for Windows* 7 on Intel® SCH US15W. The Intel® Atom™ processor E6xx series platform, another supported platform for Intel® EMGD for Windows 7 is discussed only briefly.

Below are the preferred terms used throughout this white paper:

- *Windows* 7* refers to both Windows* 7 and Windows* Embedded Standard 7
- *Intel® SCH US15W* refers to Intel® System Controller Hub US15W, US15WP, and US15WPT
- *Intel® Atom™ E6xx* refers to Intel® Atom™ Processor E6xx Series

Background

Customers in the embedded market today use Intel® GMA 500 for Windows*7 for their embedded products designed on the Intel® SCH US15W. Intel® GMA 500 support for embedded market will be terminated at the end of the year 2011. Intel® EMGD for Windows* 7, a new product available by the end of Q2 2011, is a replacement that offers embedded features for Windows* 7.

Intel® GMA 500 is not designed for the embedded market and it may not be able to meet some embedded market requirements. It supports only “as-is” features without bug fixes; new features will not be developed. However, the new Intel® EMGD for Windows*7 provides a full support model, including new embedded feature requests and bug fixes.

To obtain full support from Intel, Intel® ECG encourages existing Intel® GMA 500 for Windows* 7 customers to migrate to Intel® EMGD for Windows* 7 for their new embedded product designs.

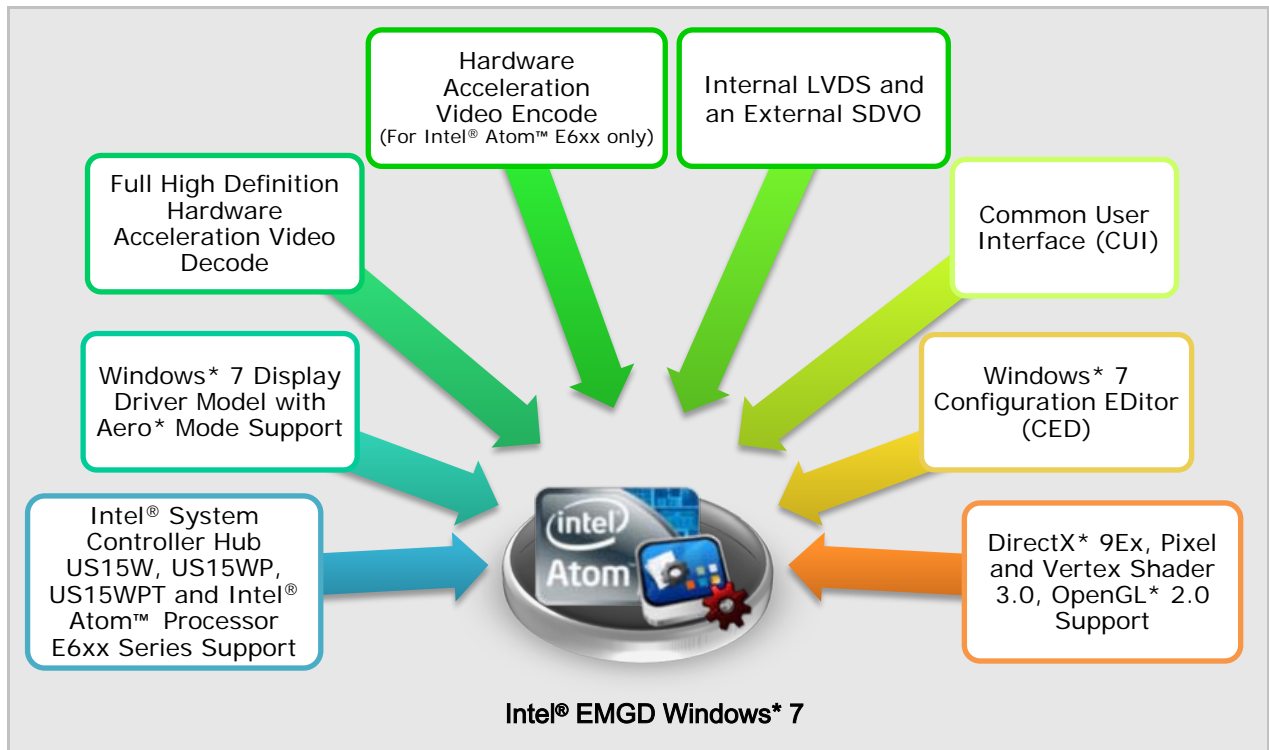


Intel® ECG Windows* 7 Graphics Driver Positioning

In July 2011 Intel® ECG officially launches the Intel® EMGD for Windows 7, which is validated on the Intel® SCH US15W, US15WP, US15WPT and the Intel® Atom™ processor E6xx series platforms.

Intel® EMGD for Windows 7 is a Windows Display Driver Model (WDDM) driver that lets users experience the full Windows* Aero user interface, better graphics technologies, and improved video experience with DXVA2.0 support. Refer to [Figure 1. Overview of Intel® EMGD Windows* 7.](#)

Figure 1. Overview of Intel® EMGD Windows* 7



Note that features of Intel® EMGD for Windows 7 discussed in this section are applicable to all supported platforms, except hardware acceleration video encode, which is available only for the Intel® Atom™ processor E6xx series platform.

To sustain Intel® EMGD for Windows 7, Intel provides a two-year guaranteed support model and long-life support, which includes new features and bug fixes.

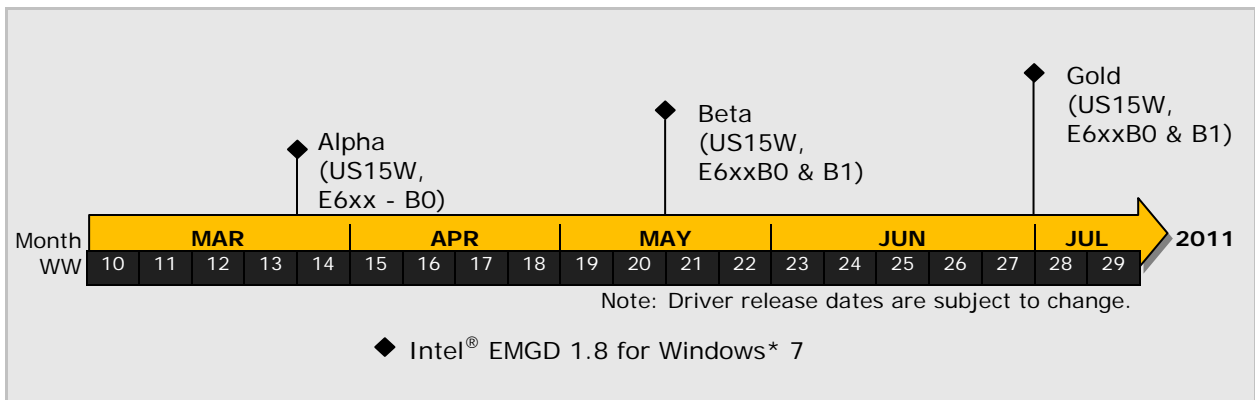


However, after two years, a “best effort” support model is provided by Intel on a case-by-case basis, depending on OS availability from the OS vendor.

Intel® EMGD for Windows* 7 Release Roadmap

The release roadmap for Intel® EMGD for Windows 7 is shown in Figure 2. Intel® EMGD for Windows 7 is officially launched to the embedded market at the end of Q2 2011 as per plan.

Figure 2. Release Roadmap for Intel® EMGD for Windows* 7





Feature Comparison

This section compares features between Intel® EMGD and Intel® GMA 500 for Windows* 7 on Intel® SCH US15W Platform.

Intel® EMGD for Windows 7 has been enhanced with the integration of Intel® GMA 500 basic and unique embedded features to suit embedded market needs. Compared features for both graphics drivers in Table 1 are focused solely on the Intel® SCH US15W platform.

Table 1. Feature Comparison between Intel® GMA 500 and Intel® EMGD for Windows* 7 on Intel® SCH US15W

	Feature	Intel® EMGD for Windows* 7		Intel® GMA 500 for Windows* 7
General	WDDM Support	Yes		Yes
	Platform Support (Graphics Frequency)	US15W (200 MHz)		US15W (200 MHz)
	Pre-Installation	Configuration Editor (CED)	✓	Binary Modification Program (BMP)
	Microsoft WHQL Certification	No		Yes
	CUI Support	Yes		Yes
	Language Support	English Only		Localized Versions
	Silent Installation	No		Yes
Firmware Support	vBIOS	EMGD vBIOS	✓	GMA vBIOS
	Boot Display during POST	Single and Clone Boot Display	✓	Single Boot Display
2D	Video Overlay	No		No
3D	DirectX* API Support	DirectX* 9Ex		DirectX* 9Ex
	Vertex Shader Model	3.0		3.0
	Pixel Shader Model	3.0		3.0
	OpenGL* API Support	OpenGL 2.0	✓	No



	Feature	Intel® EMGD for Windows* 7	Intel® GMA 500 for Windows* 7
Display	Display Interfaces	LVDS, SDVO	LVDS, SDVO
	Display Configurations	Clone, Extended Desktop	Clone, Extended Desktop
	Dual LVDS ¹	Yes	√
	Max SDVO Resolution	1920x1080 @ 60 Hz	1920x1080 @ 60 Hz
	Max LVDS Resolution	1366X768 @ 60 Hz	1366X768 @ 60 Hz
Media	DVXA* API Support	2.0	2.0
	HW Video Decode ²	MPEG-2, H.264 AVC, VC-1, WMV9	MPEG-2, H.264 AVC, VC-1, WMV9
	HW Video Encode	Only for Intel® Atom E6xx ³	√
	HDCP ⁴	Yes	Yes
Power Management	Intel® DPST	No	Yes
	Intel® ADB	No	Yes
	ACPI Backlight Control	Yes	Yes
	S3, S4 Support	Yes	Yes

¹ Dual LVDS refers to combination of internal LVDS + SDVO CH7308* LVDS.

² Performance for HW Video decode is dependent on the entry point supported by the video player.

³ Intel® SCH US15W does not support HW Video Encode, available only for Intel® Atom Processor E6xx series.

⁴ HDCP version is dependent on the sDVO device used. For example, DVI output supports HDCP 1.0 and HDMI supports HDCP 1.1 hardware.

Note: √ represents new feature for Intel® EMGD for Windows 7.

Table 1 shows Configuration Editor (CED), a different pre-installation program used to configure Intel® EMGD and vBIOS for Intel® EMGD for Windows 7. Intel® EMGD for Windows 7 also provides the capability to enable Clone mode during POST at all supported resolutions. Beyond the provided Microsoft DirectX* 9Ex graphics APIs, Intel® EMGD for Windows 7 has added OpenGL 2.0 APIs as a new feature to enhance 3D graphics. Unlike Intel® GMA 500, the combination of internal LVDS and SDVO CH7308* LVDS widely used in the embedded market is no longer a limitation because Dual LVDS is supported in Intel® EMGD for Windows 7.

However, a few limitations of Intel® EMGD for Windows 7 are found in Table 1. For example, Microsoft WHQL Certification is not supported by Intel® EMGD for Windows 7. Unlike Intel® GMA 500, Intel® EMGD for Windows 7 supports only a single language, English. Additionally, Intel® Display Power Savings Technology (DPST) and Intel® Automatic Display Brightness (ADB) are not available during operating system run-time for power conservation.

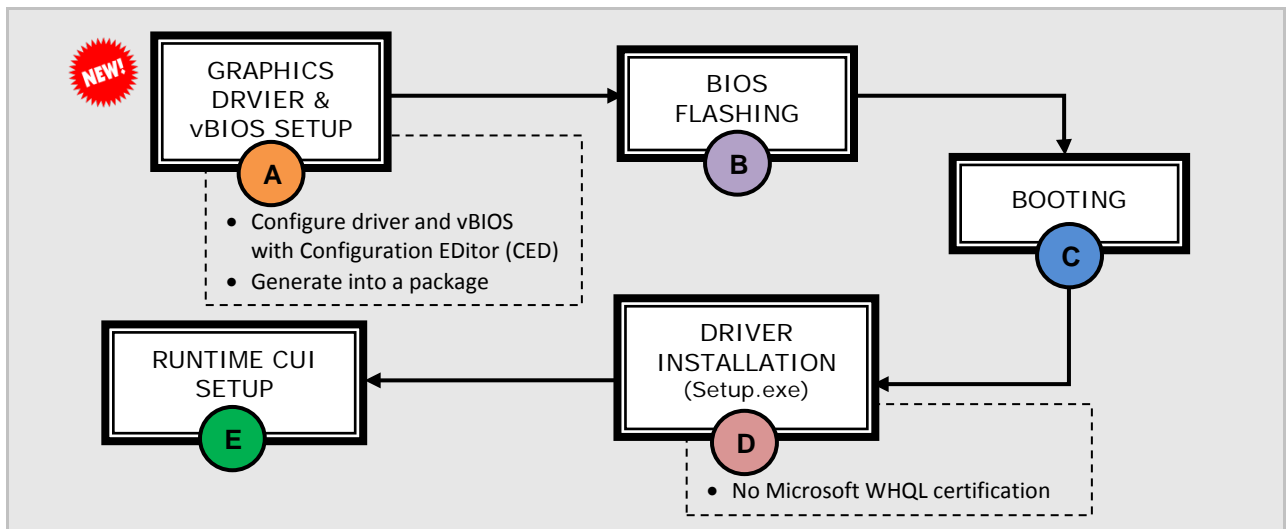


Getting Started with Intel® EMGD for Windows* 7

This section provides step-by-step guidance on how to begin configuring Intel® EMGD for Windows 7 for the Intel® SCH US15W platform.

Five essential steps shown in Figure 3 are needed for Intel® EMGD for Windows 7 configuration. Those steps are similar to Intel® GMA 500 for Windows 7 configuration steps, yet a different program and tool are used to configure the driver and vBIOS settings.

Figure 3. Step-by-Step Guidance for Intel® EMGD for Windows* 7



Step A: vBIOS Setup

Instead of using Binary Modification Program (BMP), Configuration Editor (CED) is used as the pre-installation program for Intel® EMGD for Windows 7 driver and vBIOS configuration. CED is included with the Intel® EMGD for Windows 7 driver kit [4] that is accessible from Intel® Premier Support and Intel® Embedded Design Center (EDC) sites. The steps below show the basic process of platform configuration using CED.

1. After installing CED, click `emgd-ced.exe` from the directory where CED is installed.
2. Click **New Configuration** to begin a new configuration. The Chipset Configuration Page appears; enter a file name, select a platform chipset, display configuration mode, and port devices. Click **Next** to continue.



Note: The order of port devices is important, as it determines which is the primary display and which is the secondary display.

3. The Port Configuration Page appears. Configure each selected port in Step 2, setting EDID timings, attribute settings, I2C settings, and flat panel options as needed. Click **Next** to proceed.
4. The Video BIOS configuration Page appears. Customize POST messages, display modes, and port devices for System BIOS as needed. Click **Finish** to complete the configuration.
5. After the configuration is done, click **New Package** to generate the driver and vBIOS package.
6. To create the driver and vBIOS installation that is compatible with a targeted embedded platform, select the generated package from the Package folder in the CED main window and then click **Generate Installation**.

Note: Unlike the BMP tool, CED requires the user to compile vBIOS for any change of vBIOS settings. Watcom, a third-party software, must be present to compile vBIOS.

Step B: BIOS Flashing

Integrate the generated vBIOS with system BIOS (sBIOS). Next, flash the merged BIOS into the targeted embedded platform.

Step C: Booting

Boot up the targeted embedded platform. The BIOS is expected to perform POST and identify the boot device priority before the Windows 7 OS is loaded.

Step D: Installing the Driver

Note: Intel® EMGD for Windows 7 works only on Windows 7 32-bit systems, not on 64-bit systems.

Follow the steps below to install the driver.

1. Install the generated Intel® EMGD for Windows 7 on the targeted embedded platform using `Setup.exe` from the directory that contains the driver files.
2. A setup dialog appears. Click **Next** to continue.
3. Carefully read the License Agreement and click **Yes** to proceed.
4. Review the Readme file information and then click **Next** to proceed to the next step.



5. Setup progress starts. Click **Install this driver software anyway**.

Note: The Windows Security warning dialog appears to notify the user that the driver installation program has no WHQL certification from Microsoft.

6. When the "Setup Progress" is complete, click **Next**.
7. The "Setup Complete" screen appears. Click **Finish**, and then restart the targeted embedded platform.

Step E: Runtime CUI Setup

Intel® EMGD for Windows 7 provides a graphical Common User Interface (CUI), similar to the Intel® GMA 500 CUI, that is used to change resolution, refresh rate, color bit depth and other run-time options after driver installation. The CUI property page can be accessed from the desktop context menu, tray icon menu, Windows control panel or using a hot key.

For more information regarding Intel® EMGD for Windows 7 setup, refer to the Intel® EMGD for Windows 7 User Guide [3] and Intel® Technical Product Specification for Software (TPS) [1].



Summary

Migrating from Intel® GMA 500 to Intel® EMGD for Windows 7 brings significant benefits to the user because of its support model and unique embedded features. Intel® EMGD for Windows 7 provides a two-year guaranteed support model and long-life support, which includes embedded features and bug fixes support. Additionally, the user can experience improved graphics technology via Intel® EMGD for Windows 7 with the new features. Specifically, CED, EMGD vBIOS, OpenGL V2.0 support, Clone mode during POST and Dual LVDS (combination of internal LVDS and SDVO CH7308* LVDS) are offered.

In this paper, the five ordered steps proposed for vBIOS and driver configuration are:

1. Graphics driver and vBIOS setup
2. BIOS flashing
3. Booting
4. Driver installation
5. Runtime CUI setup

Although different programs or tools are used for both graphics drivers, the configuration steps are similar, helping the user to become accustomed to the new Intel® EMGD for Windows 7 quickly and effectively for graphics driver and vBIOS configuration.

Embedded market customers with Windows 7 designs on an Intel® SCH US15W platform are strongly urged to migrate to Intel® EMGD for Windows 7, to gain better embedded features and full support for the graphics driver.



References

1. *Intel Embedded Media Graphics Driver for Windows* 7 and Windows* Embedded Standard Operating System, Technical Product Specification for Software (TPS)*. May 2011. Document Number: 473700. (<http://edc.intel.com/>)
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3. *Intel Embedded Media and Graphics Driver v1.8 (Windows* 7 and Windows* Embedded Standard 7 Release), User Guide*. March 2011. Document Number: 472133 (<http://edc.intel.com/>)
4. Intel® EMGD for Windows* 7. (<http://edc.intel.com/>)

The Intel® Embedded Design Center provides qualified developers with web-based access to technical resources. Access Intel Confidential design materials, step-by step guidance, application reference solutions, training, Intel's tool loaner program, and connect with an e-help desk and the embedded community. Design Fast. Design Smart. Get started today. <http://intel.com/embedded/edc>.



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Acronyms

ADB	Automatic Display Brightness
CUI	Common User Interface
DPST	Display Power Saving Technology
ECG	Embedded and Communication Group
EMGD	Embedded Media and Graphics Driver
GMA	Graphics Media Accelerator
LVDS	Low-voltage differential signaling
POST	Power on Self Test
sBIOS	System BIOS
vBIOS	Video BIOS
WDDM	Windows* Display Drive Model



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