

# **OpenVG 1.x SDK**

## **User Guide**

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# 1. OpenVG 1.1 SDK Content

## 1.1. Introduction

The POWERVR OpenVG SDK provides a set of documentation, source code and utilities that help developers create applications using the OpenVG graphics library on POWERVR platforms. This document describes the contents of the SDK and gives guidelines for installing it on different platforms.

## 1.2. Documentation

The following documents are located in `\SDKPackage` folder or in `\SDKPackage\Documents`.

### OpenVG SDK.User Guide

Description of the OpenVG SDK contents and installation.

### POWERVR.OpenVG Application Development Recommendations

Some recommendations to get best performance on POWERVR devices.

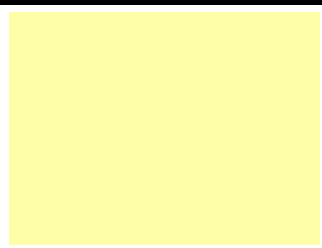
## 1.3. Training Course

Several simple applications are provided to show specific features in a simplified form. The code has been thoroughly commented to help developers to understand the API and get started.

The Training Course demos are located in the `\SDKPackage\TrainingCourse` folder.

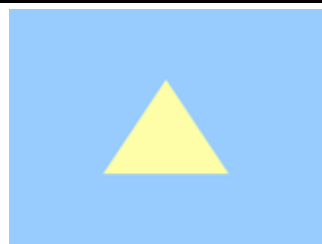
*Note: The demos in the TrainingCourse folder do not handle screen rotation to keep the code as simple as possible. In devices with a portrait display the images below might be shown stretched.*

### Initialization



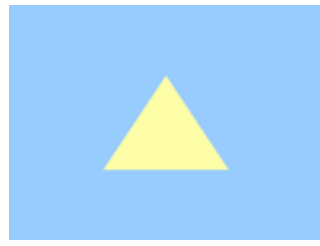
Shows how to initialise OpenVG. It does a simple background clear.

### HelloTriangle



Shows how to draw a very simple shape.

## IntroducingPVRShell



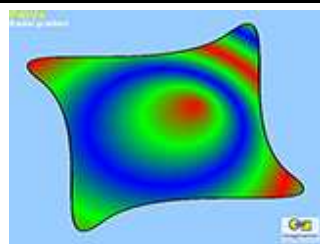
Shows how to use PVRShell for the OS and API initialisation framework using the same geometry as the previous example.

## SegmentTypes



Shows the different path segment types supported by OpenVG. This demo will cycle through all the 11 different types.

## Paints



Shows the different paint types that are used to add colour to strokes and filled shapes.

This demo will cycle through all the 3 different types of paint: solid colour, linear gradient and radial gradient.

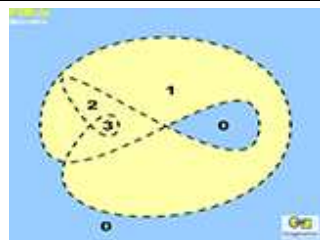
## StrokeStyles



Shows different styles that can be applied to strokes.

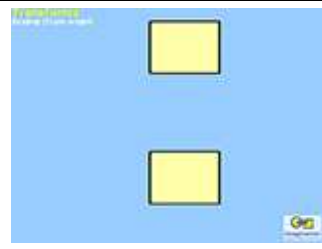
This demo is interactive and there are three options which can be selected by the user: caps, joins and dash.

## FillRule



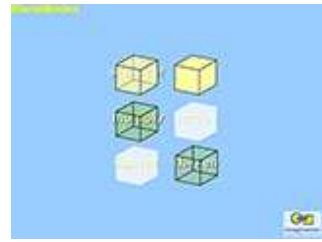
This training course shows you how to use the fill rules in OpenVG. The fill rules are used to determine whether an overlapping part of a path is filled or not.

## Transforms



Shows how to apply different transformations to position and move shapes.  
This demo cycles through translations, scaling, rotations and shear.

## BlendModes



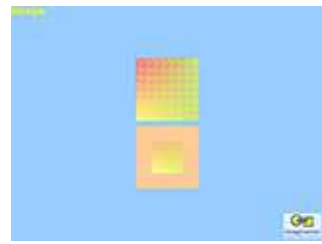
Shows how to use different blend modes in OpenVg. To do this it shows 6, each cube is identical except for the blend mode they use. Behind each cube is a text string showing the name of the blend mode that it is using.

## ChildImage



Shows how to use OpenVG child images. It starts off with the creation of a single image that is then used to spawn a child image. This child then spawns its own child. The first child is then modified and this modification can be seen in all its relatives.

## Image



Shows how to use OpenVG images. It starts off with the creation of two images. The first is populated with image data from memory. The second image is initially cleared to a single colour and then a section of the first image is copied to it.

## ImageFilter



Shows how to apply several of the inbuilt filters in OpenVG. The filters shown are the Gaussian blur, convolution, separable convolution and an image lookup.

## IntroducingPVG



Basic Tutorial that shows step-by-step how to load a PVG file (exported from Illustrator) into OpenVG

## Masking



Shows how to use an OpenVG image to set up the alpha mask.

## PatternFill



Shows how to take an image and use it to pattern fill a shape.

## Scissors



Shows how to set up and enable scissor rectangles so you can limit the area that you can draw to.

## IntroducingSVG



Shows how to load an SVG file using the loading code in our tools.

### ColorTransform



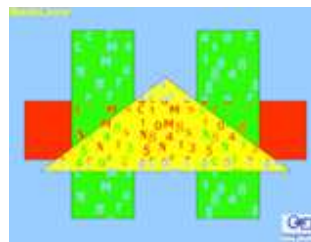
Basic Tutorial that loads a pvg file and shows how to use OpenVG 1.1's colour transformation to alter the way it is displayed.

### Font



Shows how to load path based and image based glyphs into a vgFont and use them to display text to the screen.

### MaskLayer



Shows how to use OpenVG's MaskLayers.

### RenderToMask



Shows how to use vgRenderToMask..

## 1.4. Shell

The POWERVR Shell is used in all demos to provide a common framework for developing OpenVG applications. Across all platforms, the shell takes a set of command-line arguments which allow things like the position and size of a demo to be controlled. The table below shows these options.

The Shell source is located in the `\SDKPackage\Shell` folder.

**Table 1 - Shell Command-Line Options**

Option	Description
-width=N	Sets the viewport width to N.



Option	Description
-height=N	Sets the viewport height to N.
-posx=N	Sets the x coordinate of the viewport.
-posy=N	Sets the y coordinate of the viewport.
-FSAAMode=N or -aa=N	Sets full screen anti-aliasing. N can be: 0=no AA , 1=2x AA , 2=4x AA
-fullscreen=[1,0]	Runs in full-screen mode (1) or windowed (0).
-powersaving=[1,0]	Where available enable/disable power saving.
-quitaftertime=N or -qat=N	Quits after N seconds.
-quitafterframe=N or -qaf=N	Quits after N frames.
-vsync=N	Where available modify the apps vsync parameters.
-version	Output the SDK version to the debug output.
-info	Output setup information to the debug output.

## 1.5. Tools

The tools library consists of a collection of various modules to help developers achieve common tasks, e.g. mathematical operations, matrix handling, svg loading, pvg loading and loading VGImages.

The Tools library is located in the `\SDKPackage\Tools` folder.

## 1.6. Utilities

These are utility programs or libraries useful for OpenVG application development.

All utilities are located in the `\SDKPackage\Utilities` folder.

### PVRTexTool

Tool to convert bitmap files (e.g. BMP, TGA, etc.) to any image format type supported by OpenVG.

### PVRVecEx

Plug-in for Adobe Illustrator to export path data in the POWERVR PVG format.

### FileWrap

Command-line utility to wrap external files in .cpp files.

## 2. OpenVG SDK Installation

See below the SDK installation and build notes for all platforms supported by POWERVR cores. Please, refer to the platform you are using.

### 2.1. Linux

1. OpenVG libraries are not distributed with the POWERVR Linux SDKs. Ask your platform provider for these libraries if you do not have them.
2. Define the environment variable LIBDIR to point to the directory containing the OpenVG libraries, e.g. "export LIBDIR=/home/user/Linux\_Baseport/target/usr/lib"
3. Install the latest platform toolchain for your target platform.
4. Define the TOOLCHAIN environment variable to the toolchain directory, e.g. "export TOOLCHAIN=/data/omap\_binaries/linux/arm/", or add the path to the toolchain to the PATH environment variable (i.e. run "export PATH="<path to the toolchain>:\$PATH").
5. If you want an X11 build and it is available, define the environment variable X11ROOT to point to the freedesktop directory (i.e. "export X11ROOT=/usr/X11R6\_SGX")

To build individual components go to the directory  
 Demos/<DemoName>/OVG/Build/LinuxGeneric or  
 TrainingCourse/<TCName>/OVG/Build/LinuxGeneric and run the command:

**LinuxRaw:** "make PLATFORM=<platform>"

**LinuxX11:** "make PLATFORM=<platform> X11BUILD=1"

where platform consists of the word "Linux" followed by the name of the device you are building the application for, e.g. LinuxOMAP3, LinuxX86

Depending on the chosen platform and the value of X11BUILD, the executables for the demos and training courses will go to: Demos/<DemoName>/ OVG /Build/<platform>/<ReleaseDir> or TrainingCourse/<DemoName>/ OVG /Build/<platform>/<ReleaseDir>, where ReleaseDir is one of: ReleaseRaw, ReleaseX11

6. Ensure that the POWERVR drivers are installed on the target device (please refer to DDK / driver installation instructions).
7. If the standard c++ libraries are not present on your target device, copy libc++ from the toolchain into /usr/lib. libdl and libgcc may also be required.  
*Note: libc++ lives at /usr/lib if you have installed the drivers, or can be found as part of a binary driver release package.*
8. Ensure the drivers are running (e.g. type /etc/init.d/rc/pvr start, then run an X session if required).  
 Under X11 window sizes can be specified for the executables using the command line arguments -posx=n and -posy=n to define the top right hand corner, and -width=n and -height=n to define width and height, respectively. E.g.  
 ./OVGScissors -posx=10 -posy=10 -width=100 -height=100
9. If you attempt to run an SDK training course or demo and it fails with the message: "Can't open display" produced by the X client then make sure that the DISPLAY variable is set with the shell command: "set | grep -e DISPLAY". If this command doesn't yield any output then type (in shell): "DISPLAY=:0.0; export DISPLAY"

### 2.2. Symbian

1. Install the latest Symbian release.  
 Note: In the following [SYMBIAN] is used to refer to the Symbian installation directory.
2. To build individual components go to the /Build/SymbianTextShell sub-directory of the component to build and type:

bldmake bldfiles

```
abld build <platform> urel
```

The exe will be automatically copied in the correct place in the Symbian SDK tree to be included in the image through the OBY file.

Pre-built binaries can be found in the Binaries folder ready to be dropped into your Symbian SDK.

Refer to your platform BasePort documentation to know how to build an image and how to download it to the platform. We supply in the package the OBY files that will allow you to include the SDK demos in the image.

*Note: Due to a Symbian DevKit problem with long path names, the TrainingCourse demos will not build out of the package. Please, install SDKPackage/ in your root path and rename it to a shorter name (e.g. SP/) to be able to build.*

## 2.3. Windows Mobile 7

1. Open a command prompt and set up your Windows Mobile 7 build environment.
2. Set the environment variable SDKROOT to the root of the installed SDKPackage

e.g. set SDKROOT=c:\SDKPackage

3. To build all SDK apps at the root of the SDKPackage type

```
build -c
```

4. To build an individual app navigate to the application's folder and type

```
build -c
```

The makefiles for the majority of apps are kept in [app]\OVG\Build\PlatformBuilder and the executables are built in [app]\OVG\Build\PlatformBuilder\oak\target\ARMV4I\retail.

## 2.4. Windows Mobile 6.1, Standard

1. Download and install the Windows Mobile 6.1 Standard SDK from the following location:  
<http://www.microsoft.com>
2. Unpack the contents of this package to a local folder on a PC equipped with the Windows XP operating system. The project and solution files provided (.vcproj and .sln, for Microsoft Visual Studio 2005) do not require the SDK to be installed in a pre-defined location and are configured to use relative-paths.  
The OpenVG libraries should be in the folder Builds/OVG/<platform>/Lib.
3. For building in the "Configuration Manager" dialog box, make sure the "Active solution platform" is set to "Windows Mobile 6 Standard SDK (ARMV4I)".

## 2.5. Windows CE 6 CEPC (x86)

1. Copy the POWERVR and third party folders from the DDK into your \WINCE600\PUBLIC folder.
2. Create a new OS Design Project in Visual Studio 2005 (with Platform Builder 6 installed).
  - a. When choosing the BSP select "CEPC: x86".
  - b. Choose a device and press finish.
3. In the "Catalog Items View" window under Third Party tick "POWERVR XXX – OpenVG 1.1".

4. In the "Catalog Items View" window tick
5. Core OS -> CEBASE -> Applications and Services Development -> C Libraries and Runtimes -> C++ Runtime Support for Exception Handling and Runtime Type Information.
6. Build the OS Design.
7. Copy the SDK Binaries into the release directory and execute from the command line when your device has been attached.

### 2.5.1. Note

1. To build the SDK examples you need to install "**WindowsCE 6 CEPC Default SDK.msi**" included in the package.
2. When building our tools if you get an error message similar to

#### **PVRTGeometry.cpp**

```
cwchar(75) : error C2039: 'wcsftime' : is not a member of 'global namespace'  
cwchar(75) : error C2873: 'wcsftime' : symbol cannot be used in a using-declaration  
malloc.h(45) : error C2143: syntax error : missing ';' before '*'  
..\..\PVRTGeometry.cpp(1064) : error C3861: 'min': identifier not found
```

then go to

**Tools -> Options -> Projects and Solutions -> VC++ Directories**

and set "**Platform**" to "**WindowsCE 6 CEPC Default (x86)**" and "**Show directories for**" to "**Include files**"

Then move the "**WindowsCE6 CEPC Default**" directories above "**\$(VCInstallDir)ce\include**".

3. For examples that use external files (i.e. .pod, .pfx) these files need to be copied across to the root of the device using the "**file viewer**" under

**Target->Remote Tools**

### 3. Support Contact

For further support contact:

[devtech@powervr.com](mailto:devtech@powervr.com)

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