PVRVecEx

User Manual

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1. Installation and Usage

PVRVecEx is a plug-in for Adobe Illustrator that allows exporting any vector graphics artwork in a OpenVG friendly format.

This plug-in is intended for versions CS, CS2 and CS3 of Adobe Illustrator.

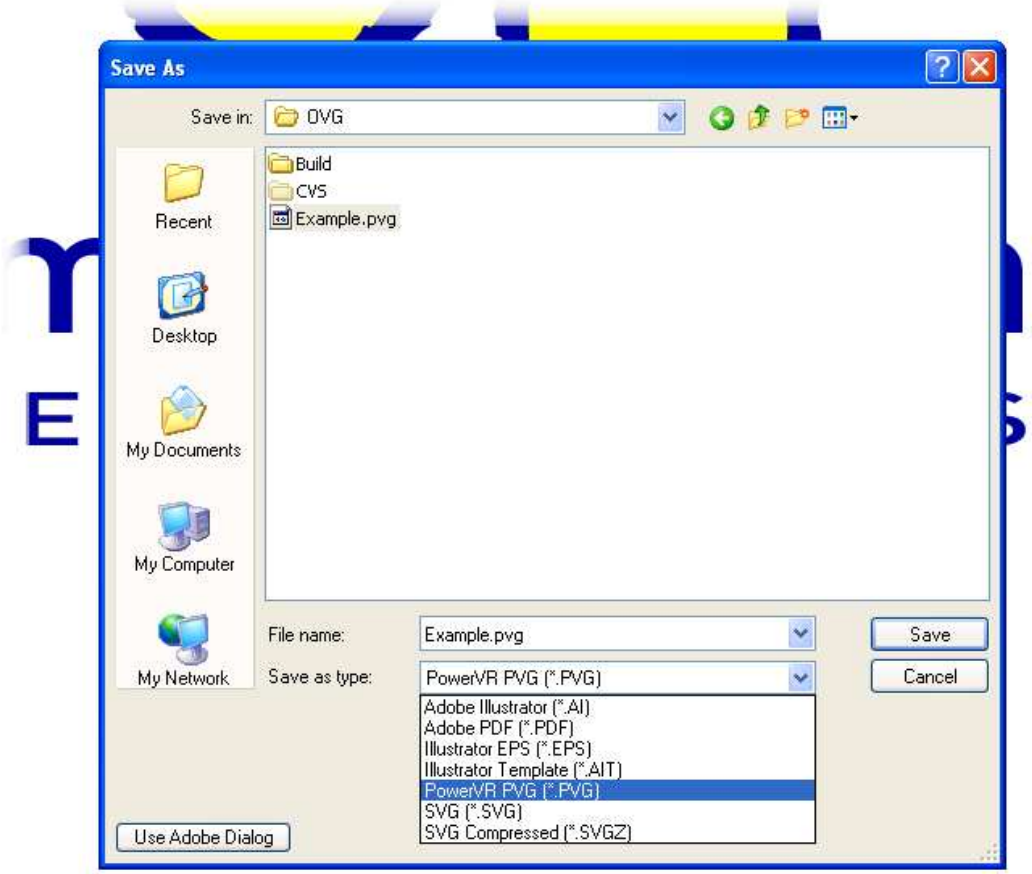
The same plug-in will work in versions CS2 and CS3

Copy the file supplied for your version in this folder:

\Program Files\Adobe\Adobe Illustrator <version>\Plug-ins

Now there is a new supported format when saving or loading a file. This format is called PVG and it is described below.

Save as…



2. PVG Format description

PVG is a binary format that stores sequentially the artwork data using OpenVG conventions. This makes a very compact format (half the size than a SVG file) and very easy to load in an OpenVG application.

All the code needed to load this format and an example on how to load and display a PVG file is supplied with the POWERVR OpenVG SDK.

2.1. Format Definition

Except the file header, any block (Paints, Path, Ramps, Dashes or Patterns) can be repeated any number of times, but they are grouped together following the other below.

HEADER (Unique):

- DWORD dwMagicToken;
  dwMagicToken has to be POVG
- DWORD dwSizeOfHeader;
  Total size of this header.
- DWORD dwVersion;
  dwVersion containing Mayor(short) and Minor(short), 0xMMMMmmmm
- DWORD dwBuild;
  dwBuild containing Branch(short) and Build(short), 0xBBBBbbbb
  This build number is needed when reporting any bug related to a PVG file
- DWORD dwFileFlags;
  Currently unused
- DWORD dwFileSize
  Total file size counting this header
- DWORD dwNumPaths;
- DWORD dwNumPaints
- DWORD dwNumRamps;
- DWORD dwNumDashes;
- DWORD dwNumPatterns
  Number of objects to be found in this file
- FLOAT fLeft, fTop, fRight, fBottom;
  Drawing extensions

RAMPS (As many as dwNumRamps):

RAMP HEADER:

- DWORD dwNumRampValues
  Total number of Colour Ramp entries.

RAMP DATA:

*Ramp values will be written after dwNumRampValues as (STOP, R, G, B). the total size of the RAMPS data block will be 4*dwNumRampValues*sizeof(float)*

PAINTS (As many as dwNumPaints. Paints do not have data block):

PAINT HEADER:

- DWORD dwPaint

Unique identifier of this paint to be used by the Path definition

- DWORD dwPaintStyle

VG_PAINT_TYPE_COLOR, VG_PAINT_TYPE_LINEAR_GRADIENT,
VG_PAINT_TYPE_RADIAL_GRADIENT or VG_PAINT_TYPE_PATTERN

- FLOAT fPaintParameters[5]

VG_PAINT_TYPE_COLOR:

R, G, B, Alpha, Fith parameter ignored.

VG_PAINT_TYPE_LINEAR_GRADIENT:

Origin.x, Origin.y, Target.x, Target.y, Alpha

VG_PAINT_TYPE_RADIAL_GRADIENT:

Origin.x, Origin.y, Focal.x, Focal.y, Radius

VG_PAINT_TYPE_PATTERN:

Currently not implemented.

- DWORD dwRamp

Identifies the Colour Ramp used for gradient. Ignored if not gradient.

- DWORD dwPattern;

Identifies the Pattern used for paint. Ignored if not pattern.

PATHS (As many as dwNumPaths):

PATH HEADER:

- DWORD dwPathType;

VG_FILL_PATH and/or VG_STROKE_PATH

- DWORD dwClipping;

Clipping path = 1 otherwise = 0

- DWORD dwAlphaBlend;

0 if no alpha, otherwise 1-255

opacity: fully translucent (1) to fully opaque (255)

- DWORD StrokePaint;

StrokePaint identifier in file (Paint list)

- DWORD FillPaint;

FillPaint identifier in file (Paint list)

- DWORD StrokeDash;

0 if none, otherwise Dash definition in file (Dash list)

- DWORD dwFillRule;

VG_EVEN_ODD or VG_NON_ZERO

- DWORD dwStrokeJoin;

VG_JOIN_MITER, VG_JOIN_ROUND or VG_JOIN_BEVEL

- DWORD dwStrokeCap;

VG_CAP_BUTT, VG_CAP_ROUND or VG_CAP_SQUARE

- FLOAT fStrokeWidth;

Same width value passed to OpenVG

- FLOAT fStrokeMiterLimit;

Same miter limit value passed to OpenVG

- DWORD dwNumSegments;

Total number of segments in this path

- DWORD dwPathDataSize;

Total Path Data size in Bytes.

PATH DATA:
Path Values will be write after this header in OpenVG format. First a list with all the commands (there are dwNumSegments commands) f*ollowed by the list of all control points (size is variable depending on the commands).*

DASHES (As many as dwNumDashes):

DASH HEADER:

- DWORD dwNumDashComponents;
  Number of dash elements (form 1 to 12)
- DWORD dwLength;
  Length of the dash segment.
- FLOAT fOffset;
  Displacement for the starting point.

DASH DATA:
Dash values to be written after this header as floats.

PATTERNS (As many as dwNumPatterns):

PATTERN HEADER:

- DWORD dwWidth;
  Total width of the rectangular pattern;
- DWORD dwHeight;
  Total height of the rectangular pattern

PATTERN DATA:
Pattern texture values to be written after this header in 16-bit 565RGB format

3. PVG Functions

3.1. PVG.h

This file is the main interface of PVG format with the OpenVG application. It is distributed with the POWERVR OpenVG SDKs.

```
typedef struct _PVG_FILE_HEADER
{
	unsigned int	dwMagicToken;
	unsigned int	dwSizeOfHeader;
	unsigned int	dwVersion;
	unsigned int	dwBuild;
	unsigned int	dwFileFlags;
	unsigned int	dwNumPaths;
	unsigned int	dwNumPaints;
	unsigned int	dwNumRamps;
	unsigned int	dwNumDashes;
	unsigned int	dwNumPatterns;
	float		fLeft, fTop, fRight, fBottom;
} PVG_FILE_HEADER;


typedef struct _PVG_PATH_HEADER
{
	unsigned int	dwPathType;
	unsigned int	dwClipping;
	unsigned int	dwAlphaBlend;
	unsigned int	StrokePaint;
	unsigned int	FillPaint;
	unsigned int	StrokeDash;
	unsigned int	dwFillRule;
	unsigned int	dwStrokeJoin;
	unsigned int	dwStrokeCap;
	float		fStrokeWidth;
	float		fStrokeMiterLimit;
	unsigned int	dwNumSegments;
	unsigned int	dwPathDataSize;
} PVG_PATH_HEADER;


typedef struct _PVG_PAINT_HEADER
{
	unsigned int	dwPaint;
	unsigned int	dwPaintStyle;
	float		fPaintParameters[5];
	unsigned int	dwRamp;
	unsigned int	dwPattern;
} PVG_PAINT_HEADER;


typedef struct _PVG_COLOR_RAMP_HEADER
{
	unsigned int	dwNumRampValues;
} PVG_COLOR_RAMP_HEADER;


typedef struct _PVG_DASH_HEADER
{
	unsigned int	dwNumDashes;
	float		fPhase;
	float		fDashValues[6];
} PVG_DASH_HEADER;


typedef struct _PVG_PATTERN_HEADER
{
	unsigned int	dwWidth;
	unsigned int	dwHeight;
} PVG_PATTERN_HEADER;
```

3.2. PVRTLoadPVG Functions

PVRTLoadPVG is the source code to load and display any PVG file. This source, as pvg.h, can be found in the Tools section of the POWERVR OpenVG SDKs.

3.2.1. FromFile

```
static COvgObject* FromFile(const char* pszFilepath);
```

This function loads a PVG file and initialises all the pathswithing OpenVG. A COvgObject class containing the loaded data and the procedures for diplaying it will be created.

3.2.2. FromMemoryBuffer

```
static COvgObject* FromMemoryBuffer(unsigned char* pui8Buffer, int
i32Size);
```

Same as FromFile function but this time from a memory block. The whole file with full header is required in this function. As the previous function a COvgObject will be created.

3.2.3. COvgObject ::Draw

```
bool Draw(int i32StartPath = 0, int i32EndPath = -1);
```

This function draws the full art or a range of paths within the PVG file.

3.2.4. COvgObject ::SetAlpha

```
void SetAlpha(unsigned char ui8Alpha);
```

Set global alpha for the art.

3.2.5. COvgObject ::SetupCenterOnOrigin

```
void SetupCenterOnOrigin();
```

Cetre the full collection of paths to be easily displayed.

3.2.6. COvgObject ::SetupTranslateToOrigin

```
void SetupTranslateToOrigin();
```

Translate the full collection of path to the origin to be easily displayed.

3.2.7. COvgObject ::SetupScaleToSize

```
void SetupScaleToSize(float fTargetWidth, float fTargetHeight, bool
bKeepAspect = true);
```

This function and the two previous ones are used to prepare a PVG file to be displayed properly (centred and scaled) within the screen limits.

4. Limitations

PVRVecEx exports the graphics data in a very friendly OpenVG format which can be streamed directly to the API. Sadly this introduces limitations in its capabilities to export all Illustrator features.

For example, anything that requires the vector image to be rasterised (e.g. deformations) has been ignored and anything that does not have a correlation in OpenVG API has also been ignored.

- **These types of 'objects' are not supported:**
  PlacedArt, RasterArt, PluginArt, MeshArt, TextFrameArt, SymbolArt and LegacyTextArt.

  To be able to export Text and Symbols, convert them into paths first. To do this, in Illustrator right click on the object and select 'Create Outlines'

- **Grouping data will not be exported:**
  Objects that have been grouped together will be exported as independent paths. If there is any parameter that has been applied to a group, this value will be ignored and the original values will be exported instead.
  Group translucency will be multiply by the object translucency. This will keep a close resemblance but in some cases the final image will not look identical to the one in Illustrator.