Xara Tutorial—Xara Bump Mapping
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1 Introduction

The recent release of Xara Xtreme (version 2.0) has provided some very interesting new features. One in particular is called “Bump Map”; this tutorial will describe bump mapping, highlight the controls offered, and show some examples of its use.

Bump mapping is a technique that provides the illusion of depth to a surface texture when adding a light source, whilst the surface remains flat. The surface texture can be a bitmap, or an appropriate vector fill (such as fractal plasma) etc.

Note 1: This .docx document has been written in MS Word 2007 in Print Layout View, and thus is printable. Furthermore, using the latest features of Xara, all images in the document were pasted from Xara, and thus are Xara objects; simply double clicking on them will load them directly back into Xara for easier, interactive inspection.

Note 2: A document tree is available in Word to see the structure of the document and make navigation easier:

- In Word 2003 and below: go to View > Document Map.
- In Word 2007: go to View tab > check Document Map checkbox in Show/Hide palette.

Note 3: This document also contains cross-references to key parts of the document. For example, Ctrl-clicking on text such as ‘Figure 2.1’ will cause the document to jump to the relevant location. Sections and figures references take advantage of this feature.
2 Bump map controls

This section will cover the controls of the bump map feature and what they do to the look of the bitmap images. The main control screen is shown below in Figure 2.1.

![Figure 2.1. This is the main bump map control panel](image)

It is accessed by selecting an object, selecting the Live Effect (LE) tool, clicking the New button on the infobar, and selecting 3D Bump Map from the drop-down menu (Figure 2.2).

![Figure 2.2. To access the bump map control panel, select an object, select the Live Effect (LE) tool, click New on the infobar, and select 3D Bump Map.](image)

There are three light types, and the sliders on the right affect the light conditions for some or all of the light types. The blue panel in the middle can be used to set the position of certain light types. These controls and others are described through the rest of this section.
2.1 Light Type

2.1.1 Directional

This setting applies the effect of a parallel light source on the object surface, lighting it all equally from one direction. The Scale, Angle and Elevation sliders (sections 2.7.1, 1.1.1 and 1.1.1) affect the resultant bump map for this light source. An image is shown in Figure 2.3 (double click to inspect in Xara).

![Figure 2.3. Bump mapping is used to simulate directional light being shone across the surface. Double click to load into Xara for inspection.](image)

2.1.2 Point

This setting applies the effect of a point light source shining vertically from above onto the bitmap. The centre of the light is brightest, and the brightness decreases with distance from the centre over the whole image. The Scale and Height sliders (sections 2.7.1 and 1.1.1) affect the resultant bump map for this light source. An image is shown in Figure 2.4 (double click to inspect in Xara).
Figure 2.4. Bump mapping is used to simulate a point light source being shone onto the surface. Double click to load into Xara for inspection.

2.1.3 Spotlight

This setting applies the effect of a locally directed beam of light (spotlight) onto the surface. All the slider discussed in section 2.7 affect this light type, shown in Figure 2.5.

Figure 2.5. Bump mapping is used to simulate a spotlight being shone onto the surface. Double click to load into Xara for inspection.
2.1.4 Inverted option

This setting changes the effect to appear as though all bumps are pits and vice versa, to give the illusion of depth reversal.

![Not Inverted vs Inverted](image)

Figure 2.6. An example of the *Inverted* feature which simulates all bumps as pits and vice-versa.

2.2 Color

Allows the colour of the light applied to be changed (Figure 2.7).

![White and Blue Light Sources](image)

Figure 2.7. Different colours of light can be shone onto a surface.
2.3 Lights

Multiple light sources can be shone onto a surface (Figure 2.8). If more than one light is applied, the dropdown box in the Lights section allows a particular light to be selected. Any changes to the slider options (covered in section 2.7) will affect just the selected light.

Figure 2.8. Multiple bump map lights shone onto the surface.

2.3.1 Add/delete light button

These buttons allow additional lights to be added and selected lights to be deleted.
2.4 Merge checkbox

The *Merge* checkbox allows you to merge the bump map image with the original bitmap as shown in Figure 2.9.

![Original image - Bump map only - Bump map merged with image](image)

*Figure 2.9. The bump map can be merged with the image, or stand alone.*

2.5 Intensity slider

The *Intensity* slider alters the brightness of the lights. Figure 2.10 demonstrates this.

![Normal Intensity - High Intensity](image)

*Figure 2.10. The intensity of the lights can be changed with the *Intensity* slider.*
2.6 Position box

Clicking on the blue region moves either a *Point* or *Spotlight* light type to the selected position. Alternatively, more precise values can be entered in the coordinate boxes, which can allow for greater ranges than clicking in the blue selection box.

2.7 Slider options

2.7.1 Scale

The *Scale* setting alters the appearance of the bump map to give the impression of greater or lesser surface depth. The setting will affect all light types, and is demonstrated in Figure 2.11.

![Figure 2.11](image)

*Figure 2.11. Altering the magnitude of the Scale setting gives the surface the appearance of greater or lesser surface depth.*
2.7.2 Angle

When a Directional or Spotlight light type is applied, the Angle slider determines the angle that the light beam appears to strike the image. This setting has no effect for the Spot light type, as it is rotationally invariant. 0° is defined as shining from the left, 90° from above, etc. Figure 2.12 demonstrates this setting.

Figure 2.12. The Angle setting allows the direction of the light source to be changed. 0° is defined as shining from the left, and increasing angles shine the light clockwise.
2.7.3 Elevation

The *Elevation* setting alters the perceived angle above the image surface that the light shines. This setting only applies to the *Spotlight* light type. The maximum angle of 90° gives the impression that the light is shining directly from above, and the minimum angle of 0° looks like the spotlight is resting flat on the surface, as shown in Figure 2.13.

![Image showing 0°, 45°, and 90° elevation settings for a spotlight light type.](image)

*Figure 2.13. The Elevation setting allows the Spotlight light to be shined at different angles relative to the surface; 0° is flat on the surface, and 90° shines directly from above.*
2.7.4 Width

The Width setting only applies to the Spotlight light type and alters the beam width of the light. Minimum values give a thin beam, whereas a larger value creates a very wide beam, as shown in Figure 2.14.

![Low Width and High Width](image)

Figure 2.14. The width of the light beam can be altered using the Width slider for Spotlight light sources.

2.7.5 Blur

The Blur setting only applies to the Spotlight light type and determines how blurred the edge of the light beam is on the image. Low values give a sharp edge, whereas large values give soft feathered edges, as shown in Figure 2.15.

![Low Blur and High Blur](image)

Figure 2.15. The Blur setting can be used to blur the edge of the Spotlight light beam.
2.7.6 Height

The Height setting (Figure 2.16) applies to the Spotlight and Point light types and gives the impression that the light source is at a different height above the surface of the bitmap. The resulting intensity of the light is not affected though.

![Diagram showing the effect of Height setting on Point and Spotlight light sources](image)

Figure 2.16. The Height setting simulates the Point and Spotlight light source being raised or lowered above the surface of the image. The light intensity is not affected however.
3 Examples of use

The following examples demonstrate possible typical uses for bump mapping. In general, bump mapping can be used to give the appearance of surface depth when a light source is used.

3.1 Car headlights

![Car Headlights Example](image-url)
3.2 Laser beams

3.3 Room lights
3.4 Planets

4 Final comments

The new bump map feature is very powerful and done in classic speedy Xara-style. It can be put to good use with enough creative thinking.

Xhris