

INK9000 Version 1.5

Ink9000 is experimental software for producing non-photorealistic (*NPR*) images in a variety of styles, using easily obtainable meshes and open source code. Its purpose is to provide a proof-of-concept testbed; the concept being the role of computer software in the commercial artist's production pipeline.

WalkThrough

The best way to illustrate the programs functions is to proceed with a step-by-step example:

1. **Load A Model:** In the distribution is a folder called objsamples. In Ink9000 use *FILE-->LOAD MESH* to load an *.obj file (minnie.obj). The screen should look like the one below, in *PREVIEW* mode.

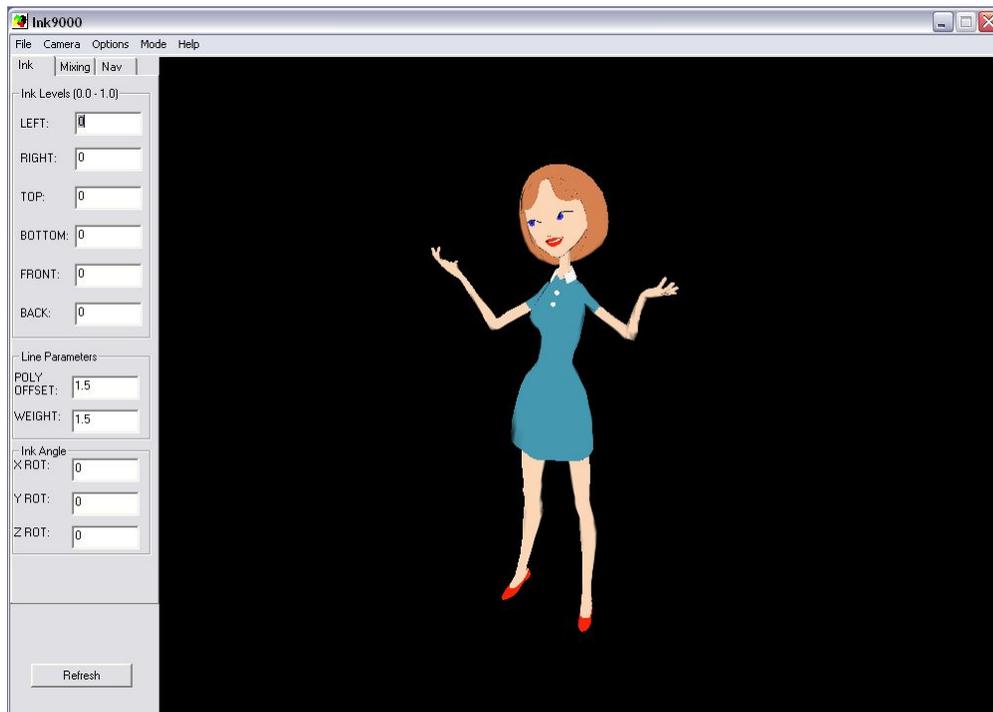


Illustration 1 Loaded Model

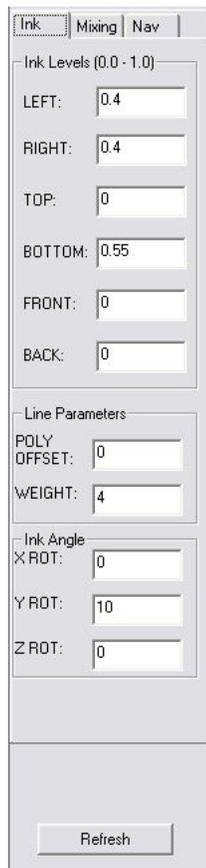
2. **Moving The Model:** The mouse is used exclusively to move the model/viewpoint. In the upper left hand corner is a tab marked *NAV*. Displayed on this tab are reminders on how to use the mouse.

If you click and drag on the displayed image, the mouse button that you use will determine the navigation change.

Holding down the left mouse button (**LMB**) while dragging will rotate the scene around the world Y and X axis. The right mouse button (**RMB**) down during dragging will translate the scene left/ right or up/down. The middle mouse button (**MMB**) will move the scene closer or further away on the Z axis. You can also perform the **MMB** function by holding down the **CTRL-LMB** combination should you not have a three button mouse. Any time you click on the image you will be automatically switched from **RENDER** mode to **PREVIEW** mode. At any time, should the screen not refresh properly, simply click on the window to restore the view.

Should you wish to use numeric placement, menu **OPTIONS-->CAMERA** provides edit boxes for camera parameters. This is also the only place that you can input Z axis rotation values.

3. **Setting Up Ink Amounts:** With Version 1.5, Ink9000 now supports colors (textures). See the section of this document below entitled “**Using Textures in Ink9000**”. As a consequence, one must set the ink level (the area covered) and the value level (lighter or darker). Below is a screen shot of the parameter for setting inking level:



*Illustration 2Ink
Level Settings*

Ink Levels refers to the amount or area that will be set for a given side. For example, a setting of **Left** 0.8 means all polygons with a “leftness of 0.8 or less will be marked with the mixing attribute associated with the left side (which can be one of three variable levels “lighter”, “darker A” or “darker B”). The maximum value for ink levels is 1.0, and the minimum 0.0.

Line Parameters refers to the properties of the cartoon inking line. These values can be adjusted to increase or decrease thickness. Should you wish to eliminate the cartoon line entirely menu **OPTIONS-->CAMERA** contains a check box that can be cleared.

Ink Angle settings are used for determining which planes of the object are considered axis aligned. For more information see the section of this document entitled "**Ink Angle Settings**".

To see the changes, use menu option **MODE-->RENDER** and then press the **REFRESH** button at the bottom of the tab, or use **CAMERA-->REFRESH**. Provided in the samples folder is a file called "minnie.scn". This is a scene file, which stores all settings that you make for a given display, such as inking level, values, and line width. This can be loaded with **CAMERA-->LOAD**, and changes can be saved with **CAMERA-->SAVE**.

4. Mixing Levels: Below are screen shots of the **MIXING** tab, where a side is associated with a value level, and those values levels may be adjusted:

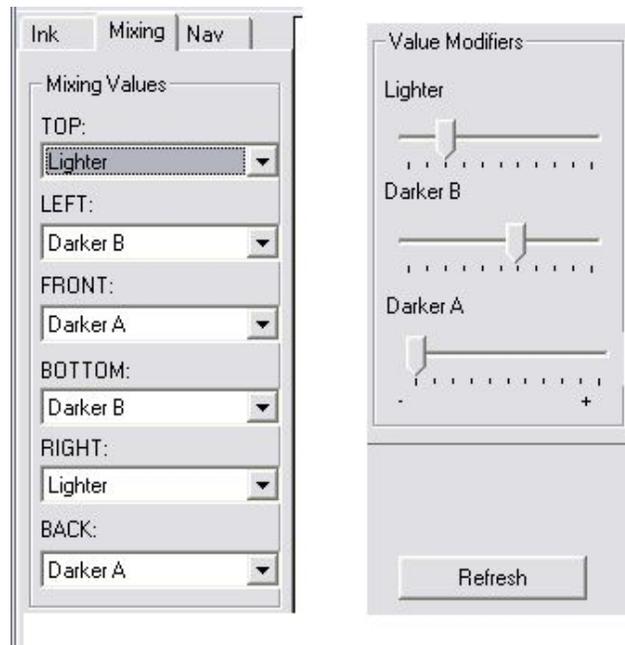


Illustration 3 Mixing Levels

A mixing value is assigned to a side, and will only affect the image if a ink level for that side is specified on the **Ink** tab.

There are three levels:

- **Lighter**--the area will be upped in value
- **Darker A**--the area will be lowered in value
- **Darker B**--the area will be lowered in value

This is shown in the left side Illustration 3, Mixing Levels. On the right side of that illustration, are sliders that allow adjusting the effects of these three levels. Sliding to the left lightens the value (-) to the right darkens the effect (+). As shown then the Lighter level is lighter than usual, while Darker A is lighter as well. It is possible to get overlap in the various levels, but generally, the Lighter level averages a higher value than either of the Darker ones.

Any changes can be viewed by press the **REFRESH** button while in **RENDER** (menu option **MODE-->RENDER**) mode.

To summarize, the **INK** tab specifies what area is covered, and the **MIX** tab specifies the value effect on the texture.

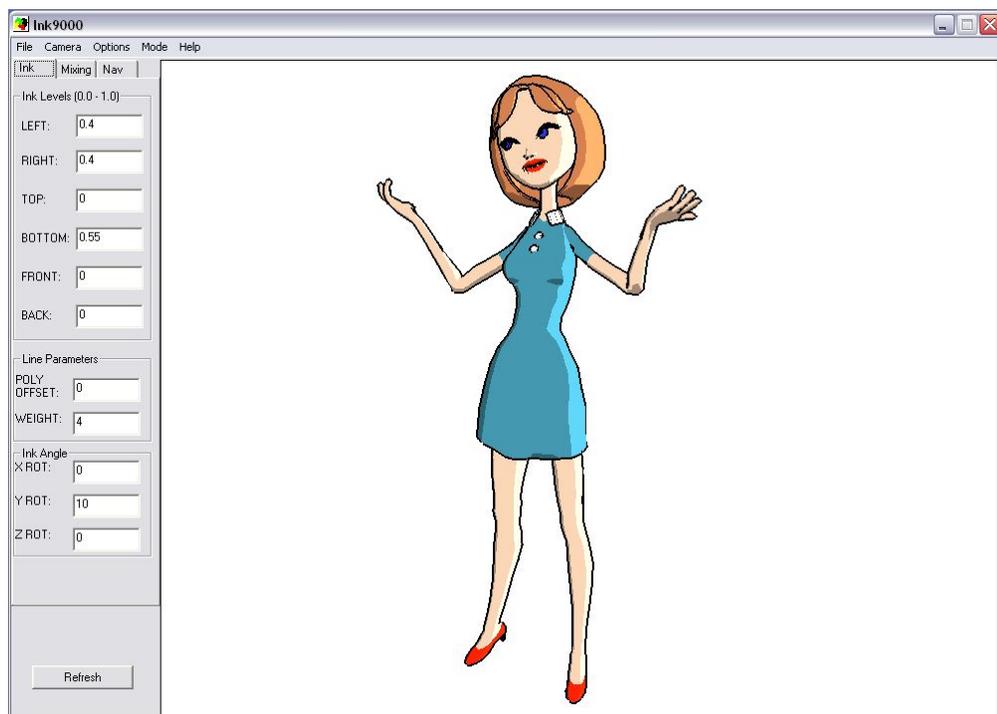


Illustration 4 Rendered Image

The screen should look like the above in **RENDER** mode. To save the image, you can use the **FILE-->SAVE VECTOR** option. This saves the output either

as Illustrator '88 or SVG formats. **FILE-->SAVE BITMAP** will save the image as well, but in TGA format as a bitmap.

Using Textures In Ink9000

Ink9000 supports colors through the use of textures assigned in your modeling program. The textures can be separate bitmaps or a single UV mapped file. Only windows bitmaps (*.BMP) are supported at this time. These textures do not need to be a single color, and can be used for logos, designs or anything else. **NOTE:** Vector output will work best if color boundary lines are ALIASED. The vectorizer will interpret anti-aliasing poorly. This is not an issue for bitmap output however.

The sample OBJ file that comes with the distribution was textured in the POSER 5 material room, by assigning a flat color bitmap to the materials that were listed in the room.

Black and White Only

Should you wish to render only in black and white, as in previous versions of the software, you have two choices:

1. Set all materials to point to a single bitmap, which can be white or gray, should you wish for the entire mesh to be a middle tone.
2. Remove the *.MTL file. Ink9000 will default to all white mode if it cannot find the MTL file associated with the *.OBJ file. The value of white defaults to 245, but can be set in the **OPTIONS-->CAMERA** Default Color. If you change this after loading a model, you will need to reload the model.

Ink Angle Settings

The Ink Angle settings of the INK tab allow you to move the area that is inked along 3 degrees of freedom. This effect also applies in other rotations as well. Below is an illustration of that effect:

Ink Angle Effects



Y rot 0



Y rot 45



Y Rot 90

Illustration 5 Effect of Inking Angle

Other Options

Menu **OPTIONS-->CAMERA** displays a dialog that allows you to set various options, some of which have been mentioned above. **ROTATION** and **TRANSLATION** values allow for precise setting of model position.

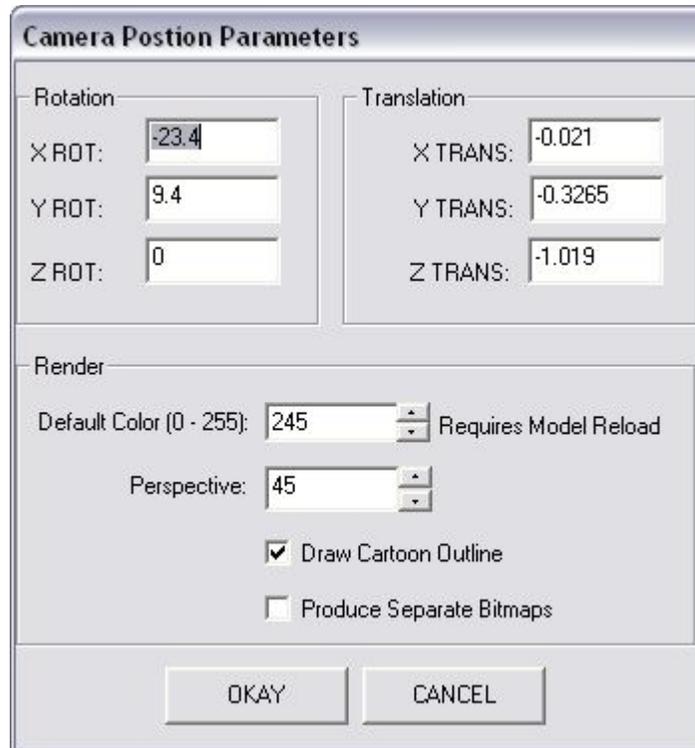


Illustration 6 Camera Options Dialog

Normally, these are set with the mouse, but may be adjusted here for precise control. Also, this is the only place to adjust Z Rotation (banking). **RENDER** settings include the value level for the default color. If a material does not have a specified texture, if the texture file cannot be found, or if the MTL file cannot be found, materials will default to this value. **PERSPECTIVE** sets the camera angle, the larger the value the more of a fish-eye effect. The "Draw Cartoon Outline" toggles the presence of the black outline drawn around the object. "Produce Separate Bitmaps" will issue out *.tga files that contain the outline, a flat color map, and a shadow map to the /temp directory on the same drive as the program. This output is created when you select **FILE-->SAVE VECTOR**, in addition to the standard output. These files are sidemap.tga, flatcolor.tga, and lines.tga. Test.tga is the composite. These files are overwritten each time you request a render, but can be used for manipulation experiments.

OBJ File Support

Ink9000 requires the following properties of the OBJ files that it uses:

1. Normals must be specified
2. UV coordinates must be specified for texturing to work
3. Vertex information

Normals cannot be automatically computed as this requires specifying the the crease angle, which is too important to assume.

Contact and Questions:

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