CONTENTS

OVERVIEW

Via Nova ® and Animated 3D Objects Screen Saver I are trademarks of Zachary Hilbun
Zachary Hilbun Copyright © 1995-1997
All rights reserved.
Written by Zachary Hilbun,   Dallas, Texas

   The Via Nova Animated 3D Objects Screen Saver I was designed to produce animated 3D (3 Dimensional) images.   Several colorful 3D objects can be customized to your preferences as to color, size, and motion.   The default configurations which control how the 3D objects are animated were designed assuming an average computer, and can be improved if you have a faster computer.   As an example, if the 3D objects move too fast or too slow you can modify the delay times, the size of the 3D object, or how far it moves each time it is rendered.   You can reconfigure the 3D objects any time you want, giving you a wide variety of images in one screen saver.   Or you can simply use the default setting for each object.

   The file READ_ME.TXT contains information on how to install, select, enable, and test the screen saver.   This file needs to be read and the operations performed before the screen saver will function.   When the SETUP program completes, a directory named "Via Nova" will be created for the configuration files.   On Windows 95 the configuration directory will be in the installation directory.   On Windows NT the configuration directory will be in your home directory.

   A program group will also have been automatically created.   Icons will also be available for:

1. Screen Saver Configure.   Configuration of the screen saver and generate the order / registration form.
2. Order and Register.   This brings up the entry in the Help file that documents how to order and register the screen saver.
3. Activate Screen Saver.   This can be used to display the screen saver without waiting for the "computer idle" timeout period.
4. Help.   Displays the Help file
5. Readme.   Displays this readme file.
6. What's New.   Displays what's new in this version.
7. Uninstall.   Uninstalls the screen saver.

   To access the icons / entries:

1. Press the "Start" button.
2. Select "Programs".
3. Select "Via Nova".
4. Select the entry.

   The screen saver uses OpenGL, a 3D graphics rendering system which comes with Windows NT and which is available for Windows 95.   It doesn't require an OpenGL 3D graphics accelerator board, but will automatically use any   which is available.   Note that some boards only support OpenGL acceleration in certain combinations of colors and resolutions.

   The screen saver requires Windows NT 4.0 or later, or Windows 95.   Windows 95 requires that OpenGL be installed on it.   This package will install OpenGL on your Windows 95 system.

HINTS, FREQUENTLY ASKED QUESTIONS

Q.   How do I put my own initials or company name where text is used?

A.   The default configrations that contain text start with "3D Text -".   You can copy or change these and make your own configurations.   There are some configurations which contain initials and the company name.   When you change the text in these configurations, all configurations that use initials and company name text will also be changed.   The configurations to change are:

1. 3D Text - Company Name
2. 3D Text - Initials
3. 3D Text - First Initial
4. 3D Text - Middle Initial
5. 3D Text - Last Initial

To change text:

1. Configure Edit from main menu.
2. Edit Configuration.
3. Copy an existing configuration if one exists that does what you want.   Use the "New Configuration Name" field and "Copy Configuration" button.
4. Double-click a configuration, or specify a new one using the "New Configuration Name" field and "Add Configuration" button.
5. Select "Parts Composing This Object".
6. Select part "3D Text".
7. Select "Edit Object".
8. Change the text.

Q.   How do I specify the images/photographs I want to see?

A.   Images, such as a photograph, are often applied to a rectangular object, although they can be applied to any 3D object.   The default configrations that contain images start with "3D Image -".   You can copy or change these and make your own configurations.   To specify images/photographs.

1. Configure Edit from main menu.
2. Edit Configuration.
3. Copy an existing configuration if one exists that does what you want.   Use the "New Configuration Name" field and "Copy Configuration" button.
4. Double-click a configuration, or specify a new one using the "New Configuration Name" field and "Add Configuration" button.
5. Select "Image/Phote To Apply To Object".
6. After exiting"Image/Phote To Apply To Object", select "Parts Composing This Object".
7. Select the kind of part you want your image displayed on.   You may need to delete any existing part by using the "Delete Part" button.   "List Of All Parts" lists the choices. After choosing, use the "Add Object Before" to select the choice. Choose "Square" under "Object Names" for a simple photograph.
8. You may need to use "Easy Motion Configure" and "Advanced Motion Configure" to place your image on the screen.

Q.   What's the easiest way to make my own configuration.

A.   The easiest way is to find an existing configuration that does something similar to

what you want.   You can then copy it using the "Copy Configuration" button, and modify it to be what you want.   You can also use "Easy Motion Configure" under the "Edit Configuration" dialog box, to specify a general description of what you want.

Q.   Where can I find additional default configurations?

A.   See our web page for additional configurations that you can download.

Q.   How do I register the program?

A.   See the "Register / To Buy" section of the Help file.

REGISTRATION

   Check our Web page for any new registration information.   Check the Web page or call us for   information on how to send a fax.

PRICING

   The typical price for one screen saver is **$23.00** as shown below.   When multiple copies are being ordered the Handling / Registration fee of $3.00 is only added one time.

Single Copy $20
Or _____ Copies at $17 each =   _____
Handling/Registration fee   + $3.00
Texas residents add 8.25% sales tax   + _____
Total payment   _____
   (e.g. 1 copy is $23.00 outside of Texas)

HOW TO REGISTER THIS PROGRAM

   After the Via Nova Animated 3D Objects Screen Saver I is installed, and prior to registration, it will operate with partial functionality.   A 3D object will be drawn a few times and then a registration reminder will be displayed.   The display of the registration reminder will slow down the rendering of the 3D object.   There is also a limit on how long the configuration application will run.   After registration, a password supplied by Via Nova will allow full functionality.   The instructions which follow refer to dialog boxes and contents within them.   An explanation of these will appear later in this document.   The general registration process is as follows:

   To create the order form:

1.   Press the "Start" button.
2.   Select "Programs".
3.   Select "Via Nova".
4.   Select "Screen Saver Configure".
5.   Select "Order Form And Password".
6.   Select "Create Order / Registration Form".
7.   See more details below.

1.   Fill out a registration/order form by selecting "Order Form and Password", then "Create Order / Registration Form" under the screen saver menu.   This command will compute the price you will pay based on the number of copies ordered, and sales tax if you live in Texas, USA.   Use the same name on the order / registration form that you will use to pay with.   If they are different, use the "Flag Registration" field on the order form to specify another name.
2.   Send the order form to Via Nova.   You can do this either by phone, fax, e-mail, or by postal mail.   If possible, the order form should be sent by e-mail regardless of the payment method.   Note that EVEN IF YOU PAY BY   Compuserve, YOU WILL STILL HAVE TO SEND IN THE Via Nova ORDER FORM created by "Create Order Form", it contains the unique ID for your computer.   When sending the e-mail, use the word "Registration" for the subject.   DO NOT send the registration form as a file attachment.
3.   Pay for the screen saver.   If possible, the order form should be sent by e-mail regardless of the payment method.   Note that EVEN IF YOU PAY BY   Compuserve, YOU WILL STILL HAVE TO SEND IN THE Via Nova ORDER FORM created by "Create Order Form".   See

below for details on how to pay.
4. Via Nova will reply with a password for your computer.
5. When you receive the password, enter it after selecting "Order Form and Password", then "Set Via Nova Password" under the screen saver menu.

   If the screen saver is moved to another computer, it will not be fully functional on the new computer.   A new password will be needed for that computer.   If the disk drive that the screen saver is on is formatted the password will no longer work.   Registered owners may request a new password free of charge if a computer upgrade causes their password to no longer be valid.   Registered owners may also request a new password free of charge if they move (not copy) the application from one computer to another.   When requesting a new password, send in the registration form created on the new computer.   Place a note in the "Flag" field of the registration form.

FOR COMPLETE DETAILS ON REGISTRATION <u>YOU MUST SEE</u>.

<u>REGISTRATION/ORDER FORM</u>

REGISTRATION/ORDER FORM

A command is provided to create an order form.   The order form must be created on the machine the screen saver will run on.   Most of the fields on the order form are optional.   The required fields are marked.   After the order form is completed, the application copies it to the Windows Clipboard, just like you had done an Edit Cut/Copy command.   It can then be pasted into any e-mail or word processor editor using Edit Paste or Ctrl v, or printed.   The order form is activated by selecting "Order Form and Password", then "Create Order Form" command under the menu.   <u>If possible, the order form should be sent by e-mail regardless of the payment method.</u>

To create the order form:

1. Press the "Start" button.
2. Select "Programs".
3. Select "Via Nova".
4. Select "Screen Saver Configure".
5. Select "Order Form And Password".
6. Select "Create Order / Registration Form".
7. See more details below.

To Paste the form after it has been created:

To send to us using e-mail (the preferred method).

1. Go to your e-mail application.
2. Select the command you normally use to create an e-mail.
3. Put the mouse cursor in the window for the e-mail text.
4. Click the left mouse button.
5. Select the Edit then Paste commands.
6. The e-mail address and e-mail subject are near the top of the form.
7. DO NOT send the form as a file attachment.

To send to us using postal mail.

1. Go to your word processor.
2. Select the command you normally use to create a new document.
3. Put the mouse cursor in the window for the document text.
4. Click the left mouse button.
5. Select the Edit then Paste commands.
6. Use the word REGISTRATION for the top line of the address.

If the order form is received by Via Nova as an e-mail, it will be checked and processed by a computer.   Don't modify the order form after it has been created.   If you want to change it, execute the "Create Order Form" command again.   Check the order form after it has been created to make sure you agree with the price and other information.   Most of the input fields in the order form dialog box can hold more text than is displayed at one time in the input field.   The input fields will automatically scroll to accommodate extra text.   See "Payment" below for payment and registration options.   If you have a problem creating the order form, there file order.txt in the installation directory.

<u>NEXT ></u>

When this button is pressed, the next dialog box for order form creation is displayed.

CREATE FORM

   When this button is pressed, the information in the order form will be checked, and copied to the clipboard.

NAME AND STREET ADDRESS

   The name must always be present, the street address must be present if you want your password sent by postal mail.

E-MAIL ADDRESS

   The e-mail address must be present if you want your password sent by e-mail.

FAX AND PHONE NUMBERS

   A fax number must be present if you want your password sent by fax.   Include the area code on all phone numbers.

PASSWORD BY

   This specifies the method of sending the password to you.   One of the choices must be selected.

COMPUTER ID

   This is the ID number generated by the Via Nova application that is unique to your computer.   If you are registering more than one screen saver, you can add ID's to the list. Separate multiple ID's by spaces.   If you are registering the screen saver for a computer other than the one you are filling out the form on, you can change the ID.

PAYMENT

   This specifies the method of sending us the payment and registration.   <u>If possible, the order form should be sent by e-mail regardless of the payment method.</u>   The total payment is calculated by the order form generation command, and is based on the number of ID's to register, Texas sales tax (if any), the price of the application, and the handling fee.   Paying by mail will be slower than by e-mail.

CHECK

   Checks must be in U.S. dollars, drawn on a U.S. bank, or an international postal money order in U.S. dollars.   Our   <u>contact information is</u>.

COMPUSERVE

   If you pay using Compuserve, the payment for the screen saver is added to your Compuserve bill.   Compuserve will only allow payment/registration for a single copy of an application at one time.   If you are ordering multiple copies, you will receive a discount, and may want to choose a different payment method.   Note that EVEN IF YOU PAY BY Compuserve, YOU WILL STILL HAVE TO SEND IN THE Via Nova ORDER FORM created by "Create Order Form", it contains the unique ID for your computer.   Our   <u>contact information is</u>.   To register using Compuserve:

1. To get to the registration forum use "go swreg".
2. Use registration number 8751.
3. Compuserve will add the purchase price to your bill.
4. Compuserve will send us the information you provide them.
5. Fill out OUR order form by selecting "Order Form and Password", then "Create Order   /   Registration Form" in the screen saver menu.
6. Send in the registration form either by e-mail or by postal mail.
7. Via Nova will send the password to you after we receive confirmation from Compuserve.

CREDIT CARD

If you have a Compuserve account, you may find it easier to use that than a credit card. See our Web site for the most complete instructions on paying by credit card and any other electronic means.   You may pay by telephone or by using the Internet.   Our   <u>contact information is</u>.

FLAG MY REGISTRATION

The <u>registration</u> form is normally processed by computer.   If you think it needs manual processing, enter text into this field.

OTHER FIELDS

"Put me on your e-mail list" will notify us to send you Via Nova product related e-mail, such as upgrades to the screen saver, new products, or for a small number of people, a satisfaction survey.   "OpenGL Accelerator Present" specifies whether you have an <u>OpenGL 3D graphics accelerator board</u> in your system.   "System" is the operating system and processor type of the system which is used to create the order form, if it is different from the computer which the screen saver will be running on, it can be changed.   "Speed in MHz" is the speed of the computer, e.g. 33, 60, 75, 90, 120, 133.

CONTACT INFORMATION

   Technical support is available for a version of the product as long as that version is being sold.   When requesting support through e-mail, include your phone number in case it is needed.

INTERNET

WWW SITE

   Via Nova has a World Wide Web site at the address http://www.vianova.com.   This site has the latest version of this program, new registration information, as well as other programs by Via Nova, and information relating to our products.   It can also be used to send e-mail to us.

E-MAIL

Registration: orders@vianova.com
Technical support: support@vianova.com
Suggestions: suggestions@vianova.com
Custom work: custom_work@vianova.com

PHONE

   E-mail or postal mail is the preferred method of contact.   Phone contact is available 9:00AM to 5:00PM CST USA, Monday through Friday.

Support: 214-357-6332
Orders: 800-931-2111

POSTAL MAIL

Via Nova
P. O. Box 780123
Dallas, TX   75378-0123

TUTORIAL

OVERVIEW

   The Via Nova Animated 3D Objects Screen Saver I can be run without custom configuration, however it is fun to configure the screen saver to choose which 3D objects will be displayed, what they will look like, and how they will be animated.   You can create new 3D objects by combining existing 3D objects into larger objects.   You can animate the 3D objects in a number of different ways.   You can make the 3D object move from a "Start Point" to a "Stop Point" of your choice.   After the 3D object has reached the "Stop Point" the same motion will be repeated.   You can make the 3D objects roll, tumble, or twist by specifying a "Constant Rotation".   "Constant Rotation" can be done while the 3D object is being moved.   You can also configure the screen saver to display multiple screens in succession, or to display only 1 configuration when the screen saver is activated.   If the 3D objects move too fast or too slow you can modify the delay times, the size of the 3D object, or how far it moves each time it is rendered.

   This is a tutorial on configuring the screen saver to change its appearance.   It is best to read the tutorial in sequential order.   You can do this by using the browse buttons.   Click ">>" to see the next "Help" topic, click "<<" to go back to the last "Help" topic.   You can also get to the next topic by clicking the first underlined text after "See Also", then click the first underlined text on the new screen.

See Also

MENU

SPEED

APPEARANCE

MENU

This is the main menu, and gives a choice of actions the screen saver can perform.

1. Press the "Start" button.
2. Select "Programs".
3. Select "Via Nova".
4. Select the "Screen Saver Configure" entry.

Although more difficult, you can also access it through "Control Panel".

1. Select the "Start" button.
2. Select the "Settings" button.
3. Select the "Control Panel" button.
4. Select "Display".
5. Select the "Screen Saver" tab.
6. Select the "Settings..." button.

FILE

This contains the Exit command.   Exit is selected when no more commands are to be given.

See also

CONFIGURE EDIT

DISPLAY

ORDER FORM AND PASSWORD

HELP

CONFIGURE EDIT

CONFIGURE EDIT

   This submenu is used to bring up <u>dialog boxes</u> that you use to configure the appearance and motion of the 3D objects, and for how long the screens are displayed.

SPECIFY NUMBER OF SECONDS TO DISPLAY LOGO

   This command is used to specify the number of seconds to display the Via Nova logo before the first configuration is displayed.   A value of 0 will prevent the logo from being displayed.

DISPLAY MULTIPLE SCREENS ON EACH ACTIVATION

   This command is used to specify that multiple screens are to be displayed on each activation.   The screens are displayed in sequential order according to the Display List.   In multiple screen mode, each configuration can be configured to display for a specified amount of time or number of renderings.

EDIT CONFIGURATION

   The names of configurations are listed.   A configuration name is selected in order to edit it.   By selecting one of the names, the "Edit Configuration" <u>dialog box</u> is displayed.   The configuration dialog boxes are used to configure the appearance and motion of the 3D objects.   These dialog boxes allow the screen saver to be configured to suit individual taste, or the speed or capability of your computer hardware.

See Also

<u>EDIT CONFIGURATIONS DIALOG BOX</u>

<u>EDIT CONFIGURATION DIALOG BOX</u>

EDIT LAST CONFIGURATION AGAIN

   This command is used to bring up the "Edit Configuration" <u>dialog box</u> that you use to configure the appearance and motion of the 3D objects.   It does not bring up the "Edit Configurations" dialog box.   The last configuration selected using the "Edit Configurations" dialog box is used.

See also:

<u>EDIT CONFIGURATION</u>

EDIT LAST SCREEN DISPLAYED BY SCREEN SAVER

   This command is used to bring up the "Edit Configuration" <u>dialog box</u> that you use to configure the appearance and motion of the 3D objects.   It does not bring up the "Edit Configurations" dialog box.   The last configuration displayed by the screen saver when it was activated due to a period of no activity is used.

See also:

STOP

This command stops the configuration begin tested.

TEST

This submenu is used to test the configuration of 3D objects.   When testing under the Windows 95 Interface, the task bar at the bottom can be made smaller to give more room on the screen for display.   This is done by using the mouse to resize it in the same way a window is resized.   This must be done before the test is run.

TEST NEXT CONFIGURATION

This command is used to test the next enabled configuration.   You can repeatedly execute this command to test all the enabled configurations.

TEST LAST CONFIGURATION EDITED

This command is used to display the results of the last configuration that was done. There is also a "Test" button in the "Edit Configuration" dialog box, and using that test button is probable more convenient if you are doing a configuration.   After it is pressed, the screen saver will display the configuration which was last edited.   Use the "Stop"   command to stop the test.   This button should be used instead of the "Preview" button found in the "Display" dialog box "Screen Saver" tab.

If the "Preview" button under the "Display" dialog box "Screen Saver" tab is used, each time it is pressed it will test the next configuration which has been checked for display.

STOP

This command stops the configuration begin tested.

DISPLAY

<u>DISPLAY</u>

This submenu is used to display various forms of information.

DISPLAY LICENSE AGREEMENT

This command displays the license agreement for this product.

DISPLAY INSTALL INFO

This command displays a <u>dialog box</u> displaying installation information, such as the version of the operating system at the time of installation, and the password for the machine the screen saver is installed on.

ABOUT BOX

This command displays a <u>dialog box</u> describing the screen saver, the Via Nova company, and contact information.

SLIDE SHOW

This command displays the configurations which are enabled for display.   A dialog box allows the user to control which configuration is displayed by selecting Next, Back, and Cancel.

PIXEL FORMAT

This command displays information on how the screen is set up for rendering.   It is used for diagnostic purposes.

DON'T DISPLAY 256 COLOR WARNING

If your system is set up for only 256 colors, then you will not see realistic colors.   You will be warned of this situation multiple times.   This command can be used to turn off the warnings after they have appeared enough times.

ORDER FORM AND PASSWORD

This submenu has commands for creating an order form and setting the password.

CREATE ORDER / REGISTRATION FORM

This command is used to create an order form which can be sent to Via Nova.

See also:

REGISTRATION/ORDER FORM

SET VIA NOVA PASSWORD

This command displays a dialog box which is used to enter the password for the screen saver.   This is not the same Microsoft Windows related password that is (optionally) entered to reenable the computer after the screen saver has been activated.   The screen saver will not be fully functional until the password is entered.   This password will be sent to you after you register.   After the initial entry of the password, your screen saver will be fully functional and you will not have to re-enter the password.

HELP

HELP

INDEX

This command displays the "Help" file for the screen saver.

USING HELP

This command displays the "Help" file for the "Help" file.

ABOUT BOX

This command displays a dialog box describing the screen saver, the Via Nova company, and contact information.

EDIT CONFIGURATIONS BOX

This dialog box has 2 tabs and allows you to choose:

1. Which configuration to edit.
2. Which configuration to test.
3. Which configuration to delete.
4. Which configuration to copy.
5. Which configurations will be displayed by the screen saver.
6. The name of a configuration.

EDIT CONFIGURATIONS TAB

The "Configuration to Edit" entries in the list box are used to select which one of the configurations to edit, test, etc.   Each configuration has a name associated with it.   The configurations are listed in alphabetical order in the listbox.   There are several default configurations.   You can modify or copy these configurations, or any of the other configurations.   Some of the 3D text configurations are for a person's initials and company name.   If you change these, those changes will appear in every configuration that refers to those configurations.

CONFIGURE

This button is used to edit a configuration.   The currently selected configuration has the configure dialog box displayed.   This can also be done by double-clicking the entry.

TEST

The currently selected configuration is tested.

NEW CONFIGURATION NAME

This field is used when a new configuration name needs to be specified.   A configuration name must be a legal file name.

ADD CONFIGURATION TO DISPLAY

Adds the configuration that is currently selected in the "Configuration to Edit" list box, under the Edit Configurations tab, to the "Configuration to Display" list box.

ADD CONFIGURATION

Creates a new configuration using the name in "New Configuration Name", and adds it to the "Configuration to Edit" list box.

DELETE CONFIGURATION

Deletes the configuration currently selected in the "Configuration to Edit" list box.

COPY CONFIGURATION

Creates a new configuration using the name in "New Configuration Name", and adds it to

the "Configuration to Edit" list box.

CHANGE NAME

Changes the name of the currently selected entry in the "Configuration to Edit" list box to the name in "New Configuration Name".

ADD DEFAULT CONFIGURATION

Displays a list of the default configurations that are built into the screen saver.   If one of them is selected it will be added to the "Configuration to Edit" list box.

EDIT CONFIGURATION DISPLAY LIST TAB

Each time the screen saver is activated the next enabled configuration will be displayed. Either 1 configuration can be displayed at a time, or multiple configurations can be displayed successively.   If only one configuration is enabled then it will be displayed every time.   By enabling only some of the configurations, you can configure the screen saver to do a slide show.   E.g. by enabling only 3D text configurations you can display 3D text of your choice on the screen for a few seconds, and follow that by other 3D text of your choice. The "Activate Screen Saver" icon can be used to activate a slide show of this type, or you can use "Display", then "Slide Show".

The "Configuration to Display" entries in the list box are used to select which of the configurations to display when the screen saver is activated.   The "Enabled" colume is used to indicate which of the configurations will actually be displayed on screen saver activation. A configuration can be disabled if you want to keep it in the list but not display it.   There are several default configurations in the list.   The configurations can be moved in the list box by using the mouse to Drag and Drop.

CONFIGURE

This button is used to edit a configuration.   The currently selected configuration has the configure dialog box displayed.   This can also be done by double-clicking the entry.

TEST

The currently selected configuration is tested.

ADD CONFIGURATION

Adds the configuration that is currently selected in the "Configuration to Edit" list box, under the Edit Configurations tab, to the "Configuration to Display" list box.

DELETE CONFIGURATION

Deletes the configuration currently selected in the "Configuration to Display" list box.

ENABLE / DISABLE FOR DISPLAY

Toggles the Enable / Disable status of the currently selected entry in the "Configuration to Display" list box.

OK, CLOSE, CANCEL

The dialog box is exited.   Any changes made are always permanent.

EDIT CONFIGURATION DIALOG BOX

   This <u>dialog box</u> allows you to modify each configuration's appearance, motion, and composition.   The configuration is set to a default which can be changed by using this dialog box.   The new configuration will be saved and used the next time this configuration is displayed.   You can create new 3D objects by combining existing 3D objects into a larger 3D object.   The "Parts Composing This Object" button is used to specify which 3D objects and configurations will be used to compose this configuration.   <u>This button is also used if you want to modify a property of a 3D object, such as text</u>.

   The default configurations were designed assuming an average computer and can be improved if you have a faster one.   For example, with a faster computer, you might be able to draw a 3D object closer to the viewer, and the 3D object would therefore be bigger than the default, and you would still have acceptable animation speed.   Or, with a faster computer, you might be able to rotate the 3D object faster than the default, etc.   If the 3D objects moves or spins too fast you can modify setting to use smaller steps, or insert a delay in the <u>rendering</u>.   Even if you don't have a faster computer, you can make many changes to the default settings to suit your taste, or for variety.   After you have changed a configuration, you can check the results by clicking the "Test" button in this dialog box, or the "Test Last Configuration Edited" command under the "Test" submenu.   You will probable have to test you new settings frequently at first, until you get used to the best range for each variable.

   You don't have to understand all of the following documentation in order to change the configuration.   Simple changes, such as the color of a 3D object, can be changed with only a few mouse clicks.   A DIALOG BOX NAMED "Easy Motion Configure" ALLOWS YOU TO SPECIFY, IN A FEW SIMPLE TERMS, HOW YOU WANT THE 3D OBJECT ANIMATED.   If you want to, you can then modify the configuration it created.

   The 3D objects rendered by this application are composed of multiple polygon surfaces. These surfaces are put together in such a way that they resemble a 3D object such as a teapot or a cube.   Each 3D object has a "Front" surface which is the exterior surface of the 3D object.   It has a "Back" surface which is the interior surface of the 3D object.   For most 3D objects you will only want to see the "Front" or exterior surface, exceptions are the cone, cylinder, and teapot, or Via Nova logo.   When the 3D object is displayed it is lit by a single light source.   The intensity and position of this light source can by specified by you.   You can also specify how the 3D object is to be moved about the screen, or animated.   The surface characteristics of the 3D object can also be specified.   You can specify the color and how shiny the surface is.

   This dialog box contains a "Hint" about how to configure 3D objects in general.   Most of the buttons in the dialog box bring up another dialog box which allows some aspect of 3D object configuration to be specified.   The following sections describe the options in the dialog box.

See Also

<u>TEST</u>

<u>EASY MOTION CONFIGURE</u>

<u>ADVANCED MOTION CONFIGURE</u>

<u>FRONT COLOR</u>

BACK COLOR

BACKGROUND COLOR

OBJECT QUALITY

LIGHT

OBJECT PROPERTIES

IMAGE/PHOTO TO APPLY TO OBJECT

DELAY

PARTS COMPOSING THIS OBJECT

MULTIPLE SCREEN DISPLAY

EFFECTS ON 3D OBJECTS

TEST

This button is used to display the results of the configuration that is currently being done. After it is clicked, the screen saver will display the 3D objects, some sliders to control some aspects of the configuration, and a "Stop", "Wireframe", and "Drag In Wireframe" button. Select the "Stop" button to stop the test.   The "Test" button is more convenient than using the "Test Last Configuration Edited" command   under the "Test" submenu.   When testing under the Windows 95 Interface, the task bar at the bottom can be made smaller to give more room on the screen for display.   This is done by using the mouse to resize it in the same way a window is resized.   This must be done before the test is run.

The "Wireframe" button toggles the rendering of the 3D objects between solid and wireframe mode.   Every time the button is pressed, the mode switches from one mode to the other.   The "Drag In Wireframe" button causes the 3D object to be rendered in wireframe mode whenever the 3D objects are being moved using the draggers.

EDITING WITH LEFT MOUSE BUTTON

One way to edit a   configuration, either for the current configuration, or for a part of it, is to click on a 3D object with the left mouse button.   This will display a bounding box and some draggers which allow you to change some of the properties of the configuration.   The bounding box is a cube which surrounds the 3D objects which are parts of same configuration as the 3D object which was clicked.   3D objects which are parts of other configurations will not be affected.

A dragger is an object drawn on the screen which can be used to modify some aspect of the configuration.   The dragger is moved on the screen using the mouse in a drag-and-drop technique.   As the dragger is moved, the size, or some other aspect of the 3D objects change.   To move a dragger, the crosshair cursor is placed over the dragger and the left mouse button pressed and held down.   The mouse is then moved and the left button released.   As the mouse is moved, the dragger will move with it, and the 3D objects will change to reflect their changed property.   The properties that can be modified using draggers are: the scale factor under "Advanced Motion", the sizes under "Object Properties", and the "Translate (Radius) under "Constant Rotations".   There are draggers in the X, Y, and Z dimension.   The draggers for the X dimension are red, Y dimension green, Z dimension blue.   Not all draggers will be present.   Some 3D objects are only affected by a change to their "X/Top/Outer Radius" property, thus only the X dragger would be present.   The rotation draggers rotate the configuration in relation to a fixed X, Y, Z coordinate system.   Eg. if you rotate by X and then by Y, the Y rotation will be about the Y axis of the fixed X, Y, Z coordinate system, not the 3D object selected.

The dragger for changing the scale of a configuration is a double line.
The dragger for changing the size of a configuration is a single line.
The dragger for changing the radius of a configuration is a "T" shaped line.
The dragger for changing the position of a configuration is a "+" shaped line.
The dragger for changing the left base of a configuration is a "L" shaped line.
The dragger for changing the right base of a configuration is a backward "L" shaped line.
The dragger for changing the rotation of a configuration is a circle around the axis of rotation to be changed.

EDITING WITH SLIDERS

During a test, sliders are present on the screen on the left and top sides.   These sliders

are used to rotate and translate (move) the 3D objects in the selected configuration.   When the test is first started, or when no 3D objects are selected, they affect the top level configuration.   These sliders modify the "Static Rotation and Translate" properties.   The sliders are positioned on the screen in such a way that moving them moves the 3D object in the same direction.   Moving a slider is like moving a scroll bar.   A slider can be moved in two ways.   If you click on the track above or below the slider button, the slider will move a fixed distance.   The slider can also be moved using a drag-and-drop technique.   The rotation sliders rotate the configuration in relation to a fixed X, Y, Z coordinate system.   Eg. if you rotate by X and then by Y, the Y rotation will be about the Y axis of the fixed X, Y, Z coordinate system, not the 3D object selected.

EDITING WITH RIGHT MOUSE BUTTON

   While the test is being done, a configuration which is a "Part Composing This Object" can be edited.   This is done by using the mouse to place the crosshairs over a part that is in the configuration you want to edit, and then clicking the right mouse button.   This will display the "Edit Configuration" dialog box for that configuration.   Some of the buttons in the dialog will be unavailable, and will be greyed out.   You will need to stop and restart the test to see changes made to a configuration.   You can not use this method to display the "Edit Configuration" dialog box for the configuration you are currently testing.   If you click on a 3D Object which is in the current configuration, nothing will happen.   If you click in a spot on the screen which contains multiple 3D objects, then the "Edit Configuration" dialog box for each of these configurations will be displayed.
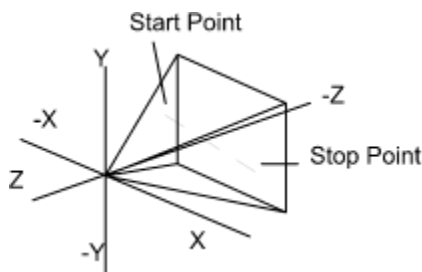
EASY MOTION CONFIGURE

This dialog box allows you to specify, in a few simple terms, how you want your 3D object animated.   If you want to, you can then modify the configuration the computer has created, using the commands in the "Advanced Motion Configure" dialog box.   The default motions created by "Easy Motion Configure" usually tradeoff speed for smooth motion.   You make selections in each of the option groups as defined below.

CREATE

This option determines whether the default configuration for this configuration is created, or if the selections you make will be used to create the configuration.   Select "Use Original Default" to create the default configuration for that configuration.   If this is selected, then all other selections in the dialog box will be ignored.   Select   "Use Selections Below" to specify that you want to specify a custom configuration using the other options in the dialog box.   You then select one option from each of the groups in the dialog box.   The configuration created by "Use Selections Below" will be reasonably good, but you may want to fine tune it after seeing the results by using the commands in the "Advanced Motion Configure" dialog box.   In particular, you may want to modify "Constant Rotation" and "Orbit / Spiral"; the rotation value that was created may be too fast or too slow for your computer, or you may want to change the direction the 3D object rotates.   You can also modify the "Repeat Motion" to cause the 3D object to oscillate back and forth.   The values for "Extra Margin" may also need to adjusted.   In general, after a configuration has been created, you can look at the non-zero values in the "Advanced Motion Configure" dialog box.   Modifying those values will change the animation of the 3D object according to what part of the animation is controlled by that value.   The values for "Static Rotation", "Extra Margin", and "Initial Rotation" are always set to the same default values.   Values for color, quality, properties, and delay are unaffected.

START TO STOP MOVEMENT PATH

This option determines the path that the 3D object will follow on the screen.   The text in the options describe the direction that the 3D object will move.   Selecting "No Travel" will result in a 3D object that does not move.   This option group creates values for the "Start Point", "Stop Point", and "Translate Unit" values of the "Advanced Motion Configure" dialog box, based on your desired travel path for the 3D object.   The value "Increase Speed By x" can be used to specify faster movement front the "Start Point" to the "Stop Point" than the default.   The default value is a 1, which will result in no change to the default speed.   A value of 2 would double the speed, a value of 3, triple it, etc.   Increasing the speed may result in jerky movement.   You may also have to modify "Extra Margin" under "Advanced Motion Configure" if artifacts are left on the screen.


AMOUNT TO MOVE OBJECT FURTHER AWAY

"Easy Motion Config" may result in a 3D object being too close to the viewer.   By putting a positive value in this field, you can move the 3D object further away.   A negative value will move it even closer.

DRAW 3D OBJECT CONTINUOUSLY

Checking this field will make sure that the rendering is repeatedly drawn.

CONSTANT ROTATION

This option determines how a 3D object will spin.   Selecting "None" will result in a 3D object which does not spin.   Selecting "Random" will result in a random spinning motion.   Selecting one of the "Rotate" options will spin the 3D object about the specified axis.   The 3D object can be rotated about the X, Y, or Z axis.   This option group creates values for the "Constant Rotation" values of the "Advanced Motion Configure" dialog box, based on your desired rotation for the 3D object.   The value "Increase Speed By x" can be used to specify faster rotation than the default.   The default value is a 1, which will result in no change to the default speed.   A value of 2 would double the speed, a value of 3, triple it, etc.   Increasing the speed may result in jerky movement.
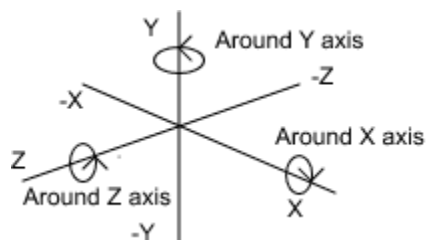
ORBIT / SPIRAL

This option determines if a 3D object will orbit or spiral as it moves.   The "Radius of Orbit" value determines the radius of the orbit or spiral.   A 0 value for "Radius of Orbit" will result in a 2nd spin being applied to the 3D object.   The computer will select a value for "Translate Unit" so that 3 spirals will occur between the "Start Point" and "Stop Point".   If you select "None", the 3D object will not orbit or spiral, and the "Radius of Orbit" value will be ignored.   Selecting "Random" will result in a constant radius with random rotations.   If you select "Orbit About" for X, Y, or Z, then the 3D object will orbit/spiral about the specified axis.   Selecting "Spiral From Start To Stop" will automatically configure the 3D object to spiral from the "Start Point" to the "Stop Point".   If however, "No Travel" was selected for "Start To Stop Movement Path", an orbit will result.   This option group creates values for the "Orbit / Spiral", "Start Point", "Stop Point", and "Translate Unit"   values of the "Advanced Motion Configure" dialog box, based on your desired orbit/spiral for the 3D object.   The value "Increase Speed By x" can be used to specify faster rotation than the default.   The default value is a 1, which will result in no change to the default speed.   A value of 2 would double the speed, a value of 3, triple it, etc.   Increasing the speed may result in jerky movement.   You may also have to modify "Extra Margin" under "Advanced Motion Configure" if artifacts are left on the screen.

ADVANCED MOTION CONFIGURE

See Tabs also

GLOBAL TAB

SCALE TAB

STATIC ROTATION AND TRANSLATE TAB

CONSTANT ROTATIONS TAB

ORBIT TAB

STATIC ROTATION TAB

TRANSLATE TAB

   You may want to read the section on EASY MOTION CONFIGURE   before reading this section.   When the 3D object is rendered, it must be rendered in a certain area of space to be visible.   The viewing volume, or area, is described in X, Y, Z Cartesian coordinates.   The Cartesian coordinate system uses X, Y, and Z numbers to specify a point in 3D space.   The point 0, 0, 0 is at the center of the screen.   The X axis is positive to the right, the Y axis is positive upward, and the Z axis is positive directly toward the viewer.   The Cartesian coordinate system is shown below.
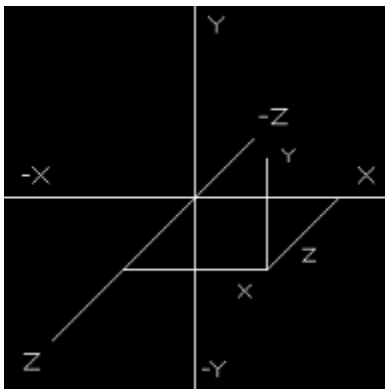

   The viewing volume is the volume or area that a 3D object can be rendered in and be seen by the viewer.   Think of the viewing volume as a 4 sided pyramid with the top tip at 0, 0, 0 and the body of the pyramid extending in the negative Z direction.   The viewer's eye is located at the top tip of the pyramid and is looking into the body of the pyramid.

   Any 3D object that is contained inside the pyramid can by seen by the viewer.   Any 3D object outside the pyramid can not be seen.   The field of view, or the angle at the top of the pyramid, is 45 degrees in the X and Y direction.   Because the viewing volume is pyramid shaped, as Z becomes more negative the values of X and Y that can be seen increase in both the positive and negative directions of X and Y.   Put another way, as you look deeper into the pyramid the pyramid gets wider in the X and Y direction.   A 3D object which is farther away can move further in the X and Y direction and still be seen.   If a 3D object is moved close enough to the screen, the part of the 3D object closest to the screen may be clipped off, and you can see the interior of the 3D object.   If viewing the interior of the 3D object is not checked (see Back Color) you will only see black inside.

The top of the viewing volume can be clipped off by specifying a "Near Clip".   The "Near Clip" is a point on the negative Z axis.   Anything in a 3D object which is closer than the "Near Clip" will not be seen.   The "Near Clip" can be used to look inside a 3D object by eliminating part of its exterior surface.

X, Y, Z points, distances, and angles used in <u>dialog box</u>es may sometimes be displayed in scientific notation.   This notation represents a decimal number by specifying a whole number and then the number of places to move the decimal point.   As an example, the number 5.e-002 is the number 5. with the decimal move two places to the left to give the number .05.   The "5." is the whole number, "e" indicates that this is scientific (or exponential) notation, and "-002" indicates moving the decimal point 2 places to the left.
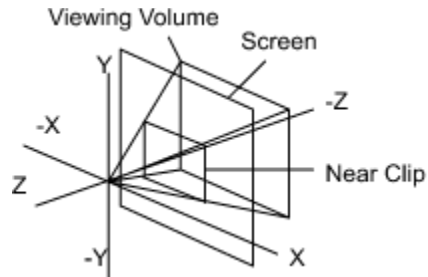

The computer renders the 3D object in one position, erases that, and instantly replaces that image with another image in a slightly different position, to make the 3D object appear to be moving.   Animation (movement) of a 3D object is done by repeatedly using the following process:

1. The appearance the 3D object is to have on this pass, and the area on the screen it is to appear, are determined by the computer.
2. The area on the screen where the 3D object is to rendered is erased.
3. The 3D object is rendered into that area.
4. The area on the screen where the 3D object was rendered is erased (optional, usually not done).
5. Repeat starting at step 1.

The points you will specify can be specified in coordinate systems other than the Cartesian coordinate system.   The cylindrical coordinate system (shown below) specifies points as a radius (called "r"), a Y value, and an angle about the Y axis (called "AY" for Around Y).   The AY angle starts from the positive Z axis and goes in a counter clockwise direction about the Y axis.   The cylindrical coordinate system is used when you want one object to be a certain distance from another object, and at a certain angle to it.
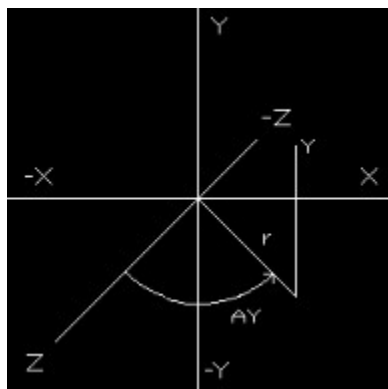
The spherical coordinate system (shown below) specifies points as a radius (called "r"), an angle from the XZ plane toward the Y axis (called "TY" for Toward Y), and an angle about the Y axis (called "AY" for Around Y).   The AY angle starts from the positive Z axis and goes in a counter clockwise direction about the Y axis.   The spherical coordinate system is used when you want one object to be a certain distance from another object, a certain angle above or below it, and a certain angle to the left or right of it.
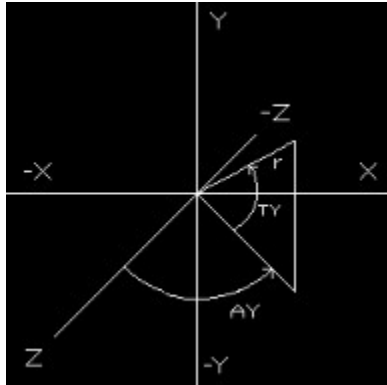
Angles in the cylindrical or spherical coordinate system can be specified as negative, which reverses their direction of rotation.   When you specify a point it can be specified in either of the 3 coordinate systems.   A POINT IS SPECIFIED IN A dialog box BY PRESSING A BUTTON WHICH HAS THE NAME OF THE POINT ON IT, such as "Start Position" or "Stop Position".   A dialog box is activated which contains a diagram similar to one of the 3 above. The "System" group allows you to select which coordinate system you want to specify the point in.   The "Coordinate" group allows the entry of the coordinates.   The labels for the coordinates reflect the currently selected system.   After the "OK" button is pressed, a display area under the point specification button displays the coordinate system in use and the 3 coordinates.

Some of the values in a dialog box require rotational angles about the X, Y, and Z axis. The input of these angles is similar to the input of a point.

LOGICAL ORDER TRANSFORMATIONS ARE DONE IN

The geometric transformations that can be applied to a 3D object are: "Scale", "Static Rotation", "Static Translate" (move), "Constant Rotation", "Orbit Rotation", "Static Rotation", and "Translate" (move).   These transformations are applied to a 3D object in the order they were just specified in, and are described below.   You will typically want to "Scale" (if needed) the 3D object, then point it in the right direction using "Static Rotation", and then move it into position using "Static Translate".   If you want to make it constantly rotate you can specify a "Constant Rotation".   "Orbit" is used to make a 3D object rotate about a center point, like a planet orbiting the sun.   The second "Static Rotation" is usually used to tilt a rotating or orbiting 3D object so that you can see it from other than a side view.   "Translate" is used to move the transformed object from a start point to a stop point on the screen.

For example, when the "Spacecraft" is rendered without any form of rotation, it points to the left, or down the -X axis.   Say you wanted to rotate the "Spacecraft" about a line that runs from is nose to its tail, and have the spacecraft point toward you, or down the +Z axis, while it is rotating.   You would   supply a "Constant Rotation" about the X axis of some value, and a value of 0 for Y and Z.   Also specify a 2nd "Static Rotation" of 90 degrees CCW about the Y axis.

You may find it easier to copy a configuration that does a motion simular to what you

need, and then modify it.

GLOBAL TAB

This tab specifies properties not related to a specific motion.

ERASE BETWEEN RENDERINGS

The options for this group are "No Erase", "Erase, Don't Show Being Rendered", and "Erase, Show Being Rendered".   Choosing "No Erase" will cause multiple 3D objects to be rendered on the screen without erasing between renderings.   Choosing "Erase, Show Being Rendered" will show the 3D object as it is being rendered.   This is only noticeable on complex 3D objects that take some time to render, such as the teapot.   Checking "Erase, Don't Show Being Rendered" will only show the 3D object after is has been completely rendered.   If a 3D object is being animated then "Erase, Show Being Rendered" should be selected.

ERASE AFTER RENDERING, INSTEAD OF BEFORE

Checking this box causes the screen to be erased after each repeated rendering instead of before.   Unless the 3D object takes a long time to render, it may be erased so quickly that all you see is a black screen.   You should try using "Extra Margin" before checking this box, it usually results in a faster rendering.   It is used when the values for   "Extra Margin" weren't adequate.   This is usually not needed, and is unchecked by default.   When it is checked, the X and Y values for "Extra Margin" will be set to 1.   See the explanation for Extra Margin for more information.

RESTART REPEAT OSCILLATE WHEN

"Translate" (move),   "Constant Rotation", and "Orbit Rotation" can all have their movements repeated.   When one of these reaches its endpoint, it can cause the others to restart at their endpoint as well.   The choices are "No Limit", "Translate Start or Stop Point Reached", "Constant Rotation Limit Reached", and "Orbit Rotation Limit Reached".

CONTINUOUS

Checking this box causes the 3D object to be repeatedly rendered.   If values are specified for "Constant Rotation", "Translate", or "Orbit Rotation", then continuous rendering is automatic, and you don't need to check this box.

EXTRA MARGIN

Normally, when a 3D object is rendered into an area on the screen, only a rectangular area slightly bigger than the 3D object is erased.   Erasing this small area results in a faster rendering than erasing the whole screen.   When animation is being done the areas being rendered into are usually very close together, and much of the previous rendering does not need to be erased.   Because the next rendered area overlaps it enough, then almost all of it is erased when the next area is erased.   If your configuration causes the current and last area to be fairly far apart, some part of the last 3D object that was rendered, may still be visible on the screen.   The X and Y values for "Extra Margin" allow you to specify that a larger area is to be erased before the rendering is done.   This larger area will then erase more of the previous rendering.   If artifacts from the previous rendering are to the left or right of the current rendering, then increase the X value.   If they are above or below, increase the Y value.   The minimum value of X and Y is 1, which results in no increase over the default size of the erased area.   A value of 1.1 or 1.2 is usually sufficient to solve the

problem.   If the areas being rendered into are very far apart it may be more efficient to use the "Erase After Rendering" checkbox as defined below.

NEAR CLIP

   The "Near Clip" is a point on the negative Z axis.   Anything in a 3D object which is closer than the "Near Clip" will not be seen.   In order to see the interior of a 3D object the "Back Side" checkbox in the "Object Properties" dialog box must be checked.

SCALE TAB

Scaling of the 3D object is done 1st.   These values allow a 3D object to be scaled in the X, Y, or Z dimension.   As an example, the Y dimension of the 3D object can be made twice as large by putting a 2 in the Y field.   The scaling can be varied from a maximum scale size to a minimum scale size, or kept constant.   The "X", "Y", and "Z" fields are the values to start the scale values at.   If the "by" fields are 0, then the scaling will be constant.   The "by" field indicates the amount the scale should be changed each time the 3D object is rendered.   If a "by" field has a value other than 0, then the "to" field is used as the minimum scale value. The "Oscillate" checkbox indicates what to do when the minimum scale value is reached.   If "Oscillate" is checked then the scale will be increased toward the maximum scale value.   If "Oscillate" is not checked then the scale will be set to the maximum scale value and then it will decrease toward the minimum scale value.

STATIC ROTATION AND TRANSLATE TAB

This tab specifies motions which are applied a single time.

STATIC ROTATION

Static rotation of the 3D object is done 2nd.   The X, Y, and Z degree values determine how the 3D object is to be rotated one time.   This is used to point a 3D object in a certain direction.   This isn't noticeable on the 3D objects which have a shape which is uniform, such as the cube or sphere.   These rotations may be applied in two orders, depending on whether the X, Y, Z or Z, Y, X option button is selected.   With X, Y, Z, selected, the X rotation is applied first, followed by Y, and Z.   With Z, Y, X, selected, the Z rotation is applied first, followed by Y, and X.   CW stands for clockwise, CCW stands for counter clockwise.
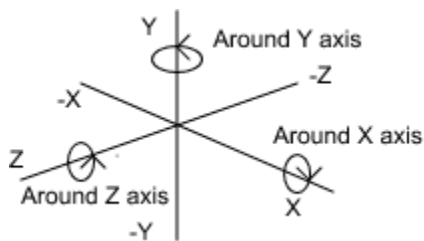
STATIC TRANSLATE

Static translate of the 3D object is done 3rd.   The X, Y, and Z values determine how the 3D object is to be translated (moved) one time.   This is used to place a 3D object in a certain position.   You might need to do this when a 3D object is being combined with other 3D objects to create a larger 3D object.   Another use is to move the 3D object into a position so that it can be properly rotated.

CONSTANT ROTATIONS TAB

CONSTANT ROTATION VALUES

Constant rotation of the 3D object is done 3rd.   The X, Y, and Z degree values determine how the 3D object is to be continuously rotated, or spun.   Each time the 3D object is rendered, these incremental degree values are added to the cumulative rotational degree value.   These increments result in the 3D object being continuously rotated.   If you specify X, Y, and Z values, the X rotation is done first, followed by Y, and Z.   CW stands for clockwise, CCW stands for counter clockwise.   In order to spin a 3D object, one of the X, Y, or Z values can be given a small value.   In order to make the 3D object appear to be tumbling, values in which X, Y, and Z differ slightly, such as X = 2, Y = 3, Z = 3, should be used.

AXIS WHICH LIMITS MOTION

"Degrees Movement" determines how far a 3D object can be rotated before the rotation is restarted.   The X, Y, and Z radio buttons specify   which axis will limit the motion.   When one of the "Constant Rotation" values reaches the "Degrees Movement" value, the rotation is restarted.

REPEAT MOTION

"Repeat Motion" specifies how the rotation is to be repeated once "Degrees Movement" has been reached.   If "No Limit" is selected, rotation will continue without being restarted. If "From Start" is selected, rotation will be restarted from the 0 degrees position.   If "Oscillate" is selected, the direction of rotation will be reversed every time "Degrees Movement" is reached.

ORBIT TAB

Orbiting of the 3D object is done 4th.   This tab specifies a translate (movement) and rotations which are applied continuously.   "Translate" and "Orbit / Spiral" work together to cause a 3D object to "orbit" about a center point, or spiral from the "Start Point" to the "Stop Point".   If "Translate" and "Orbit / Spiral" are applied after the "Static Rotation" and "Constant Rotation", the 3D object can be rotating as it "orbits" the center point.

TRANSLATE

The "Translate" (move) value is the radius of the orbit or spiral.   "Orbit Rotation"   is the number of incremental degrees the 3D object is rotated along the "orbit" and is thus the orbital velocity.   Both "Translate" and "Orbit Rotation" must have values other than 0, for an orbit/spiral to occur.   If "Translate", "Orbit Rotation", and "Translate Unit" are all specified, then the 3D object will spiral.

1 "Translate Unit" Per 1 Full Rotation

In this is checked "Translate Unit" is interpreted as the amount of translation to occur in one circle of a spiral (i.e. a large value will create a loose spiral, and a small value a tight spiral).

ORBIT ROTATION

If a distance value is not specified for "Translate", but an incremental degree value is specified for "Constant Rotation" and "Orbit Rotation" then the 3D object will be spun in two ways.   The "Constant Rotation" will spin it one way, then the "Orbit Rotation" will spin it another.   As an example, it the torus has a "Constant Rotation" Z value of 5 degrees, and a "Orbit Rotation" Y value of 5 degrees, then it will appear like a tire which is both rolling and spinning about a vertical axis.   If you are going to use a "Translate" value to achieve a spiral or "orbit", see Translate above.

AXIS WHICH LIMITS MOTION

"Degrees Movement" determines how far a 3D object can be rotated before the rotation is restarted.   The X, Y, and Z radio buttons specify   which axis will limit the motion.   When one of the "Constant Rotation" values reaches the "Degrees Movement" value, the rotation is restarted.

REPEAT MOTION

"Repeat Motion" specifies how the rotation is to be repeated once "Degrees Movement" has been reached.   If "No Limit" is selected, rotation will continue without being restarted. If "From Start" is selected, rotation will be restarted from the 0 degrees position.   If "Oscillate" is selected, the direction of rotation will be reversed every time "Degrees Movement" is reached.

STATIC ROTATION TAB

Static rotation of the 3D object is done 5th.   This is the 2nd of two possible static rotations.   The values are the same as in the 1st static rotation.   This is used to tilt a 3D object in a certain direction.

TRANSLATE TAB

Translation of the 3D object is done 6th.   This tab specifies a translation (movement) which is applied continuously.   The translation is from the "Start Point" to the "Stop Point".

START POINT

Any of the 3 coordinate systems can be used to specify the start point, this description assumes you are using the Cartesian system. Remember A POINT IS SPECIFIED IN A dialog box BY PRESSING A BUTTON WHICH HAS THE NAME OF THE POINT ON IT.   The X, Y, and Z values define the point to begin rendering.   The Z value must be negative for the 3D object to be seen.   A "Start Point" must be entered.   If it appears that nothing is being rendered, then the 3D object is probably outside the viewing area.   The Z value determines the size of the 3D object.   The more negative the Z value, the farther away it will be, and therefore smaller.
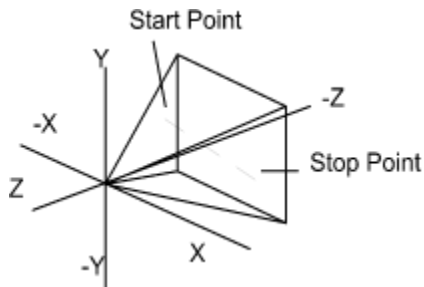
STOP POINT

Any of the 3 coordinates can be used to specify the point, this description assumes you are using the Cartesian system.   The X, Y, and Z values define the point to stop rendering. You only need a "Stop Point" if "Translate" is non-0.   The Z value must be negative for the 3D object to be seen.

TRANSLATE UNIT

To translate is to move a 3D object from one point to another.   Putting a positive number in this field causes the 3D object to be slowly moved, by this distance, from the "Start Point" to the "Stop Point".   This is done by rendering the 3D object, moving the "Translate" distance toward the "Stop Point", then rendering the 3D object again.   A small value will cause the 3D object to move slowly and smoothly.   A large value will cause it to move faster, but the movement may be jerky.

If "Translate Unit", "Translate" and "Orbit Rotation" are all specified, then the 3D object will move in a spiral.   In this case "Translate Unit" determines the amount of translation to occur in one circle of that spiral.

REPEAT MOTION

"Repeat Motion" specifies how the translation is to be repeated once the "Start Point" or "Stop Point" has been reached.   If "No Limit" or "From Start" is selected, translation   will be restarted from the "Start Point".   If "Oscillate" is selected, the direction of translation will be reversed every time the "Start Point" or "Stop Point" is reached.

PARTS COMPOSING THIS OBJECT

The "Parts Composing This Object" dialog box specifies what 3D objects or other configurations are to compose this configuration.   A configuration can not be used to compose itself, either directly, or through intermediate configurations.   <u>The "Edit Object" button is used if you want to modify a property of a 3D object, such as text</u>.

PARTS COMPOSING THIS OBJECT TAB

This tab specifies which 3D objects and configurations are to compose this configuration and how they are to be used.

PARTS COMPOSING THIS OBJECT

This list box displays what 3D objects and configurations are used by this configuration.

DELETE PART

Deletes the currently selected part.

EDIT OBJECT

The currently selected object is edited.   As an example, if the object is a 3D Text object, then the text can be edited.

PART IS

Displays whether the currently selected part is a 3D object or a configuration.

OVERRIDE

The parent configuration can override some of the specifications in a part configuration. The "Quality", "Front Color", "Back Color", "Shininess", "Flat Shading", "Render All", "Wireframe", "Sides Visible",   "Emit Color", "Size", and "Texture Image can be overridden. When a part configuration is overridden, the parent's value will be used rather than the parts value.

SAVE/RESTORE STATE

The parent configuration can save and restore the current geometric transformations when it uses a configuration or 3D object.   The purpose of this is to allow a used configuration to modify the current geometric transformations so that following used configurations and 3D objects will be affected by those modifications.   An example of this would be to have a configuration that did nothing but cause a rotation of 90 degrees about the Y axis.   Any used configurations or 3D objects which followed this part would be rotated by 90 degrees.   If you want to combine the effects of multiple parts like this, the parts need to be used in the reverse order that the effects are to happen.   As an example, if you want to rotate a 3D object and then translate it, you need to use the translate configuration first, and then the rotate configuration.

Causing one configuration to affect another is done by enabling "Save Transform", but disabling "Restore Transform" when use is made of a configuration which is to modify the

current geometric transformation.   When a point is reached when the changed geometric transformations is no longer desired, the previous one can be restored by disabling "Save Transform" and enabling "Restore Transform" when a use is made.   "Save Object Properties" and "Restore Object Properties" works the same way, but saves and restores those properties specified by the "Object Properties" dialog box.

LIST OF ALL PARTS TAB

   This tab is used to select a 3D object or a configuration to add to the "Parts Composing This Object" list.

CONFIGURATION NAMES

   This listbox displays the names of all configurations that can be used.   Selecting "Add Configuration Before" adds the currently selected configuration to the "Parts Composing This Object" listbox before the currently selected item in that listbox.   "Add Configuration After" adds it after.

OBJECT NAMES

   This listbox displays the names of all 3D objects that can be used.   Selecting "Add Object Before" adds the currently selected configuration to the "Parts Composing This Object" listbox before the currently selected item in that listbox.   "Add Object After" adds it after. The "Display Hint" button displays a hint for the currently selected 3D object.   The following is a description of some of the 3D objects.

```
Torus           doughnut
Tetrahedron    4 Sided 3D object
Cube           6 Sided 3D object
Octahedron    8 Sided 3D object
Dodecahedron         12 Sided 3D object
Icosahedron   20 Sided 3D object
Leaf           A maple leaf.
Via Nova Logo3D logo of the Via Nova company.
Layered Sphere   A sphere which is constructed of several layers.
```

HINT

   The Hint window displays a hint about using each 3D object.   The hint for a 3D object is displayed when the "Display Hint" button is clicked or a 3D object is double-clicked.   The hint contains information on how to select the size of the 3D object in the "Object Properties" dialog box.

FRONT COLOR

This <u>dialog box</u> allows the color on the outside of the 3D object to be specified by selecting one of the colored squares.   If "Add to Custom Colors..." is selected the color specified on the right hand side of the dialog box is added to the palette and can then be selected.   The option under "Sides Visible" group, "Front" checkbox in the "Object Properties" dialog box, must be checked to allow the outside of the 3D object to be seen. For full details see <u>Color Selection</u>.

BACK COLOR

   This dialog box allows you to specify the color on the inside of the 3D object.   Selecting the color is the same as in "Front Color" defined above.   The option under "Sides Visible" group, "Back" checkbox in the "Object Properties" dialog box, must be checked to allow the inside of the 3D object to be seen.   The "Front" and "Back" colors selected should contrast enough to be distinguishable.   For full details see Color Selection.

BACKGROUND COLOR

   This <u>dialog box</u> allows you to specify the background color of the screen.   Selecting the color is the same as in "Front Color" defined above.   The "Front", "Back", and "Background" colors selected should contrast enough to be distinguishable.   For full details see <u>Color Selection</u>.

COLOR SELECTION

The left half of the dialog box is used to select existing colors.   The right half of the dialog box is used to create a color and add it to the "Custom Colors" palette. You create a color by adjusting its hue, saturation, and luminosity or by specifying its red, green, and blue values.

BASIC COLORS

"Basic Colors" is a pallet of the preset colors available for your screen.   Click the color you want to use.

CUSTOM COLORS

"Custom Colors" is a palette of any colors you have created.   A new color is added to the selected square after you have defined the custom color.   Click the color or empty square you want to use.

COLORS REFINER BOX

The Color Refiner Box is the large square box on the right.   It shows all the colors available for your system.

COLORS / SOLID BOX

This box shows the changes you make to the hue, saturation, and luminosity of a color. As you make changes, the new nonsolid color is displayed on the left side of the box.   The right side of the box shows the solid color closest to the selected color.   They may be the same.   Double-click the right side of the box to select the solid color.

RED, GREEN, BLUE

These options show the numbers for the red, green, and blue, values of the selected color. Type values in these boxes.   The color refiner cursor and the arrow for the luminosity move to reflect the new values.

LUMINOSITY BAR

The Luminosity Bar is on the far right.   Drag the arrow up or down to adjust the luminosity of the color.   If you are using the keyboard type a value in the "Lum" box.   The luminosity change is shown to the left of the "Color/Solid" box.

HUE, SAT, AND LUM

These options show the hue, saturation, and luminosity of the selected color.   Type values in these boxes.   The color refiner cursor and the arrow for the luminosity move to reflect the new values.

ADD TO CUSTOM COLORS BUTTON

Choose the "Add to Custom Colors" button to add the new color to the selected square in the "Custom Colors" palette.

OBJECT QUALITY

The "Object Quality" dialog box contains suggestions which may or may not have an effect, depending on the 3D object being   rendered, the version of OpenGL that is on your system, and the presence of any OpenGL 3D graphics accelerator board.

QUALITY

In the dialog box there is one numeric entry named "Quality" which usually controls the number of polygons which are used to make up a 3D object.   The larger the number of polygons used the smoother the object will look.   Changing this value may have no effect on some 3D objects.   It is always a number between 0 and 1, with 1 being the highest quality.   On a 3D object such as a cone, a "Quality" value of 0 results in a 3 sided pyramid, a slightly larger "Quality" value results in a 4 sided pyramid, a still larger "Quality" value result in a cone with a rounded base.

QUALITY OF COLORS AND DEPTH RESOLUTION

These options allow you to specify how many colors to use in rendering the image and how accurately to calculate depths in the Z direction.   The choices are "Low", "Medium", and "High".   Each choice indicates the number of bits that will be used.

WHEN MAKING A TRADEOFF FAVOR...

Due to limitations in the way your Windows system is configured, or in the   OpenGL 3D graphics accelerator board, if one is present, it may not be possible to achieve both the "Color Quality" and "Depth Quality" that is specified.   The "Color Over Depth" selection will try to meet the "Color Quality" specification first, and then meet the "Depth Quality" if possible.   The "Depth Quality" selection will try to meet the "Depth Quality" specification first, and then meet the "Color Quality" if possible.   "Depth Quality" usually is the most critical, and therefore should usually be selected.

COLOR QUALITY

This specifies the number of colors to use in rendering the image.   It is limited by the number of colors that your system is configured for.   The "Low" selection is usually good enough.   See appearance for details.

DEPTH QUALITY

This specifies how accurately to calculate depths in the Z direction.   It may be limited by the OpenGL 3D graphics accelerator board, if one is present.   This makes the most difference on 3D objects which have both an interior and exterior surface which are displayed, and in which multiple 3D objects are rendered, some near and some far from the viewer.   If the specified "Depth Quality" is not enough, the interior color may appear on the exterior surface, or vice versa.   The "Low" selection is usually good enough.

MISCELLANEOUS QUALITIES

The "option button" choices are "Fastest", "Nicest", and "Don't Care", and refer to the fastest rendering speed and the nicest rendering appearance.   Many of these are technical terms which you don't really need to know.   The important thing is that they influence the quality of the rendering at the expense of rendering speed.   "Don't Care" means you don't

have a preference, and the computer will use what is easiest for it.   "Polygon", "Point Smooth", and "Line Smooth", determine how smoothly the polygon surfaces, lines, and points that make up the 3D object are rendered.   "Perspective" determines how correctly perspective influences color and rendering of the 3D object.   "Fog" determines how correctly atmospheric effects are calculated.
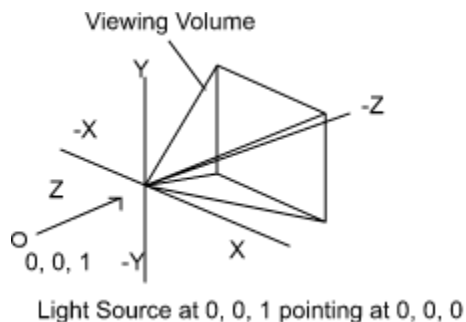
LIGHT

The light is the source of both specular, diffuse, and ambient light.   Diffuse light is that light which illuminates an object from a certain direction, but does not cause strong reflections.   Specular light is that light, from a specific direction, which is strongly reflected, like the shiny spot on an apple.   Ambient light is that light that falls on a 3D object from all different directions.   When a 3D object has a surface that is almost directly facing the viewer then that polygon surface will reflect specular light from the light source.   Since the light source is white, then the reflection will also be white and that surface will appear to be white, even though it may really be a different color.   If the 3D object is rotating, then as a surface is almost directly facing the viewer it will lighten in color and then turn white.   As it rotates away it will darken again.   If white is chosen as the 3D object's color, then the specular reflection will not be visible.   White 3D objects also have a problem, in that they reflect so much light that the polygon surfaces all look about the same, and it is difficult the see the shape of the 3D object.   Very dark colors have the problem that they reflect so little light that their polygon surfaces all look about the same.

WASH LIGHT VS. SPOT LIGHT

A "Wash Light" produces parallel rays of light from an infinite distance, like the sun does. It has direction, but not an identifiable position.   A "Spot Light" produces a cone of light from a specified position.   The "option button" choices "Wash Light" and "Spot Light" specify the type of light you want to use.   For a complex scene, like the Via Nova logo, a "Spot Light" tends to produce more dramatic images, there are more shadows.

LIGHT DIRECTION

The "Light Direction" is the direction the light source points in.   The light source was described above.   You specify a   position of the light source.   The light source points from the position you specify towards the point 0, 0, 0.   Thus a light source position of 0, 0, 0 is invalid.   If the position of the light source was Cartesian 0, 0, 1, then the light would point down the negative Z axis toward the point 0, 0, 0.   If a light source has a negative Z value, then it is possible to place the light on the other side of the 3D object from the viewer. There is only 1 light illuminating the 3D object.   If you want the light source to be a certain angle to the left or right of the 3D object, then use cylindrical coordinates.   If you want the light source to be a certain angle to the left or right of the 3D object, and a certain angle above or below it, then use spherical coordinates.

Light Source at 0, 0, 1 pointing at 0, 0, 0

INTENSITY

This determines the intensity of the light falling on the 3D object from the light source. The light source position can also be specified in this dialog box.   A value of 1 will usually

produce a pleasing <u>rendering</u>.   If the intensity is too high, the different shades of color on the 3D object will be washed out, and will all appear to be the same color.

AMBIENT LIGHT

   Ambient light is that light that falls on a 3D object from all different directions.   This value determines the ambient light intensity.   The ambient light values can range from 0 to 1, with 1 being the most ambient light.   If little ambient light is specified, then shadows will be produced on the side of the 3D object away from the light source.   If the ambient light is too high, then the details of the 3D object will be washed out.   If you want to see sharp edges on the 3D objects, use a small value for ambient light.

SPOT LIGHT

   The options under this group box only apply when the "Spot Light" "option button" has been selected.

ANGULAR SIZE OF SPOT

   This value is 1/2 the angular size of the cone of light produced by the spot light.   If it is 180 then the spot light points in all directions.   As an example, if you specified a value of 45 then the total angular size of the cone would be 90 degrees.

INTENSITY DISTRIBUTION OF SPOT

   The light can be made to be more intense at the center of the cone than at the edges. The value can range from 0 to 1.   If a value of 0 is specified, then the cone will be of uniform intensity from edge to edge.   A value of 1 will cause the light to be intense at the center of the cone with little at the edges.

INVERSE SQUARE ATTENUATION FACTOR

   The light from a spot light can be attenuated (diminished) with distance just like some lights are in the real world.   As you get further from the light, it is spread out more, and there is less of it at a point.   A light bulb without a reflector is an example of this.   The "Inverse Square Attenuation Factor" causes the light to be attenuated according to the following formula.

light = (1 / distance ^{2} * inverse square attenuation factor) * original light

   If the "Inverse Square Attenuation Factor" is 1, then the light will be attenuated to 1/4 of what it was every time the distance is doubled.   A value less than 1 will lessen the attenuation.   A value of 0 will disable it completely.   The effect of this attenuation factor is so great that it will seldom be used.   You will have to specify an extremely large "Intensity" to see the 3D object.   The "Inverse Square Attenuation Factor" can be used at the same time as the "Linear Attenuation Factor".   The attenuation from each one is added together to give a total attenuation.

LINEAR ATTENUATION FACTOR

   The light from a spot light can be attenuated (diminished) with distance just like some lights are in the real world.   The air scatters and absorbs it, the more air it passes through, the more it is attenuated.   An automobile head light is an example of this.   The "Linear Attenuation Factor" causes the light to be attenuated according to the following formula.

light = (1 / distance * linear attenuation factor) * original light

   If the "Linear Attenuation Factor" is 1, then the light will be attenuated to 1/2 of what it was every time the distance is doubled.   A value less than 1 will lessen the attenuation.   A value of 0 will disable it completely.   The effect of this attenuation factor is so great that you will usually need to specify a fairly small value.   You will also have to specify an extremely large "Intensity" to see the 3D object.   The "Linear Attenuation Factor" can be used at the same time as the "Inverse Square Attenuation Factor".   The attenuation from each one is added together to give a total attenuation.

LIGHT POSITION

   The spot light has a variable position in 3D space like a 3D object does.   It shines from this position in a direction specified by "Light Direction".   The position can be specified relative to the 3D object being <u>rendered</u> by using the "Move Light With Object" values.   If you want the light source to be a certain angle to the left or right of the 3D object, then use cylindrical coordinates.   If you want the light source to be a certain angle to the left or right of the 3D object, and a certain angle above or below it, then use spherical coordinates.

MOVE LIGHT WITH OBJECT

   If desired, the spot light can be moved at the same time the 3D object is moved.   If the "No Movement" option button is selected, no movement will occur.   If the "Translate" option button is selected, the spot light will be <u>translated</u> the same distance the 3D object is.   The "Light Position" is then always relative to the 3D object.   The spot light will retain its position relative to the 3D object as the 3D object is moved around.   The spot light can also be rotated by the X, Y, and Z amounts specified by "Static Rotation".   If "Translate, Rotate X", "Translate, Rotate Y", and "Translate, Rotate Z" are all checked, then the spot light will be rotated by all 3   "Static Rotation" values.   If only 1 or 2 boxes are checked, then the light will move only in that direction.   When rotation is being done, the "Light Direction" is rotated as well.   If the "Light Direction" was pointing at the 3D object before the rotation, it will still be pointing at the 3D object after the rotation.

OBJECT PROPERTIES

The values in this dialog box pertain to the properties which a 3D object can have.   The properties can mean different things for different 3D objects.

DISPLAY HINT

Pressing this button displays a list of the 3D objects and a hint for the selected 3D object. The hint for a 3D object is displayed when the "Display Hint" button is clicked or a 3D object is double-clicked.   The hint contains information on how to select the size of the 3D object in the "Object Properties" dialog box.

OBJECT SIZE PROPERTIES

These values specify what the size of the 3D object should be.   The sizes are always from the center of the 3D object to an edge.   As an example, if a square is being specified, the size in the X direction would be from the center of the square to the left or right edge.   Not from the left edge to the right edge.   Most of the values can have multiple interpretations depending on the 3D object which has been selected.   Instructions on how to set the size of a particular 3D object are displayed using the "Display Hint" button.

X/TOP/OUTER RADIUS

This value specifies either:

1/2 the total X dimension of the 3D object.
1/2 the total top dimension when a 3D object has a same top and base dimension.
The outer radius of a 3D object.

Y/HEIGHT

This value specifies either:

1/2 the total Y dimension of the 3D object.
1/2 the total height of a 3D object.

Z

This value specifies 1/2 the total Z dimension of the 3D object.

LEFT BASE

This value specifies 1/2 the left base dimension when a 3D object has both a top and base dimension.

RIGHT BASE

This value specifies 1/2 the right base dimension when a 3D object has both a top and base dimension.

START ANGLE

This value specifies the angle rendering is to start on, see "Sweep Angle".

SWEEP ANGLE

A 3D object like a disk, can have from 0 to 360 degrees of the disk rendered (drawn). This value specifies how much of the 3D object is rendered.   The "Start Angle" specifies at what position from 0 degrees the rendering is to start.

INNER RADIUS

This value specifies the inner radius of a 3D object.

OBJECT "SPECULAR REFLECTION"

This is the amount of specular light which will be reflected from the 3D object.   A value of 1 provides the most specular reflection (the whitest reflection), 0 provides the least.

OBJECT "SHININESS"

This value determines how shiny the surface of the 3D object is.   A value of 1 is the shiniest, and 0 the least.   The shininess determines how large the shiny spot is on a 3D object.   A very shiny surface has a specular reflection, or white reflecting area, which is constrained to a small area.   A less shiny surface has a specular reflection which occurs over a larger area.

EMIT COLOR FROM OBJECT

If this option is checked, the 3D object will emit the colors that have been selected as its front and back colors.   The object will thus have these colors even if the lighting setting would normally produce a dark scene.

SIDES VISIBLE

This group determines which of the 3D object's surfaces can be seen.   Checking "Front" allows you to see the 3D object's exterior surfaces.   Checking "Back"   allows you to see the 3D object's interior surfaces.   "Front" should always be checked.   If   "Back" is not checked then the interior of 3D objects such as the teapot, cone, and cylinder will not be visible.   It will appear as if the surface does not exist, and you will be able to see through the back surface to any surface behind it.   If a 3D object is closer than the "Near Clip" its interior will be visible, and therefore "Back" needs to be checked if you want to see the interior. Checking "Back" slows down the rendering process, and should only be checked when the interior surface can really be seen, e.g. teapot, cone, and cylinder, or when using "Near Clip".   A "Back Color" should be defined if you want to see something other than black for the interior surface.

RENDER IN WIREFRAME

If a 3D object is rendered (draw) in wireframe, then rather than being a solid object, only the outlines of the polygons that make it up will be drawn.   The 3D object will thus be transparent as well.   If this option is not checked, the 3D object will be solid.   If it is checked it will be wireframe.

DO FLAT SHADING

This option controls how smoothly the color of a 3D object changes across its surface.   If this is checked, then each polygon surface that a 3D object is composed of will be the same color across the polygon surface.   If it is not checked, then the color will make a smooth change across the polygon surface.   This effect is most noticeable on the rounded surfaces found on the teapot, sphere, torus, cone, and cylinder.   If "Flat Shading" is not checked, then the 3D object will appear to have a smooth surface.   If it is checked, then the surface will appear to be made of many polygon surfaces.

DITHER COLOR

On a machine with only 16 colors the quality of the image will be poor and it may be rendered slowly.   When using 256 colors, dithering combines patterns of colors to give the appearance of more colors.   If this is checked, and only 256 colors are available on your video card, then the colors will be dithered.   This gives a substantial improvement in appearance.   If you have more than 256 colors checking this box has no effect.

ENABLE HARDWARE OR NONGENERIC ACCELERATION

When OpenGL acceleration hardware or nongeneric OpenGL software is being used, it usually increases the rendering speed.   However, you may find that with some configurations on some computers that it actually runs slower.   Unchecking this checkbox will cause only the generic OpenGL software to be used.

RENDER ALL FEATURES

On the teapot, spacecraft, and Via Nova logo, there is a choice of how much detail to be included in the rendering.   If "Render All Features" is checked then all details will be rendered.   If it is not checked then some details will be left off, or the 3D object will be drawn in a different way.   See the description of the Via Nova logo and teapot and spacecraft for more information on how they respond to this option.

OPTION 1

On some 3D objects, such as the Via Nova logo, there is a choice of how to render an object.   If "Option 1" is checked on the Via Nova logo, then the text "Via Nova" will be rendered on top of the building.

FOG

Fog is an atmospheric effect which is added to the rendered scene.   It can be used to represent fog, smoke, haze, etc.   It helps give a sense of depth to a scene.

ENABLE

If this checkbox is checked, then Fog will be enabled.   When Fog is enabled it will slow down the rendering of the scene.

COLOR

This specifies the color of the Fog.   The default gray color works well.   The "Background Color" should be set to match the color of the Fog.   This will give the appearance of a wall of Fog behind the 3D object.

START

This is the distance at which the Fog starts to be visible.   It is always specified as a positive distance from the point 0, 0, 0, e.g. if you wanted the Fog effect to start at the point 0, 0, -10, then "Start" would be set to 10.   The density of the Fog increases from the Fog "Start" point to the "Stop" point.

STOP

This is the distance at which the Fog density stops increasing, it is constant after this.   It is always specified as a positive distance from the point 0, 0, 0.

DENSITY

This is how dense the Fog is.   The larger the number, the more quickly the Fog increases. The value of "Density" has no effect when "Linear" is selected.

MODE

This specifies how quickly, and in what way, the Fog increases from the Fog "Start" point to the "Stop" point.   If "Linear" is selected, the increase will be linear from the "Start" to "Stop" point.   In this Mode, when the "Stop" point is reached, the part of the 3D object at that point will not be visible.   The value of "Density" has no effect when "Linear" is selected. If "Exponential" is selected, the increase will be quick near the "Start" point, and slow near the "Stop" point.   If "Exponential 2" is selected, the increase will be slow near the "Start" point, and quick near the "Stop" point.   In this Mode, when the "Stop" point is reached, the part of the 3D object at that point will not be visible.

IMAGE/PHOTO TO APPLY TO OBJECT

   This is used to apply an image or photograph to the 3D objects in a configuration.   You can apply this to any 3D object except point, line, and leaf.   The 3D object can not be rendered in wireframe mode.   The image is gotten from a file of type .bmp, .jpg, .jpeg, or .png.   See our web site for a free utility to convert .gif to one of the supported image formats.   A file of type .png which is 1-bit black-and-white, can not be displayed.   Greyscale .png can be displayed however.   Options can be checked to manipulate the image before it is applied to the 3D objects.   If you are displaying a photograph on a randomly moving   3D object, you may want to set the ambient light to a value of 1 so that the photograph is always fully lit.   A "Texture" is an image that is applied to a 3D object to give its surface the appearance of wood, metal, stone, etc.   Several image files are supplied and can be found in the installation directory.   See our web page for links to free images on the net.   The order that manipulations are applied in is:

1. Flip Top and Bottom
2. then, Flip Left and Right
3. then, Rotate 90 Degrees Clockwise
4. the, Fit Square 3D Object Aspect Ratio to Image
5. Stretch Image To Fit Required Size

FLIP TOP AND BOTTOM

   The image is made upside down.

FLIP LEFT AND RIGHT

   The image is made to be a mirror image of itself.

ROTATE 90 DEGREES CLOCKWISE

   The image is rotated 90 degrees clockwise.   This is useful when you want a texture to run in a certain direction.

FIT SQUARE 3D OBJECT ASPECT RATION TO IMAGE

   When an image, such as a photograph, is being applied to the Square 3D object, the aspect ratio of the square should match that of the image.   If it doesn't, the X or Y dimension will appear compressed.   You can change the size of the square to match the image, or you can enable this option and have it done automatically.   If the option is enabled, the X and Y size of the square should be 1.

STRETCH IMAGE TO FIT REQUIRED SIZE

   If an image is going to be Repeated (see below), it must be converted to a certain size to be applied to a 3D object.   This conversion doesn't affect your image file, it is converted after your file is read, and your file remains unchanged.   The X and Y dimensions of the converted image don't have to be the same, but they must be a power of 2, e.g. 64, 128, 256, 1024, 2048, ...   The conversion can be done in 2 ways.   If this option is enabled, then your image will be stretched so that its X and Y dimensions will be a power of 2.   In this case, there will be a delay before the image is displayed, due to the stretching calculations. If this option is disabled, then the image will be cropped at the sides so that its X and Y dimensions will be a power of 2.   In this case, some of the image will be lost.   If you

manipulate your image using some form of image manipulation software, you can make it be a power of 2 and avoid cropping and stretching.   See our web site for links to image utility software.

REPEAT IN DIRECTION

The "Repeat In X Direction" and "Repeat In Y Direction" values specify how many times an image is to be repeated on a 3D object.   This is most useful when you are applying a texture to a 3D object.   If the texture appears grainy, then repeat it in the X and Y dimension to make it less so.

SPECIFY TEXTURE FILE NAME

This brings up an image file selection dialog box.

CLEAR TEXTURE FILE NAME

This specifies that no texture is to be applied to the 3D objects in this configuration.

MULTIPLE SCREEN DISPLAY

   This is used to specify how long to display a screen, when multiple screens are being displayed on each activation of the screen saver.   This only takes effect when the screen saver is enabled for multiple screen display.   If "Specified Number of Times" is selected, the 3D object will be rendered this many times.   If "From 'Start' to 'Stop' Specified Number of Times" is selected, the 3D object will be rendered from its "Start" point to its "Stop" point this many times.   If "Specified Number of Seconds" is selected, the 3D object will be repeatedly rendered for this many seconds.   The "Specified Number of Times / Seconds Value" is used to specify the value to use for any of the option button choices.

DELAY

This causes a delay to occur during some part of the rendering.   This is either so that the viewer can watch the 3D object being rendered, to slow down the speed of animation, or to keep the screen saver from interfering with other applications running on the same computer.   The delay is specified in increments of 1/1000 of a second, e.g. a value of 1,000 would give a 1 second delay.   A delay value of 0 results in the screen saver giving up its time to other applications.   The 0 value delay can result in a very short delay, or a long delay, depending on what the other applications are doing.   If a delay value greater than 0 is specified, then on Windows 95 the minimum delay that can be implemented by the operating system, is 55 milliseconds, on Windows NT it is 10 milliseconds.   The resolution of the delay values is the same as their minimum, e.g. on Windows 95 a delay of 56 to 110 milliseconds will produce a delay of 110 milliseconds.   If the "Render At Constant Rate" box is checked, then the "Time / Delay" field does not have the 55 and 10 millisecond limit that the delay value have.   Some example delay times are:

100 = 1 / 10 second
200 = 1 / 5 second
500 = 1 / 2 second
750 = 3 / 4 second
1000 = 1 second
2000 = 2 seconds

The delay "Delays While Rendering", occurs in the middle of the 3D object being rendered. During the rendering of a 3D object like the teapot, it can slow it down so that you can watch it being rendered surface by surface.

The delay "Delay After Stop Point Reached", occurs after the "Stop Point" (if any) has been reached.   It allows the completed picture to be viewed for the delay period, before it is erased and rendered again starting at the "Start Point".

The time or delay "Time / Delay", occurs after each rendering of the 3D object.   It is mainly used to control the speed of animation when the 3D object is being drawn multiple times.   This time value can be interpreted in 3 ways depending on which option button is selected.   If "No Delay" is selected then there is no delay between each rendering.   If "Add Delay After Each Rendering" is selected then a delay of the specified time period is inserted after the 3D object is rendered.   The next rendering will not start until this delay has completed.   How often the 3D object is rendered is thus determined by how long it takes to render it, plus the delay.   If "Render At Constant Rate" is selected, the rendering will be started each time this much time has elapsed.   How often the 3D object is rendered is thus independent of how long it takes to render it.   If this time period is less than the time it takes to render the 3D object then no delay will occur.   If this time period is significantly shorter (< 25%) than the time it takes to render the 3D object, then it can slow down the rendering because of the overhead of processing the rate delays.

The "Compute Render Times In Milliseconds" group deals with determining how long it takes to render a 3D object one time.   This is useful when determining what value to use in the "Time / Delay" field when the "Render At Constant Rate" box is checked.   If the "Compute Render Times" box is checked, then the timings will be performed.   The timings are stopped when execution of the test is stopped.   If   the "Compute From Start To Stop Point" box is checked, the timings will be stopped when the "Stop Point" is reached.   If a value is in the "Sample Time Period" field then the timings will be stopped when that number of milliseconds has elapsed.   "Smallest Render Time", "Largest Render Time", and "Average Render Time" contain the results of the timings.   These timings may be skewed by other

activity that is occurring on the computer at the same time.   The "Largest Render Time" is most susceptible to this.

EFFECTS ON 3D OBJECTS

The options in the configuration dialog boxes can affect different 3D objects in different ways. The following paragraphs describe what is rendered when a 3D object has been selected for display, and how each 3D object is affected by the dialog box options.

GEOMETRIC 3D OBJECTS

The geometric 3D objects that can be rendered are sphere, tetrahedron (4 sides), cube (6 sides), octahedron (8 sides), dodecahedron (12 sides), Icosahedron (20 sides), torus (doughnut), cylinder, cone, disk, point, line, triangle, and square. "Render All Features" and "Option 1" have no effect on these 3D objects. On the sphere, cylinder, disk, cone, and torus the "Quality" determines the number of polygon surfaces used to render the 3D object. A "Quality" of 0 results in the simplest form of that 3D object, e.g. a cone with 0 "Quality" is a 3-sided pyramid.

TEAPOT AND VIA NOVA LOGO

The teapot and Via Nova logo have an exterior and interior ("Front" and "Back") surface. "Back" must be checked in order for you to see the interior surface. If you don't check "Front" then the exterior will be invisible and only the interior parts that face the viewer will be seen. The "Quality" determines the number of polygon surfaces used to render the 3D object, with a higher number resulting in a smoother appearance.

Choosing "Erase, Show Being Rendered" and enabling "Render All Features" has the effect of rendering the teapot surface by polygon surface, you can see the teapot being built-up. If "Render All Features" is not enabled for a teapot, that has the effect of rendering the teapot as fast as possible, it may be drawn too quickly to see it being constructed. Choosing "Erase, Show Being Rendered" for the Via Nova logo also has the effect of rendering it polygon surface by polygon surface. If "Render All Features" is enabled for the Via Nova logo, the entire building will be rendered. If not, only part of the building is rendered.

If a "Delay While Rendering" value is set, the delay is the time between rendering each polygon surface. In order to get the best view of the interior surface being rendered, the teapot should have a "Static" rotation of X = 20 CW, Y = 180, or you can have a "Static" rotation of x = 20 CCW, and a "Constant" rotation of some Y value. If you check "Do Flat Shading" you will have a better view of the polygons that compose the teapot and Via Nova logo. When each polygon surface is being individually rendered, speed is not that important. In fact the "Delay While Rendering" value is there so that you can slow it down enough to see each polygon surface being rendered. The Z "Start Point" position should place the teapot so that it fills the screen. You may want to do a "Constant Rotation", but probably not a "Translation".

If you want to render the teapot and Via Nova logo as fast as possible:

1. Under the "Object Quality" child dialog box set the "Quality" to 0. This will use fewer polygons to construct the teapot and Via Nova logo.
2. Under the "Object Properties" child dialog box check "Do Flat Shading" (is faster than smooth shading), uncheck "Render All Features" (this will use display lists to draw the teapot and Via Nova logo), under "Sides Visible" uncheck "Back" (the interior will no longer be drawn).
3. Remove all delays between renderings.

4. Your may want to choose "Erase, Don't Show Being Rendered".
5. If you are rendering the teapot, you may want to change the Y value of "Constant Rotation" to 1 degree so that you get smoother rotation.

The teapot and Via Nova logo take so long to render that only a computer with an <u>OpenGL 3D graphics accelerator board</u> can animate it smoothly.   Computers without an accelerator card can make an attractive display by checking "Render All Features", and displaying the rendering of the teapot and Via Nova logo surface by surface.

SPACECRAFT

A simple spacecraft is <u>rendered</u>.   A green "running light" is on the right wing tip, a red on the left wing tip, a blinking red light on the tail, and a blinking white light on the bottom.

LEAF

A maple leaf is <u>rendered</u>.   If "Render All Features" is checked, the top of the leaf with be the color specified by "Front", the bottom of the leaf will be the color specified by "Back".   If "Render All Features" <u>is not</u> checked, one side of the leaf with be the color specified by "Front", the other side of the leaf will be the color specified by "Back".   If "Render All Features" is checked, "Flat Shading" <u>should not</u> be checked.   The leaf will look more realistic if   "Shininess" and "Specular Reflection" are set to 0.

LAYERED SPHERE

A sphere composed of multiple layers is <u>rendered</u>.   The "Quality" value determines how many triangles make up the surface of the sphere.   The "Delay" value determines how long to delay between rendering a triangle on one layer of the sphere, and the triangle on the next layer.   Those triangles that are nearly edgewise (they have a vertex where the Z = 0), will not have the delay applied to them.

See Also

<u>3D TEXT</u>

3D TEXT

User specifiable 3D text with optional thickness is <u>rendered</u>.   The "Font" button will bring up the standard font selection <u>dialog box</u>.   The font selection is limited to True Type fonts. "Outline" is text which is outlined, but not filled.   "Justification" is how the text is rendered with regard to its center of rotation.   "Left" justification rotates the left end of the text about the center of rotation, "Right" the right end, "Center" the center of the text.   If you want a line of text to begin or end with a blank space, you must put in a ` instead.   This will be replaced by a blank space when the text is displayed.

Properties in the "Object Properties" dialog box, under the "Edit Configuration" dialog box, have an effect on text.   If "Filled" text with 0 thickness is being done, then "Back" needs to be checked if you want to see the back side of the text.   "Flat Shading" is always done for text, even if you have disabled this option.   If "Sweep Angle" is not 0, the 3D text will be drawn in a circle around a central point.   The "Start Angle" is the angle it starts at, and the "Sweep Angle" is the number of degrees around the circle that the text will be rendered.   A value of 360 for the "Sweep Angle" would draw the text in a complete circle.   A value of 180 would make the 3D text for half a circle.   "X/Top/Outer Radius"   is the radius of the circle the 3D text forms.

The quality of the text is controlled by the "Object Quality" dialog box, under the "Edit Configuration" dialog box, and ranges from 0 to 1, with 1 being highest quality.   The quality determines how smooth the curves in the letters are.   Low quality will result in characters which are composed of lines rather than curves.   The higher the "Quality", the slower the text will be drawn.

SPEED

The speed of the renderings determined by the following factors on your computer:

CPU SPEED

Within a CPU family, (486 vs. Pentium), the speed is roughly proportional to the clock rate. Pentiums are twice as fast as a 486's at the same clock rate.

THE SPEED OF THE VIDEO CARD

Cards such as a 3D graphics accelerator board are specifically made to accelerate 3D graphics rendering, and can be extremely fast.   Other cards will be much slower, and will differ among themselves to some extent.   You may find that some configurations run faster if you disable hardware acceleration under "Object Properties".

REFRESH RATE (FREQUENCY)

The refresh rate (refresh frequency) determines how often the screen is redisplayed. Animation can not occur more frequently then the screen is refreshed, therefor the higher the refresh rate, the faster the animation can be.   The refresh rate can be changed by the same method that monitor resolution and number of colors are.

BUS SPEED

The bus the video card is on can affect the speed of rendering.   A local bus is fastest, followed by EISA and ISA bus.

MONITOR RESOLUTION

The monitor resolution is the number of dots used to make up the monitor screen.   It is specifiable by the user.   The speed is usually inversely proportional to resolution.   The higher the resolution the slower the rendering.

SIZE OF 3D OBJECT ON SCREEN

The larger the 3D object is on the screen, the slower it will be rendered.   If you render the 3D object further from the viewer (a more negative Z value, ex. going from z = -5 to z = -10) it will be rendered smaller, and therefore faster.

NUMBER OF SURFACES ON THE 3D OBJECT

The more surfaces the 3D object has, the longer it will take to render.   The tetrahedron has the smallest number of surfaces, and therefore is the easiest to animate.

RENDER ALL FEATURES

This option is located under the "Object Properties" dialog box.   Only some 3D objects are affected by this option.   See the description under EFFECTS ON 3D OBJECTS for how they are affected.   When this option does affect a 3D object, and it is checked, the rendering speed will slow down.

FLAT SHADING

This option is located under the "Object Properties" <u>dialog box</u>.   If "Do Flat Shading" is checked then the <u>rendering</u> will be faster than if it is unchecked.

BACK ENABLED

This option is located under the "Object Properties" <u>dialog box</u>.   Checking "Back" will slow down <u>rendering</u>, and you should check this box only if there is really an interior surface that can be seen in the 3D object.

FOG

When Fog is enabled, the 3D object will be rendered more slowly.

OTHER APPLICATIONS

Screen savers have a lower priority than any other program on the computer.   Other applications which are running at the same time as the screen saver will slow down the <u>rendering</u>.   You may find that some applications, even thought they appear to be idle, will slow down the screen saver.   If a compute-intensive application is running and the screen saver becomes active, you may notice a delay in the activation of the screen saver.   You may also notice a delay in response to the mouse being moved or a key being pressed while the screen saver is running.   The rendering of 3D objects is extremely compute-intensive, and although screen savers run at the lowest priority of all application, they could possibly affect the performance of a file server which is serving a network.   On most renderings this will not be a problem, however when rendering the teapot or Via Nova logo with a "Delay While Rendering" of 0 and "Render All Features" disabled, the computer may be slowed down.   Specifying a delay value will help to some extent, but checking "Render All Features", especially with an appropriate delay value, should always solve the problem.

QUALITY

The "Object Quality" checkboxes are suggestions, and may or may not affect the speed of the <u>rendering</u>, depending on how the Microsoft <u>OpenGL</u> system or an OpenGL <u>3D graphics accelerator board</u> implements the "Object Quality" suggestions.   When "Quality" controls the number of polygons surfaces used to render the 3D object, more polygons will appear, and thus will result in slower rendering.

TEXT

The more 3D text that is drawn, and the higher the quality, the slower it will be drawn.

APPEARANCE

The appearance of the <u>rendering</u> is determined by the following factors.

THE RESOLUTION OF THE MONITOR

The higher the monitor resolution, the smoother the edges will be.   Monitor resolution and number of colors used can be modified by choosing "Start", "Settings", "Control Panel", "Display", then "Settings".   As the resolution ("Desktop Area") is increased, the number of colors available may be reduced by your video card.

THE NUMBER OF COLORS BEING USED

The number of colors available in the video card determines how many shades of color are used to <u>render</u> the drawing.   If 65,536 or 16,777,216 colors are being used the quality will be excellent.   There is not great improvement going from 65,536 to 16,777,216 colors.   If 256 colors are being used there is a large drop in quality compared to 65,536 or 16,777,216. Checking "Dither Color" when using 256 colors will significantly improve the appearance.   It has no effect on 65,536 or 16,777,216 colors.   If a white color is selected with 256 colors then the 3D object may have a washed out appearance.   16 colors should not be used.   See <u>THE RESOLUTION OF THE MONITOR</u> for details on how to change the number of colors.

DO FLAT SHADING

For 3D objects which have a smooth surface, such as a sphere, rotation can not be seen unless "Do Flat Shading" is used.   If a cone, cylinder, or torus is rotated about a certain axis, "Do Flat Shading" should also be used.   If the teapot is being <u>rendered</u> using "Render All Features", using "Do Flat Shading" allows you to more clearly see each of the polygon surfaces used to create the teapot.

BACK SIDE

If   "Back Side" is not checked then the interior of the teapot, cone, and cylinder will not be visible.   It will appear as if the interior surface does not exist.

TRANSLATION

If a large translation value is used, then there will be a noticeable jitter as the 3D object moves across the screen.   This is less noticeable if the 3D object is moving directly toward or away from you.   Values of 1 or less work well for translation directly toward or away from the viewer.   A value of around .25 works well when there is translation in the X and Y direction.   If the translation is too large, then artifacts of the <u>rendering</u> process may be visible on the screen.

ROTATION

To achieve smooth rotation, the rotate value needs to be only a few degrees.   This will depend on the speed that the 3D object can be <u>rendered</u>.   The faster the 3D object is rendered, the larger the maximum rotate value can be.   A very large rotate value can also be used.   This won't be smooth, but will give the appearance of a rapidly rotating 3D object.

RENDER ALL FEATURES

This only affects the teapot, spacecraft, and Via Nova logo, more detail will be rendered on the 3D object.   See the description of the <u>EFFECTS ON 3D OBJECTS</u> for details.

QUALITY

The options under "Object Quality" are suggestions, and may or may not affect the appearance.   When "Object Quality" controls the number of polygons surfaces used to <u>render</u> the 3D object, more polygons will result in a smoother 3D object appearance.

TEXT

The quality of 3D Text depends on the quality that was specified by the user.   3D text is also used for warning messages that are given to the user while the screen saver is running. Low quality is used for these warning messages.

UNINSTALL

   To uninstall the Via Nova Animated 3D Objects Screen Saver I use the "Add/Remove Programs" application in "Control Panel".   Select the name of this screen saver from a list provided by the "Add/Remove Programs" application.   If this does not work, use the "Uninstall" icon in the "Via Nova" group.   The uninstall program then deletes the Via Nova Animated 3D Objects Screen Saver I from the system.   After the uninstaller starts it will go through the following actions.   Not all actions will be performed:

1.   Select the Start button in the dialog.
2.   The uninstaller warns that the program will be uninstalled.
3.   The uninstaller will start to uninstall the program.
4.   If the uninstaller prompts with a message boxes titled "Delete Shared File".   It will mention a "reference count" and refer to a file pathname with "Via Nova" in it.   Select the "Delete" button in these message boxes.
5.   If the uninstaller prompts that the directory you installed the screen saver into is not empty, and asks if you want to "Delete all files and subdirectories", select YES.
6.   Select Quit when the uninstaller is finished.
7.   Using Explorer, delete any installation directories you don't want which were not automatically deleted.   Make sure that there are no other applications in the directories you are deleting.   These directories will be the directory that you originally installed into.

UPGRADE

TO A NEWER VERSION

   If the upgrade allows the use of your current password, use the "Display Install Info" command to get the password assigned to your machine, because you may need to enter it again after the new installation.   You can either uninstall the screen saver, install the newer version, and then reenter your saved password, or you can install the new version without uninstalling the older version.   If the upgrade requires a new password, and you are entitled to it for free, then place a note in the "Flag" field of the registration form.

VIA NOVA COPYRIGHT/LICENSE/WARRANTY AGREEMENT

COPYRIGHT

   The license/warranty agreement may be viewed by looking in the file LICENSE.TXT in the installation directory, or by using the "Display License Agreement" command under the "Display" submenu.

About

   A <u>dialog box</u> found on most Windows applications which contains information about the application and the company that produced it.   It is usually displayed by selecting the "About" menu item under the "Help" menu.

Rendering

Drawing a 3D object on a computer screen.

Translate

To move a 3D object from one point to another.

OpenGL

A software system supplied by Microsoft for 3D <u>rendering</u>.

3D Graphics Accelerator Board

   A graphics   accelerator board specially designed to accelerate 3D graphics such as OpenGL.   Note that some boards only support OpenGL acceleration in certain combinations of colors and resolutions.

<u>Help</u>

A documentation file which accompanies most Windows applications.   It contains underlined text, which when clicked, displays further information.

Program Group

Under Windows 95, use the "Start" button to gain access to the Via Nova applications.

Dialog Box

A box which contains a title and permits user input through buttons, and input fields.

Registration

Paying for a software product.

Main Window

The <u>program group</u> that contains many of the standard Window applications.

Control Panel

The program group that contains many of the standard Windows applications that control operating system configuration.

Desktop

A <u>dialog box</u> which control the appearance of the screen.