

The Digital Universe Help File

COLLABORATORS

	<i>TITLE :</i>		
	The Digital Universe Help File		
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Chapter 1

The Digital Universe Help File

1.1 Main help index

This help file provides the on-line documentation necessary to use ←
"The Digital
Universe" successfully, and to fully understand the information it provides.
The following categories of help are available:

Starting The Digital Universe

Menus

Windows

Keyboard and Mouse Operations

Configuration of the software

Frequently Asked Questions

Utilities

Ordering The Digital Universe

1.2 Menus

Help is available on the following menu items:

PROJECT:

About

Environment Prefs

Screenmode Prefs

Display/Object Prefs

Fields of View

Open Control Panel

Time Control

Misc. Objects

Full sky view

Medium sky view

Undo view

Redraw

Recalculate

Quit

PRINT:

Full Screen

Full Page

MODE:

Planetarium

Local Sky

FIND:

Sun/Planet/Moon

Constellation

Star

Deep Sky Object

Misc. Object

EXPORT:

Screen Snapshot

Animation

Reports

QUICKLOOK:

North

Northeast

East
Southeast
South
Southwest
West
Northwest
 HELP:
Dictionary
Objects
People
Spacecraft

Intro. to Astronomy

Search Hypertext

1.3 Menu Shortcuts

Menu shortcuts are keys which may be pressed to access items from the menu without having to use the mouse. All shortcuts consist of pressing and holding the right "Amiga" key (immediately to the right of the spacebar) while pressing the shortcut key. For example, to choose "Environment Prefs" from the menu without using the mouse, press and hold the right "Amiga" key while typing "E".

Menu shortcuts are indicated by a letter or character following a slanted, stylized "A" in the menu entry.

1.4 MENU:Project>About

Menu Shortcut
 ?

Choosing this option brings up the
 About The Digital Universe
 window thanking
the people who had various major roles in the development of the software. In addition, the window contains information on who the software is licensed to, as well as their registration number.

1.5 MENU:Project:Environment Prefs

Menu Shortcut

E

Choosing this option brings up the

Setting Environment Parameters
window,

allowing you to change various factors about your physical environment; namely where you are on the Earth, the time zone you are in, and related information.

1.6 MENU:Project:Screenmode Prefs

Menu Shortcut

S

Choosing this option brings up the

Setting Screen Mode
window which allows you

to change the screen resolution, monitor type, number of colors, etc. used by "The Digital Universe".

1.7 MENU:Project:Display/Object Prefs

Menu Shortcut

D

Choosing this option brings up the

Display/Object Preferences
window. This

window allows you to customize a great variety of options used by "The Digital Universe" in generating a view on the screen (or printer - see

Full page
or

Full screen
printing.)

1.8 MENU:Project:Fields of View

Menu Shortcut

V

Choosing this menu item brings up the

Field of View Preferences
window. This

window allows you to set up to ten preset fields of view (in degrees), as well as a custom display orientation for each field. A simple keystroke will then zoom the display to one of the ten fields.

1.9 MENU:Project:Open Control Panel

Menu Shortcut

C

Choosing this menu item brings up the Control Panel window. This window allows you to pan around the simulated sky of "The Digital Universe", as well as quickly change various display options.

1.10 MENU:Project:Time Control

Menu Shortcut

T

This option brings up the Time Control window. This window allows you to set the current date and time used in the simulation of the sky, as well as specify the conditions of automatic or manual advancement through time.

1.11 MENU:Project:Misc. Objects

Menu Shortcut

O

This menu item brings up the Miscellaneous Objects window. This window allows you to specify which comets, asteroids, or Earth-orbiting satellites that "The Digital Universe" should consider.

1.12 MENU:Project:Full Sky view

Menu Shortcut

F

Picking this option from the menu zooms the display so that an entire hemisphere of the sky can be seen (180 degree field of view). Due to difficulties of displaying a round celestial sphere on a flat monitor, distortion will occur near the edges of the view.

See also:

MENU:Project:Medium Sky view

1.13 MENU:Project:Medium Sky view

Menu Shortcut

M

Picking this menu option zooms the display so that a moderate field of view (70 degrees) is used. This can be useful to re-orient a user without causing severe distortions near the edges of the field.

See also:

MENU:Project:Full Sky view

.

1.14 MENU:Project:Undo view

Menu Shortcut

U

Choosing this option from the menu will "Undo" the last zoom and/or direction of view. "The Digital Universe" keeps track of your last ten views, and can therefore "undo" the display up to ten times.

1.15 MENU:Project:Redraw

Menu Shortcut

B

Choosing "Redraw" from the Project menu will redraw the screen. This is useful if you have aborted a draw in progress and then later change your mind.

Note that the Redraw option does only what it says - redraw the screen. If you aborted the generation of a display before the positions of various objects could be calculated, a redraw will not show them (since the computer has not calculated where they would appear). To recalculate their positions and redraw them on the screen, select

Recalculate

from the Project menu instead.

1.16 MENU:Project:Recalculate

Menu Shortcut

.

Choosing "Recalculate" from the Project menu will recalculate the positions of objects and then redraw the screen. This is useful if you aborted a calculation in progress and then later change your mind.

Note that the computer first determines where various objects will occur on the screen, and then draws them there. If you interrupted the computer while it

was drawing objects on the screen, chances are that their positions had already been calculated. In such a situation, choosing

Redraw

from the Project menu

would be much faster.

1.17 MENU:Project:Quit

Menu Shortcut

Q

Choosing this option from the Project menu will exit from "The Digital Universe".

1.18 MENU:Print:Full Screen

Menu Shortcut

N

If you pick this option from the "Print" menu, the software will attempt to print the contents of the current screen to your printer. "The Digital Universe" uses the configuration you have set up with your Workbench printer preferences. If you have not configured a printer for use with your Amiga, you must do so. Consult your Workbench documentation for more information.

Print routines used with "The Digital Universe" make maximum use of the resolution of your printer. If you have a good quality printer and choose a density of 7 for your Workbench printer graphics preferences, the output will likely be superior to that on the screen.

"Full Screen" printing means that the contents of the entire screen will be sent to the printer. Since a standard monitor is wider than it is high, but a piece of paper is higher than it is wide, the plot is scaled down so that it can fit horizontally across the paper. As a result, the lower portion of the paper will not be used. Landscape printing is not currently supported with "The Digital Universe".

If you wish to fill an entire sheet of paper, use the

Full Page

mode.

View the difference between Full Page and Full Screen printing

1.19 MENU:Print:Full Page

Menu Shortcut

G

If you pick this option from the "Print" menu, the software will attempt to print the contents of the current screen to your printer. "The Digital

Universe" uses the configuration you have set up with your Workbench printer preferences. If you have not configured a printer for use with your Amiga, you must do so. Consult your Workbench documentation for more information.

Print routines used with "The Digital Universe" make maximum use of the resolution of your printer. If you have a good quality printer and choose a density of 7 for your Workbench printer graphics preferences, the output will likely be superior to that on the screen.

"Full Page" printing means that the plot will be scaled to fill the paper. Since a standard monitor is wider than it is high, but a piece of paper is higher than it is wide, the right and left edges of the image on the screen will not be appear on the paper. Landscape printing is not currently supported with "The Digital Universe".

If you would rather print the entire contents of the screen, use the

Full Screen
mode.

View the difference between Full Page and Full Screen printing

1.20 MENU:Mode:Planetarium

Menu Shortcut
P

If you put the software into "Planetarium" mode, it draws the screen so that celestial north is up. As a result, the horizon may not appear level.

See also

Local Sky
mode.

1.21 MENU:Mode:Local Sky

Menu Shortcut
L

If you put the software into "Local Sky" mode, it orients the screen so that it matches the view it would have from your position on the Earth. In this mode, the horizon appears to be level.

See also

Planetarium
mode.

1.22 MENU:Find:Sun/Planet/Moon

Menu Shortcut
X

Selecting this option from the "Find" menu brings up the

Sun, Planets, and Moons window
, allowing you to find the Sun, a planet, or a
moon of interest. It is only enabled if you have set the option in the

Display/Object Preferences
window to draw planets and their moons.

1.23 MENU:Find:Constellation

Menu Shortcut
Y

Selecting this option brings up the
Constellation Selection
window, allowing
you to find a particular constellation.

1.24 MENU:Find:Star

Menu Shortcut
Z

Selecting this option brings up the
Star Selection
window, allowing you to find
a particular star of interest. It is only enabled if you have set the option
in the

Display/Object Preferences
window to draw stars.

1.25 MENU:Find:Deep Sky Object

Menu Shortcut
K

Selecting this option brings up the
Deep Sky Object Selection
window, allowing
you to find a deep sky object of interest. It is only enabled if you have set
the option in the

Display/Object Preferences
window to draw deep sky objects.

1.26 MENU:Find:Misc. Object

Menu Shortcut

J

This menu option brings up the Miscellaneous Object Selection window, allowing you to find an asteroid, comet, or Earth-orbiting satellite of interest. It is only enabled if you have set the option in the Display/Object Preferences window to draw miscellaneous objects. In addition, the only items which can be found are those which have been selected in the Miscellaneous Objects window.

1.27 MENU:Export:Screen Snapshot

Menu Shortcut

H

The "Screen Snapshot" option allows you to take a "photograph" of the current screen. It brings up a file requester allowing you to specify a directory and filename into which it will save an IFF ILBM picture. By convention, IFF picture files should end in a .iff extension.

IFF ILBM is the standard picture format for the Amiga, which can be viewed by a wide variety of software packages. The utility showanim provided with "The Digital Universe" may also be used to view these pictures.

An icon will be saved with the picture for Workbench users. It will use "showanim" to display the image.

1.28 MENU:Export:Animation

Menu Shortcut

A

Choosing this option from the "Export" menu will bring up the Animation Control window. From this window, you can create an unlimited variety of animation files, saved as an IFF ANIM.

IFF ANIM is the standard animation format for the Amiga. A large selection of third party software packages can play animations in this format. The utility

showanim

provided with "The Digital Universe" may also be used to view ←
these
animations.

1.29 MENU:Export:Reports

Menu Shortcut
R

This menu option brings up the
Report Generation
window, which allows you to
output numerical reports to the printer or a file.

1.30 MENU:Quicklook:North

Menu Shortcut
8

Choosing this option will cause the software to generate a view of the sky as it appears to the north of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.31 MENU:Quicklook:Northeast

Menu Shortcut
9

Choosing this option will cause the software to generate a view of the sky as it appears to the northeast of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.32 MENU:Quicklook:East

Menu Shortcut
6

Choosing this option will cause the software to generate a view of the sky as it appears to the east of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.33 MENU:Quicklook:Southeast

Menu Shortcut

3

Choosing this option will cause the software to generate a view of the sky as it appears to the southeast of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.34 MENU:Quicklook:South

Menu Shortcut

2

Choosing this option will cause the software to generate a view of the sky as it appears to the south of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.35 MENU:Quicklook:Southwest

Menu Shortcut

1

Choosing this option will cause the software to generate a view of the sky as it appears to the southwest of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.36 MENU:Quicklook:West

Menu Shortcut

4

Choosing this option will cause the software to generate a view of the sky as it appears to the west of your location. The menu shortcut for this option makes sense if you consider the numerical keypad to represent directions on a compass.

1.37 MENU:Quicklook:Northwest

Menu Shortcut

7

Choosing this option will cause the software to generate a view of the sky as it appears to the northwest of your location. The menu shortcut for this

option makes sense if you consider the numerical keypad to represent directions on a compass.

1.38 MENU:Help:Dictionary

Menu Shortcut
None

Selecting this menu item will bring up a hypertext dictionary of astronomy and computer-related terms.

[Link to dictionary](#)

1.39 MENU:Help:Objects

Menu Shortcut
None

Selecting this menu item will bring up a hypertext guide to a vast amount of information about various objects in the solar system and elsewhere, organized as a multimedia-based encyclopedia.

[Link to object descriptions](#)

1.40 MENU:Help:People

Menu Shortcut
None

Selecting this menu item will bring up a hypertext guide to a number of prominent individuals in astronomy.

[Link directly to information about individuals](#)

1.41 MENU:Help:Spacecraft

Menu Shortcut
None

This menu item will bring up a hypertext multimedia encyclopedia of all interplanetary spacecraft as well as several Earth-orbiting satellites.

[Link to Spacecraft Encyclopedia](#)

1.42 MENU:Help:Intro. to Astronomy

Menu Shortcut

I

Choosing this item will bring up a hypertext multimedia encyclopedia providing an introduction to astronomy.

Link to Introduction to Astronomy

1.43 MENU:Help:Search Hypertext

Menu Shortcut

W

Selecting this item from the menu will bring up the Search Hypertext Files window. This window will allow you to search through all the help files looking for a word or phrase.

1.44 Windows

Context-sensitive help is available by simply pressing the HELP key when the mouse pointer is over the window or gadget you wish to have explained. As a result, help for a particular window is not usually obtained by going through this menu, but it is provided for users that make their way here one way or another.

About The Digital Universe

Setting Environment Parameters

Setting Screen Mode

Display/Object Preferences

Field of View Preferences

Control Panel

Time control

Miscellaneous Objects

Sun, Planets, and Moons

Constellation Selection

Star Selection

Deep Sky Object Selection

Miscellaneous Object Selection

Animation Control

Report Generation

Search Hypertext Files

Printing Status

Object Information

Multiple Objects

Calculating...

Miscellaneous Object Orbit Entry

1.45 Multiple Objects Window

Normally, when you click the mouse pointer on an object on the screen, a window appears giving detailed information about the object. However, if more than one object is under the pointer, "The Digital Universe" needs to know which object you want more information about.

To find out, it brings up the Multiple Object Selection Window, containing a list of objects sorted by increasing magnitude (brighter objects at the top of the list). For objects with multiple names or designations, such as the brighter stars, only the most commonly used name is displayed. The designation for the object is shown on the left, and its magnitude is on the right.

To choose which object you are interested in, simply click on it. Detailed information will then appear. If you change your mind and would rather not obtain further information about anything, just close the window.

1.46 About The Digital Universe Window

This window lists several of the people who have had important roles in the development of "The Digital Universe".

In addition, this window contains information about who the software is registered to, as well as their registration number. Please use this registration number in any correspondence you may have with us. Our postal address is:

Syzygy Research & Technology Ltd.
Box 75
Legal, AB
T0G 1L0

CANADA

In addition, you can contact us by sending Internet email to sales@syz.com or support@syz.com. You can also visit our World Wide Web (WWW) site with the following URL:

<http://www.syz.com>

1.47 Setting Environment Parameters

This window allows you to change various factors about your
 physical
 environment, such as your location on the Earth, the time zone you are in, etc.

For more information on a particular gadget, place your mouse pointer over the gadget of interest and press the HELP key.

Note that to make changes in this window take effect, you must press the
 Save
 or
 Use
 button at the bottom of the window. If you simply close the
 window, the
 software will use your old environment configuration.

Further help is available for the following gadgets in this window:

Latitude

Longitude

Altitude

Temperature

Pressure

City List

Current City

Time Zones

Current Time Zone

Time Zone Offset

Load

Save

Use

Horizon File

1.48 Latitude

There are two methods of telling "The Digital Universe" where you are. One is to simply click on a nearby city in the list. The other is to directly enter your position. This box allows you to specify your latitude, if you would rather enter your location manually than click on a city in the list below this gadget.

The latitude must be of the format "DD:MM:SSX" where:

DD = degrees
MM = minutes
SS = seconds
X = 'S' or 'N' (South or North)

For an example of acceptable format, click on a city in the list below.

If you prefer, your latitude may also be entered in decimal degrees, followed by 'N' or 'S', as before.

1.49 Longitude

There are two methods of telling "The Digital Universe" where you are. One is to simply click on a nearby city in the list below. The other is to directly enter your position. This box allows you to specify your longitude, if you would rather enter your location manually than click on a city in the list below this gadget.

The longitude must be of the format "DDD:MM:SSX" where:

DDD = degrees
MM = minutes
SS = seconds
X = 'E' or 'W' (East or West)

If you prefer, your longitude may also be entered in decimal degrees, followed by 'E' or 'W', as before.

1.50 Altitude

Since "The Digital Universe" is capable of generating the appearance of the night sky to a great deal of precision, serious observers will want to take advantage of the fact that the software can make adjustments depending on your altitude above sea level. If you know your altitude, you may enter it in this box.

Your altitude should be entered in a form similar to '1000m' or '1000f' for 1000 metres or 1000 feet above sea level, respectively. If you leave the box empty, the software will assume a default altitude equal to sea level.

1.51 Temperature

If "The Digital Universe" is configured to take refraction into account when determining the position of stars and other objects, it needs to know the approximate temperature. This is because colder air bends light more strongly than warm air.

By entering the current temperature into this box, the software will make the appropriate adjustments. This ability is only of limited use, however, since the true apparent position of an object depends on the temperature and pressure at different atmospheric levels - not just the conditions on the ground.

A valid entry for temperature should be similar to:

20C or 70F or 300K

to represent degrees Celsius, Fahrenheit, or Kelvin, respectively.

In addition, the given temperature should be between -100 to 100 degrees Celsius, -148 to 212 degrees Fahrenheit, or 173 to 373 Kelvin.

1.52 Pressure

If "The Digital Universe" is configured to take refraction into account when determining the position of stars and other objects, it needs to know the approximate pressure. This is because high pressure air bends light more strongly than that of low pressure.

By entering the current pressure into this box, the software will make the appropriate adjustments. This ability is only of limited use, however, since the true apparent position of an object depends on the temperature and pressure at different atmospheric levels - not just the conditions on the ground.

A valid entry for pressure should be similar to:

101K or 29.9I

to represent 101 kilopascals (kPa) or 29.9 inches of mercury, respectively.

The given pressure should be between 0 to 200 kPa or 0 to 59 inches of mercury.

1.53 Cities and towns

"The Digital Universe" contains a database of the locations of 1230 different cities and towns worldwide. If one of the entries is near where you live, all you have to do is click on it. Then, the latitude, longitude, and altitude (if known) of this location will be entered automatically in the appropriate boxes above.

It should be remembered that cities and towns take up a certain amount of size on the Earth's surface. The coordinates provided by the internal database usually refer to the geographical center of the settlement. If a high degree of accuracy is required, you may need to adjust the location manually to your observing location. "The Digital Universe" is accurate enough that an error of only a few hundred metres (a few arcseconds) in latitude and longitude can make a detectable difference.

There are two 'special' locations in this list. <Other> should be used when specifying a location not otherwise in the list. 'Geocentric location' places you at the centre of the Earth. Many tables and almanacs tabulate events as they occur from a geocentric position, so the ability to define your location as such is useful in comparing the calculations of "The Digital Universe" to published values.

1.54 Time Zones

The world is divided up into several different time zones. "The Digital Universe" needs to know which time zone you are in so that it can use your own local time in simulating the appearance of the sky. Time zones can be specified by two different methods: by name, and by the number of hours it is kept away from Greenwich Mean Time (also known as Universal Time - UT).

If you see your time zone in the list, a simple click on it will enable the software to calculate the offset from UT. If your time zone is not listed, select <Other> at the top of the list, and then enter the appropriate value into the

Offset
requester.

Some places in the world make use of something known as "Daylight Savings Time". Regions with this policy usually set clocks an hour ahead in the spring, and an hour behind in the fall. Since the dates at which Daylight Savings Time occurs vary from region to region (based on local custom and politics), "The Digital Universe" is unable to determine on its own when to consider Daylight Savings Time.

This means that twice per year you may have to change your time zone entry. Most zones appear twice in the list - once as a "Standard" time, and once as a "Daylight" time. For example, you may have to change your time zone from "Mountain Standard Time" in the winter to "Mountain Daylight Time" in the summer.

1.55 Current Time Zone

This little box indicates which time zone is currently being used by the software.

1.56 Current City

This box indicates which city has been selected in the list above.

1.57 Time Zone Offset

This indicates the current time zone offset from Universal Time (↔ UT). It is expressed in hours and minutes (in the form +HH:MM or -HH:MM), and is calculated by subtracting the current Universal Time from the current Local Time. As a result, time zones in the western hemisphere are usually expressed as negative offsets, while time zones in the eastern hemisphere are positive.

You can only enter a value into this box if you have selected <Other> from the

time zone list above.

1.58 Load

This button allows you to load a preset environment configuration. If selected, a file requester is brought up allowing you to specify the file from which to load the configuration. As a standard, environment filenames should end with an ".environ" extension. When the program first starts, it attempts to read the default environment from a file named "du.environ".

By allowing multiple configurations in this manner, "The Digital Universe" allows you to preset the environment settings for every observing site you have.

1.59 Save


This button allows you to save an environment configuration. If selected, a file requester is brought up allowing you to specify the file in which to save the configuration. Environment filenames should end with an ".environ" extension. If you save the configuration as a file named "du.environ", the settings will be loaded every time the program is started.

By allowing multiple configurations in this manner, "The Digital Universe" allows you to preset the environment settings for every observing site you

have.

If you have entered invalid data somewhere on the window, the program will not let you save your configuration. Instead, it will describe what the problem is and give you the chance to fix it.


1.60 Use

This button allows you to use the environment settings specified  in the window.

These settings will only be used for the current session with the software - if you wish to make them permanent, press the Save button instead.

If you have entered invalid data somewhere on the window, the program will not let you use your configuration. Instead, it will describe what the problem is and give you the chance to fix it.

1.61 Horizon File

"The Digital Universe" is capable of drawing more than just a  simple line to represent your horizon. Since few of us have truly flat horizons, the software will allow you to specify a special file describing its appearance. By convention, horizon filenames should end in the ".hor" extension.

You may enter the filename (complete with path) into the box provided. If preferred, you can click on the image to the right of the input box to bring up a file requester to choose the file.


Note that a horizon is only drawn if the appropriate option is selected in the

Display/Object Preferences window.

A sample horizon file, named "sample.hor", is provided with "The Digital Universe".

For more information, see
The Horizon File Format
.

1.62 The Horizon File Format

If you have instructed the software to draw a horizon, through  enabling the appropriate option in the Display/Object Preferences window, it will, by

default, draw a straight horizontal line. However, few of us have truly flat horizons. Therefore, "The Digital Universe" will draw a customized horizon if you ask it to. This is done by specifying the "horizon file" from the

Setting Environment Parameters window.

A horizon file can be created by any word processor or text editor capable of generating plain ASCII output. It should consist of 360 lines, with a single decimal number on each line. Line number 'n' will contain the altitude of the horizon, in degrees, for the azimuth of (n-1) degrees. In other words, the first line should contain the altitude of your horizon straight north (at an azimuth of 0 degrees). The next line should contain the altitude of your horizon 1 degree to the east of that, and so on for 360 degrees.

Of course, it could get rather tedious obtaining and entering 360 different altitude measurements. The software requires the altitude of the horizon directly north (as the first line), but will interpolate for any other intermediate values if you give them an altitude of 100. Thus, you can create a less detailed horizon file by only specifying the coordinates you want (including the point on the horizon to the north), and entering 100 for every other line.

When creating a horizon file, it may be easiest to modify a copy of "sample.hor", provided as an example with "The Digital Universe".

Determining Altitude/Azimuth Measurements for your Horizon

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Since not many people have access to a theodolite or professional surveying instrument, a method is described here to obtain rough measurements of the altitude of your horizon at varying degrees of azimuth.

You must first find the point on your horizon due north of your observing location. Northern hemisphere observers can approximate this on a clear night by finding Polaris, the North Star. If you hang a weight from a string and line it up so it appears to pass over Polaris, it will intersect the horizon at a position within a degree or so of true north.

Since southern hemisphere observers cannot view Polaris, and do not have an equivalent bright "South Star", they must find true north by getting "The Digital Universe" to find the time when any bright star lies directly to the north of their location. This is done by finding a bright star lying north of the celestial equator (having a positive declination), and clicking on it to find its local time of meridian transit. This star can then be used in place of Polaris, but only at the specified time.

Remember where this north point is located, and come back out to your observing site in the day, bringing a protractor, level, and a ruler with you. If you line the protractor so that 0 degrees points directly north and the numbers increase in a clockwise direction, they will indicate azimuth angles. To take an altitude measurement at a particular azimuth, point the level in the proper azimuth direction, and keep it level. Put your eye at one end of the level, and adjust the ruler at the other end until the tip of it appears to line up with the horizon. Read off the distance between the tip of the ruler and the top of the level, then divide this number by the length of the level. If you then use a scientific calculator to determine the arctangent of the result, you are left

with the altitude of your horizon.

View diagram of how to measure altitude

1.63 Setting Screen Mode Window

This window allows you to change the screen resolution, monitor type, number of colors, etc. used by "The Digital Universe".

For more information on a particular gadget, place your mouse pointer over the gadget of interest and press the HELP key.

Note that to make changes in this window take effect, you must press the

Save

or

Use

button at the bottom of the window. If you simply close the window, the software will use your old screenmode configuration.

Help is available for the following gadgets:

Screen list

Current screen

Use topaz font

Screen size

of colors

Save

Use

1.64 List of Screens

This list shows the different screenmodes which your Amiga is capable of using.

You can choose any mode by simply clicking the mouse pointer on it. The

Save

or

Use

button must then be selected for the changes to take effect.

The first entry in the list is labeled <Default monitor>. If this is selected, "The Digital Universe" will open up an NTSC Hires Interlaced screen if you are using an NTSC monitor, or a PAL Hires Interlaced screen if you are using a PAL monitor.

1.65 Current Screen

This box shows the screenmode which you have selected in the list ↔ of screens above. Remember that "The Digital Universe" will not use the selected screenmode unless you click on the Save or Use buttons below.

1.66 Use Topaz font

If you have selected a non-interlaced screen in the screenmode list and are using a font other than Topaz/8 as your default system font, some of the windows used with "The Digital Universe" may become too large to display. If this happens, the window will simply not appear on the screen when it should.

If you tell the software to use the topaz font, it will override your system default preferences so that all the windows can be displayed.

If you are running a screen with more than 200 lines of vertical resolution, you will probably not need to select this gadget.

1.67 Screen Width and Height

You can enter your desired screen width and height into these boxes (in pixels). If you select a screenmode from the list to the left, the default sizes will appear. However, if you wish to use a "virtual" screen larger in size, simply increase the number in this box.

If you choose a screen size larger than that which can be shown on your monitor, you can scroll about simply by moving your mouse to the edges of the display. In this way, the size of the screen you wish "The Digital Universe" to use is limited only by the amount of chip (graphics) memory you have, and not by the capabilities of your monitor.

If you increase the screen dimensions to a size which cannot be supported by the amount of chip memory that you have, the software will reduce the screen until it fits. Note that the size chosen by "The Digital Universe" may not necessarily be the largest screen which can fit with the memory that you have, but will be a bit smaller.

If "The Digital Universe" opens up a screen smaller than that which you know you have been able to use in the past, chances are that your chip memory has become fragmented. Usually, rebooting the computer will solve the problem.

1.68 Number of colors

This slider allows you to change the number of colors used by "The Digital Universe". The software currently only uses screens of 8 or 16 colors.

If 8 colors are chosen, everything appears on the screen as varying shades of gray. If 16 colors are chosen, color is used for the purposes of labeling, drawing grid lines, etc. However, 33% more chip memory is required.

1.69 Save

If you press this button, the preferences you have set for your screenmode are saved to the configuration file used by the software when it is started. In this way, your changes are made permanent, and it will use these preferences every time you use "The Digital Universe" in the future.

If you wish to use your preferences for the current session only, click on the

Use
button instead.

1.70 Use

The "Use" button tells "The Digital Universe" to use the preferences for screenmode and number of colors that you have set up. These preferences are only active for your current session - the next time you use the software, it will use its old settings.

If you wish to save the settings for future use, press the

Save
button instead.

Then, your settings will be in effect every time the software is loaded.

1.71 Display/Object Preferences Window

This window allows you to customize a great variety of options used by "The Digital Universe" in generating a view on the screen (or printer - see

Full page
or
Full screen
printing.)

For more information on a particular gadget, place your mouse pointer over the gadget of interest and press the HELP key.

Note that to make changes in this window take effect, you must press the Save or Use button at the bottom of the window. If you simply close the window, the software will use your old display configuration.

Help is available for the following gadgets:

Calculation & Display

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Display

Ra/dec grid

Horizon

Fast Labels

Fast info

Show Time

Flip Horizontal

Flip Vertical

Star trails

Show FOV
Precision

Precession

Proper Motion

Nutation

Aberration

Refraction
Objects

Stars

Sun/Planet/Moon

Deep Sky

Misc. Object
Palette

Use night palette

Simulate Twilight
Object Preferences

=====

Stars

Bayer Designation

Flamsteed number

Star names
Deep Sky

NGC/IC #

Messier #

Names
Sun, Planets & Moons

Show Phase

Features & Flattening

Show Grid

Object Names
Miscellaneous Objects

Misc. Object Names
Constellations

Boundaries

Figures

Names
Limiting Magnitudes

=====

Stars/Planets

Deep Sky

Misc. Object

Save

Use

1.72 RA/Dec grid

Selecting this option causes the software to draw the grid lines of right ascension and declination on the screen.

1.73 Horizon

If this option is selected, "The Digital Universe" will draw the horizon on the screen. If no horizon file has been chosen in the

Setting Environment Parameters window, just a simple line will be drawn, representing an ideal, flat horizon. On the other hand, if a horizon file has been selected, a representation of the user's horizon will be generated as well.

Note that the horizon will only appear level if the software is in Local Mode

.

1.74 Fast Labels

When "The Digital Universe" labels stars, planets, or other objects, it can do so by one of two methods:

1. The label is just placed to the right of the object.
2. The label's position is adjusted so as to minimize overlap with nearby labels and objects.

The "Fast Labels" gadget allows you to choose which method to use. If it is selected, labels are placed to the right of the object. This is much faster than the second method, though the results do not look as good.

1.75 Fast Info

If you click the mouse pointer on an object on the screen, a window is displayed containing information about it. For objects which move with respect to the background stars (such as planets), information such as rise and set times is difficult to determine and may take some time to calculate. If this gadget is selected, these calculations will not be performed, speeding up the process of obtaining information about an object. In such a case, the affected information will be marked "Unavailable".

1.76 Show Time

If this option is selected, the time used by the software in performing its calculations is displayed in the upper left hand corner of the screen (or paper, if a printed copy is made). Two times are displayed: LT (Local Time) and DT (Dynamical Time).

1.77 Flip Horizontal and/or Vertical

If you have a telescope, the apparent view through it may be flipped in the horizontal and/or vertical axes. These buttons allow you to specify whether you want "The Digital Universe" to produce such an inverted image to match that seen through your telescope.

1.78 Star trails

Normally, when the software steps through time (either automatically, manually, or when generating an animation), it erases the screen before redrawing the new image. If this option is selected, however, the screen will not be erased. This allows you to generate views showing how objects move across the sky, which appear similar to "star trail" photographs made by leaving a camera's shutter open for long periods of time.

1.79 Show FOV

The "field of view" indicates how much of the sky you can see at once. It can be thought of as a circular region with a particular angular diameter. With smaller fields of view, objects appear larger on the screen, but fewer objects can be seen at once.

Since a "field of view" is really a circular region, but computer monitors are rectangular in shape, "The Digital Universe" adjusts the display so that the field will just fit vertically on the monitor.

If you choose the "Show FOV" option, a circle will be drawn indicating the true field of view on the display.

1.80 Earth's Shadow

The Sun casts a shadow of the Earth into space. Objects near to the Earth (such as Earth-orbiting satellites and the Moon) may periodically move into this shadow and drastically darken in appearance.

When the Moon moves into the Earth's shadow, a lunar eclipse occurs. If this gadget is selected, "The Digital Universe" draws a representation of the Earth's shadow as it appears at the distance of the Moon. The outer circle drawn shows the region of the penumbral shadow, while the inner circle

indicates the region of the umbra.

By telling the software to draw the Earth's shadow, the circumstances of lunar eclipses can be readily determined.

1.81 Stars

If this option is selected, stars will be drawn on the screen when the software is generating a view of the sky. For normal use this should be left on. However, if turned off, the display is updated much more quickly. The difference is especially noticeable when generating a view of the sky for the far past or future. For example, if you are generating an animation of the appearance of Saturn and its rings, you will likely be zoomed in so closely to the planet that you wouldn't see the stars anyway. Turning them off would allow the animation to proceed much more quickly.

1.82 Sun/Planet/Moon

This gadget allows you to specify whether or not you want "The Digital Universe" to calculate the positions of the Sun, planets, and their moons. Though it should be left on for an accurate representation of the night sky, there are many cases where an individual merely wishes to study the stars. On machines without a math coprocessor (FPU), updates to the display are much faster if the software doesn't have to calculate the position of these objects.

1.83 Deep Sky Objects

If this option is selected, the software will determine and plot the position of deep sky objects from the Messier, NGC, and IC databases. Since doing so can slow the display, the user is provided with the ability to turn the feature on or off.

1.84 Miscellaneous Objects

If this option is selected, "The Digital Universe" will calculate ←
and plot the
positions of any miscellaneous objects (comets, asteroids, Earth-orbiting
satellites, etc.) which you have selected in the
Miscellaneous Objects
window.

1.85 Precession

Choosing this option allows the software to calculate the effects of precession when determining the appearance of the sky. It slows down calculations significantly, so should only be chosen when you want high accuracy, or are simulating the sky for dates in the far future or past.

If selected, celestial objects are precessed to the epoch defined in the Time Control window.

1.86 Proper Motion

If this option is selected, the software will consider proper motion of the stars in determining their positions. Since proper motion calculations slow the software down somewhat, and it is only a significant effect over time periods of thousands of years, it can often be disabled.

If this option is selected, the effect of proper motion is applied to adjust the star's position to where it would be at the epoch defined in the

Time Control
window.

1.87 Nutation

If this option is selected, the software will consider the effects of nutation. Nutation is typically a small effect, noticeable only when zoomed in to a small region of the sky. Therefore, unless high accuracy is desired, it can often be left disabled to speed calculations.

1.88 Aberration

If this gadget is selected, the effects of aberration will be considered in generating a simulated view of the sky. Aberration is only noticeable when zoomed in to a particularly small region of sky, and can therefore often be left disabled, speeding calculations.

1.89 Refraction

Refraction will be considered when generating views of the sky if this option is selected. If you are interested only in the relative positions of nearby objects, you can speed up calculations by leaving this gadget unselected. This is because refraction affects objects in the same part of the sky by the same amounts.

However, if you are interested in the apparent position of objects near the horizon, refraction can affect their position by a half a degree or so, so it may be significant.

If refraction is turned on, and you zoom in to the Sun or Moon as they rise or set, you will be able to see how refraction makes their appearance seem "squashed" when near the horizon.

Refraction calculations use the current temperature and air pressure as set in the

Setting Environment Parameters

window to provide a reasonably accurate estimate of the effect.

1.90 Use Night Palette

When you look at the night sky, it takes a half hour or more for your eyes to get as sensitive to light as they are capable of becoming. This "dark adaptation" is necessary for seeing the fainter objects in the sky.

However, a light source is sometimes needed to be able to look at star charts, equipment, etc. in the dark. A bright white light from a flashlight ruins your dark adaptation, and some time is required before your eyes get used to the dark once again.

Scientists have discovered that red light does not affect our eye's sensitivity nearly as much as white light. Therefore, astronomers often use flashlights with a red filter over the front of them to preserve their dark adaptation.

Computer monitors are notoriously bad for affecting night vision. With this in mind, "The Digital Universe" provides a special night palette for those observers who may be using their computer near the telescope. When selected, this gadget uses a special black and red palette instead of the standard one.

1.91 Simulate Twilight

Normally, the software shows the stars even if the Sun is in the sky. This allows users to study celestial objects and events without having to worry about the constraint of the Sun being below the horizon. This is quite useful, if a bit unrealistic.

If this gadget is selected and the Sun is currently in the sky, the background changes from black to blue, with only the brightest objects remaining visible. After sunset, the background slowly changes from blue to black, simulating the effect of twilight. Throughout the night, the sky remains black, slowly fading to blue again before dawn.

This gadget can only be selected if the software is set up to calculate the position of planets and their moons by enabling the Sun/Planet/Moon

option. If it is not, the position of the Sun is unknown and twilight cannot be simulated.

1.92 Constellation Boundaries

Constellations have been defined in the heavens for thousands of years. But these constellations have only consisted of a few stars linked together into shapes.

In 1930, E. Delaporte realized that it would be useful to define particular constellations on the basis of the regions in the sky which they occupy, instead of just a few stars making up the figure. He published a list of proposed constellation boundaries in a work entitled "Délimitation Scientifique des Constellations", which soon became accepted by the astronomical community.

Selecting this gadget displays the constellation boundaries as outlined by Delaporte. His boundaries fall directly on lines of constant right ascension and declination when 1875 coordinates are used (the standard at the time of his publication). Since then, however, precession has caused the boundaries to shift slightly, so they do not always seem to line up perfectly.

1.93 Constellation Figures

Selecting this option causes the software to connect the stars into various constellation figures.

Note that the constellation figures do not follow the stars in proper motion calculations. In this way, you can easily use "The Digital Universe" to generate the appearance of a given constellation 100,000 years in the future or past, and directly compare its appearance with the modern constellation figure.

1.94 Constellation Names

If this option is selected, constellation names will appear on the screen.

An interesting detail can be seen with the constellation of "Serpens" (the serpent). Since it is considered to be held by "Ophiuchus" (the serpent holder), the two constellations actually overlap one another. This caused some problems when trying to divide the sky into regions, delineated by constellation boundaries.

As a result, some astronomers subdivide Serpens into two smaller constellations - "Serpens Caput" (the serpent's head) and "Serpens Cauda" (the serpent's tail). The region of Serpens directly overlapping Ophiuchus is considered to be part of the latter constellation.

1.95 NGC/IC

If this option is selected, "The Digital Universe" will label any deep sky object with its NGC or IC numbers. It can only be selected if the software is configured to display deep sky objects.

1.96 Messier

If this gadget is selected, the software will label any Messier objects which may appear on the screen. It can only be selected if the software is configured to display deep sky objects.

1.97 Names

If this option is selected, the software will label deep sky objects with their proper names, if any. It can only be selected if the software is configured to display deep sky objects.

1.98 Bayer designation

If this gadget is selected, stars will be labelled with their Bayer designation, if they have one. It can only be selected if the software is configured to display stars.

1.99 Flamsteed number

If this option is selected, stars will be labelled with their Flamsteed number, if they have one. It may only be selected if the software is configured to display stars.

1.100 Star Names

If this gadget is selected, stars will be labelled with their proper names, if they have any. It can only be selected if the software is configured to display stars.

1.101 Show Phase

The Moon is famous for going through its cycle of phases. However, all planets in our solar system also exhibit phases when viewed through a telescope. Mercury and Venus, lying closer to the Sun than the Earth, can be seen to go through a complete cycle of phases, just like the Moon. The other planets, lying further than the Earth, do not appear to go through the complete cycle, but the percentage of their illuminated surface visible from the Earth does change over time.

If this gadget is selected, "The Digital Universe" will display solar system objects with their proper phase, if the user has zoomed in sufficiently to be able to see details on the surface of the object. However, since drawing an object with the proper phase requires more time than drawing a simple disk, the software allows the user to shut off these phase calculations if desired.

The option can only be selected if the software is configured to display solar system objects.

1.102 Features & Flattening

This gadget enables or disables two related options of a solar system object's appearance. As with most options, enabling the gadget creates a more realistic view of the object, at the expense of taking longer to generate.

The option can only be selected if the software is configured to display solar system objects.

Features

"The Digital Universe" contains maps of the surfaces of Venus, the Moon, Mars, Jupiter, and Saturn. If the gadget is selected and the user is zoomed in sufficiently close to one of these bodies, the software will use these maps to generate the current appearance of the celestial body.

Only the maps of the Moon and Mars are of any real practical use. Venus' surface is permanently covered in clouds, hiding its details from astronomers. The map used by "The Digital Universe" is based on radar data from the Magellan space probe, and shows how Venus would appear if it were stripped of its cloud cover.

Jupiter and Saturn are gas giant planets, with no solid surface. Different parts of the planet rotate at different rates (known as differential rotation). As a result, predicting the current appearance of either of these objects is akin to predicting the weather on Earth over a long period of time. The maps used by the software for these objects simply indicate how the planets would appear if they had not changed in appearance since the Voyager 2 encounter.

Flattening

Most planets and moons in the solar system are wider at the equator than at the poles, due to their rotation about their axis. This effect, known as polar flattening, is especially evident with the "gas giant" planets (particularly Saturn). If the option is enabled, "The Digital Universe" will also take polar flattening into account in generating the appearance of an object.

1.103 Show Grid

If this option is selected, "The Digital Universe" will draw the longitude/latitude grid on a solar system object. The software uses sophisticated algorithms and formulae to determine the orientation of the object, so the grid can be used to accurately determine the location of the poles and equator.

The option can only be selected if the software is configured to display planets and their moons.

1.104 Sun/Planet/Moon Names

If this option is selected, the software will display names next to planets and their moons. It can only be selected if the software is configured to determine and display the position of these objects.

1.105 Misc. Object Names

If this gadget is selected, the software will display names next to any miscellaneous objects (comets, asteroids, or Earth-orbiting satellites) that it is plotting on the screen. It can only be selected if the software is configured to determine and display the positions of these objects.

1.106 Limiting Magnitude of Stars/Planets @ 20 degree field

Since "The Digital Universe" contains information on approximately 300,000 objects, it would be both time consuming and confusing if it placed all of the objects on the screen at once. To solve this problem, it uses the concept of limiting magnitude.

If the field of view is 20 degrees and you drag this slider gadget to a particular number, the software will only display objects brighter than that magnitude. If you zoom in to a smaller region of sky, the software automatically compensates to show fainter objects. Likewise, if you view a larger region of sky, only brighter objects will be shown.

By adjusting this bar, you can experiment with different apparent densities of stars on the screen.

This bar only adjusts the limiting magnitude for stars, planets, and their moons.

1.107 Limiting Magnitude of Deep Sky Objects @ 20 degree field

Since "The Digital Universe" contains information on approximately 300,000 objects, it would be both time consuming and confusing if it placed all of the objects on the screen at once. To solve the problem, it uses the concept of limiting magnitude.

If the field of view is 20 degrees and you drag this slider gadget to a particular number, the software will only display deep sky objects brighter than that magnitude. If you zoom in to a smaller region of sky, the software automatically compensates to show fainter objects. Likewise, if you view a larger region of sky, only brighter objects will be shown.

By adjusting this bar, you can experiment with different apparent densities of deep sky objects on the screen.

The ability to adjust the limiting magnitude for stars and deep sky objects separately is necessary, since most deep sky objects are quite faint. However, since they are often more interesting than individual stars, the user may want to make them more prominent on the screen by making them appear brighter with this slider.

1.108 Limiting Magnitude of Miscellaneous Objects @ 20 degree field

Since "The Digital Universe" contains information on approximately 300,000 objects, it would be both time consuming and confusing if it placed all of the objects on the screen at once. To solve the problem, it uses the concept of limiting magnitude.

If the field of view is 20 degrees and you drag this slider gadget to a particular number, the software will only display miscellaneous objects (comets, asteroids, and Earth-orbiting satellites) brighter than that magnitude. If you zoom in to a smaller region of sky, the software automatically compensates to show fainter objects. Likewise, if you view a larger region of sky, only brighter objects will be shown.

The ability to adjust the limiting magnitude for stars and miscellaneous objects separately is necessary, since most comets and asteroids are quite faint. However, since they are often more interesting than individual stars, the user may want to make them more prominent on the screen by making them appear brighter with this slider.

1.109 Save Display Preferences

If this button is pressed, the options set in the Display/Object Preferences window are used, and saved to disk. The next time you start a session with "The Digital Universe", your preferences will be loaded. ←

If you merely wish to use your settings for the current session, click on the

Use
button instead.

1.110 Use Display Preferences

If this button is pressed, the options set in the Display/Object Preferences window are used. However, if you quit the program and start it up again, it will use the settings last saved to disk (and not necessarily the settings you chose the last time you used the software).

If you wish to make your settings permanent, you should save them to disk by clicking on the

Save
button instead.

1.111 Field of View Preferences Window

This window allows you to preset up to 10 different fields of view. The software can then be made to instantly adjust its display to a given field of view (and orientation) with a single keypress.

Simply type the desired field of view in the appropriate box. This is the angular distance (in degrees) across the field. You can also specify if the field should be flipped in the horizontal or vertical dimensions. In this way, you can customize the field of view presets to allow you to see how a particular region of the sky would appear through binoculars or your telescope with different eyepieces.

Note that to make changes in this window take effect, you must press the

Save
or
Use

button at the bottom of the window. If you simply close the window, the software will use your old display configuration.

When your fields of view are set up, you can tell the software to instantly adjust the magnification to any of the ten fields. Simply ensure that the background window (the window upon which the simulation of the night sky is generated) is selected. Then, press the number key corresponding to the desired field, using the keys on the main portion of the keyboard (NOT the numeric keypad).

If you wish to see the field of view circle drawn in the display, select the option labelled "Show FOV" in the

Display/Object Preferences
window.

Determining the Field of View in Telescopes or Binoculars

=====

There are two methods of determining the field of view of an optical system - either by the manufacturer's specifications, or by experiment.

Specifications

Sometimes binocular manufacturers specify their equipment's field of view directly, measured in degrees. If this is the case, you merely need to enter this value into the software. Other manufacturers specify the field of view in terms of 'x' feet (or yards, metres, etc.) at a certain distance 'y'. To determine the field of view in degrees, make sure that 'x' and 'y' are specified in the same units (if not, convert so that they are). If you then divide 'x' by 'y' and take the arctangent of the result (using a scientific calculator), you will be left with the field of view in degrees.

Telescope manufacturers are unable to provide field of view specifications with their equipment, since it depends on the particular eyepiece being used. If the field of view for an eyepiece is available, it can be used in determining the effective field of view for the telescope.

First, the magnification needs to be calculated. For this, you need the focal length 'a' of the objective lens or mirror (the larger lens or mirror in your telescope) as well as the focal length 'b' of your eyepiece. These parameters are usually readily available. The magnification of the system is then given by a/b , provided that 'a' and 'b' are both specified in the same units. Call this result 'c'.

Now, divide the field of view of the eyepiece by 'c'. The result is the effective field of view of the telescope, with that particular eyepiece. The number can be entered directly into the boxes in this window. If your telescope inverts its image in either the horizontal or vertical dimensions, consider setting the appropriate "Flip Horiz." or "Flip Vert." boxes to the right.

You should repeat the calculation for each eyepiece you use with your telescope. Then, the software will be able to generate the true appearance of the sky through each of your eyepieces.

Experiment

If you are unable to obtain one or more of the parameters necessary to calculate the field of view directly, it can be determined by experiment. Use "The Digital Universe" to find a bright star near the celestial equator. The stars in Orion's belt work good for this, if they are visible. Then, take your equipment outside, find the star, and center it in your view. If your telescope has a motor allowing it to track the stars across the sky, turn the motor off. Time how long it takes for the star to drift out of the field, expressed in seconds. Divide this number by 120, and you are left with the diameter of the field of view in degrees, which may be directly entered into the software.

As before, if your telescope inverts its image in either the horizontal or vertical dimensions, consider setting the appropriate "Flip Horiz." or "Flip Vert." boxes to the right.

1.112 Save

If you press this button, your field of view preferences will become active, and will be saved to disk. The next time you start the software, they will automatically be loaded for you. ←

If you merely wish to use the settings for the current session, click on the

Use
button instead.

1.113 Use

The "Use" button allows you to use the field of view preferences ↔
for the
current session only. If you quit the program and then restart it, the
settings will be lost.

If you wish to keep your settings for future sessions, click on the
Save
button
instead.

1.114 Control Panel Window

This window provides buttons and gadgets to quickly perform common ↔
functions.
The buttons on the left control the orientation and field of view of the
display, while the ones on the right provide shortcuts to settings in the

Display/Object Preferences
window.

Unlike other windows, there is no "Use" button to make your changes take effect
- instead, they are acted upon immediately. If you are interested in changing
only one parameter, this is faster. However, if you have several parameters to
change it may be quicker to use the Display/Object Preferences window to adjust
them all at once before getting the computer to recalculate the display. In
addition, you must use the Display/Object Preferences window if you would like
your changes saved to disk.

Additional help is available for the following gadgets and buttons:

Arrows

Zoom in

Zoom out

Field

Right Ascension

Declination

Display Stars
Bayer Designation
Flamsteed Designation
Star Names
Constellation Figures
Constellation Boundaries
Constellation Names
RA/Dec Grid
Horizon
Deep Sky Objects
NGC Number
Messier Number
Deep Sky Name
Miscellaneous Objects
Misc. Object Name
Earth's Shadow
Flip Horizontal
Flip Vertical
Sun/Planet/Moon
Phase
Features
Planetary Grid
Sun/Planet/Moon Names
Star Trails
Field of View
Display Time

1.115 Arrows

The arrow buttons in the Control Panel allow the user to pan the display around the sky. In general, clicking on one of these buttons moves the center of your field of view in the direction of the arrow.

Specifically, the function of these arrows depends on whether you are in

Planetary mode

or

Local Sky

mode. If you are in Planetary mode, the arrows move your view in the directions of the compass (north, south, east, west, etc.). In Local Sky Mode, they move your field of view left, right, up or down.

1.116 Zoom Out

Selecting this button enlarges the field of view by a factor of 1.5.

1.117 Zoom In

This button reduces the field of view by a factor of 1.5.

1.118 Field

This requester allows you to enter the diameter of the field of view directly. It may be specified in one of two ways - by decimal degrees (such as 42.5) or in degrees, minutes, and seconds separated by colons (such as 45:32:25).

After typing the desired field of view, press the ENTER key. The display will be adjusted to the exact field that you specified.

1.119 Right Ascension

The Right Ascension of the center of your field of view may be entered into this requester. It may be specified in one of two ways - by decimal hours (such as 12.4) or in hours, minutes, and seconds separated by colons (such as 10:24:35).

After typing the new right ascension, press the ENTER key. The display will immediately be adjusted so that the center of the field is defined by the contents of the right ascension and declination

requesters in the Control Panel

window.

1.120 Declination

The Declination of the center of your field of view may be entered ↵ into this requester. It may be specified in one of two ways - by decimal degrees (such as -45.3) or in degrees, minutes, and seconds separated by colons (such as 56:23:54).

After typing the new declination, press the ENTER key. The display will be immediately adjusted so that the center of the field is defined by the contents of the

right ascension
and declination requesters in the Control Panel window.

1.121 Stars

This button is provided as a shortcut to the Stars gadget in the

Display/Object Preferences window.

1.122 Bayer designation

This button is provided as a shortcut to the Bayer designation gadget in the

Display/Object Preferences window.

1.123 Flamsteed designation

This button is provided as a shortcut to the Flamsteed designation gadget in the

Display/Object Preferences window.

1.124 Star Names

This button is provided as a shortcut to the Star Names gadget in the

Display/Object Preferences
window.

1.125 Constellation Figures

This button is provided as a shortcut to the
Constellation Figures
gadget in

the

Display/Object Preferences
window.

1.126 Constellation Boundaries

This button is provided as a shortcut to the
Constellation Boundaries
gadget in

the

Display/Object Preferences
window.

1.127 Constellation Names

This button is provided as a shortcut to the
Constellation Names
gadget in the

Display/Object Preferences
window.

1.128 RA/Dec Grid

This button is provided as a shortcut to the
RA/Dec Grid
gadget in the

Display/Object Preferences
window.

1.129 Horizon

This button is provided as a shortcut to the
Horizon
gadget in the

Display/Object Preferences
window.

1.130 Deep Sky Objects

This button is provided as a shortcut to the
Deep Sky Objects
gadget in the

Display/Object Preferences
window.

1.131 NGC/IC

This button is provided as a shortcut to the
NGC/IC #
gadget in the

Display/Object Preferences
window.

1.132 Messier

This button is provided as a shortcut to the
Messier #
gadget in the

Display/Object Preferences
window.

1.133 Deep Sky Names

This button is provided as a shortcut to the
Deep Sky Names
gadget in the

Display/Object Preferences
window.

1.134 Miscellaneous Objects

This button is provided as a shortcut to the
Miscellaneous Objects
gadget in

the

Display/Object Preferences
window.

1.135 Misc. Object Names

This button is provided as a shortcut to the
Misc. Object Names
gadget in the

Display/Object Preferences
window.

1.136 Earth's Shadow

This button is provided as a shortcut to the
Earth's Shadow
gadget in the

Display/Object Preferences
window.

1.137 Flip Horizontal

This button is provided as a shortcut to the
Flip Horizontal
gadget in the

Display/Object Preferences
window.

1.138 Flip Vertical

This button is provided as a shortcut to the
Flip Vertical
gadget in the

Display/Object Preferences
window.

1.139 Sun/Planet/Moon

This button is provided as a shortcut to the
Sun/Planet/Moon
gadget in the

Display/Object Preferences
window.

1.140 Show Phase

This button is provided as a shortcut to the
Show Phase
gadget in the

Display/Object Preferences
window.

1.141 Features & Flattening

This button is provided as a shortcut to the
Features & Flattening
gadget in

the

Display/Object Preferences
window.

1.142 Show Grid

This button is provided as a shortcut to the
Show Grid
gadget in the

Display/Object Preferences
window.

1.143 Sun/Planet/Moon Names

This button is provided as a shortcut to the
Sun/Planet/Moon Names
gadget in

the

Display/Object Preferences
window.

1.144 Star Trails

This button is provided as a shortcut to the
Star Trails
gadget in the

Display/Object Preferences
window.

1.145 Show FOV

This button is provided as a shortcut to the
Show FOV
gadget in the

Display/Object Preferences
window.

1.146 Show Time

This button is provided as a shortcut to the
Show Time
gadget in the

Display/Object Preferences
window.

1.147 Time Control Window

This window contains the controls necessary to set the current \leftrightarrow
time and time
advancement criteria used by the software.

Help is available for the following gadgets:

Set Time
=====

Local Mean Time

Universal Mean Time

Dynamical Time

Local Sidereal Time

Universal Sidereal Time

Delta T

Estimate

Current/Other Time

Epoch
Time Advancement

=====

Advance
Advance Units
Every
Every Units
Automatic/Manual Advance
Lock onto
Object list
Use

1.148 Local Mean Time

In these two boxes you can enter your local time - the civil time ←
kept by
clocks in your time zone. You can enter the time in "conventional" format
(yyyy/mm/dd hh:mm:ss.s) in the left hand box or as a Julian Date in the right
hand box.

After entering the time, press ENTER. The time you entered will then be
converted to all of the other standards displayed in the window and they will
be updated. You must press the

Use
button at the bottom of the window for your
changes to take effect.

See also: Description of Local and Universal Time

Entering Dates B.C.
, Leap Years

1.149 Universal Mean Time

In these two boxes you can enter the Universal Mean Time - the ←
civil time kept
by clocks in Greenwich, England. You can enter the time in "conventional"
format (yyyy/mm/dd hh:mm:ss.s) in the left hand box or as a Julian Date in the
right hand box.

After entering the time, press ENTER. The time you entered will then be
converted to all of the other standards displayed in the window and they will
be updated. You must press the

Use
button at the bottom of the window for your
changes to take effect.

See also: Description of Local and Universal Time

Entering Dates B.C.
, Leap Years

1.150 Dynamical Time

In these two boxes you can enter the current Dynamical Time. ↔
Dynamical Time is

that used by professional astronomers, closely related to time as kept by atomic clocks. Due to irregularities in the Earth's rotation, the difference between Dynamical Time and Greenwich Mean Time varies irregularly. The difference (in seconds) is specified in the

Delta T
requester.

You can enter the time in "conventional" format (yyyy/mm/dd hh:mm:ss.s) in the left hand box, or as a Julian Date in the right hand box.

After entering the time, press ENTER. The time you entered will then be converted to all of the other standards displayed in the window and they will be updated. You must press the

Use
button at the bottom of the window for your
changes to take effect.

See also: Description of Dynamical Time

Entering Dates B.C.
, Leap Years

1.151 Local Sidereal Time

Your Local Sidereal Time can be entered in these two boxes. It ↔
can be input in

"conventional" format (yyyy/mm/dd hh:mm:ss.s) in the left hand box, or as a Julian Date in the right hand box.

After entering the time, press ENTER. The time you entered will then be converted to all of the other standards displayed in the window and they will be updated. You must press the

Use
button at the bottom of the window for your
changes to take effect.

See also: Description of Sidereal Time

Entering Dates B.C.

1.152 Universal Sidereal Time

The current Universal Sidereal Time can be entered in these two boxes. It can be input in "conventional" format (yyyy/mm/dd hh:mm:ss.s) in the left hand box, or as a Julian Date in the right hand box.

After entering the time, press ENTER. The time you entered will then be converted to all of the other standards displayed in the window and they will be updated. You must press the

Use button at the bottom of the window for your changes to take effect.

See also: Description of Sidereal Time

Entering Dates B.C.

1.153 Entering Dates B.C.

Since the definition of our current calendar was introduced in stages, there are several inconsistencies. For example, in 1582 it was found that the calendar in use was no longer synchronized with the seasons, so ten days were dropped in an effort to restore things to normal (see the definition of a leap year for more information).

Another inconsistency arises from the fact that there was no year 0. 1 B.C. was immediately followed by 1 A.D. In order to account for this fact, "The Digital Universe" specifies years (and expects you to specify them) in the following manner:

Year	Specification
----	-----
2 A.D.	2
1 A.D.	1
1 B.C.	0
2 B.C.	-1
3 B.C.	-2
	etc.

Thus, a moment like 2:00 pm on August 2, 5 B.C. would be specified like:

-4/8/2 14:00:00

1.154 Delta T

Since the Earth is gradually (and erratically) slowing down in its rotation, Universal Time (based on the rotation of the Earth) and Dynamical Time (related to atomic time, and representing a uniform timescale) differ in an unpredictable manner. You can specify a value (in seconds) for the difference between dynamical and universal time in this box.

Since all calculations are done using dynamical time, and civil timekeeping is based on universal time, results are only as accurate as the specification for Delta T.

See also:

Estimate Delta T

1.155 Estimate Delta T

"The Digital Universe" contains a historical record of the value of Delta T from 1620 to the present. If you are simulating the appearance of the night sky during this period and press the "Estimate" button, an appropriate value for Delta T will be inserted into the box to the left.

1.156 Current/Other Time

This radio button specifies whether the software is using the current time (as kept by the Amiga's internal clock) or some other time. If "Current Time" is selected, the time requesters above will represent the time that the

Time Control Window was opened, or the time that "Current Time" was selected. In addition, the time will be reset at the instant that Use is depressed. In this way, it is easy to synchronize "The Digital Universe" to keep pace with the current time.

On the other hand, if "Other Time" is selected, "The Digital Universe" will not read the internal clock to determine the time. "Other Time" will automatically be selected if the time is changed in one of the boxes above.

1.157 Epoch

You are able to specify the epoch used for calculations in this box. Four different entry formats are possible:

Jnnnn.n (J2000.0) - specifies the instant at the start of a Julian Year
 Bnnnn.n (B1950.0) - specifies the instant at the start of a Besselian Year
 JDnnnnnnn.n - specifies the epoch as a particular Julian Date
 DATE - specifies the epoch of date. The epoch used is that represented by the date and time in the boxes above.

1.158 Advance

You are able to enter a number in this box which (in combination with the

Advance Units

gadget directly to the right) specifies how much time the software is to advance by, either manually or automatically.

1.159 Advance Units

Use this box to select which unit of time (used in conjunction with the

Advance

gadget directly to the left) should be used in manual and automatic time

advancement. You can choose from:

- seconds
- minutes
- hours
- days
- Gregorian Years
- Julian Years
- Tropical Years
- Sidereal Years
- Anomalistic Years
- Eclipse Years
- Gaussian Years

1.160 Every

If automatic advancement is selected with the Automatic/Manual Advance

radio button, the software needs to know how frequently to update the screen.

You can use this requester in conjunction with the

Every Units

gadget to the

right in order to specify this interval.

1.161 Every Units

If automatic advancement is selected with the Automatic/Manual Advance

radio button, the software needs to know how frequently to update the screen.

You can use this gadget in conjunction with the

Every

requester to the left in order to specify this interval. You can choose from:

seconds
 minutes
 hours
 days
 Gregorian Years
 Julian Years
 Tropical Years
 Sidereal Years
 Anomalistic Years
 Eclipse Years
 Gaussian Years

1.162 Automatic/Manual Advance

These radio buttons allow you to specify whether time should be advanced automatically or manually. It is advanced by the amount specified by the

Advance
 and
 Advance Unit
 gadgets.

If manual advancement is selected, the user can step forward or backward through time with the right and left arrow keys respectively. If automatic advancement is selected, time progresses forward at an interval specified by the

Every
 and
 Every Unit
 gadgets.

If the computer is in automatic advancement mode, it stops immediately after manual advancement is depressed - you don't have to press

Use
 first.

1.163 Lock Onto

As time progresses, either manually or automatically, "The Digital Universe" needs to know what it should be "locked onto". This information is specified with this radio button and possibly the

Object list
 to the right.

If "RA/Dec" is selected, the computer will keep the center of its field of view locked onto the same right ascension and declination as time progresses. This is useful if you wish to keep looking at the same stars.

If "Alt/Az" is selected, the computer will keep the center of its field of view locked onto the same altitude and azimuth as time progresses. As a result, the horizon stays fixed in place and you can see the motion of the stars across the sky.

If "Object" is selected, you will be able to select an object to lock onto in the list to the right. In this way, you can follow a planet, moon, asteroid, comet, or Earth-orbiting satellite as it travels across the sky.

1.164 Object List

If "Object" is selected in the Lock Onto radio button to the left, you are able to select an object from this list to lock onto as time advances. In this way, you can follow a planet, moon, asteroid, comet, or Earth-orbiting satellite as it travels across the sky.

1.165 Use

Once you have made changes to the Time Control window, you need to press this button for the changes to take effect.

1.166 Miscellaneous Objects

This window provides an interface whereby you can specify which ← miscellaneous objects (comets, asteroids, or Earth-orbiting satellites) that "The Digital Universe" should consider in generating a view of the sky.

Help is available for the following gadgets:

Orbit File

Objects in the File

Selected Objects

Sort By

Edit

Add

Remove

Save

1.167 Orbit File

You can use this requester to specify the file that you wish to obtain miscellaneous object orbits from. By convention, these orbit files should be placed in the DU:data/orbits directory.

You may enter the filename (complete with path) into the box provided. If preferred, you can click on the image to the right of the input box to bring up a file requester to choose the file.

"The Digital Universe" uses files in the "Universal Orbit Format", developed specifically for use with this package. This format allows for orbital elements of asteroids, comets, or Earth-orbiting satellites to be stored and retrieved. Several utility programs exist to convert orbital element files in a variety of formats into the "Universal Orbit Format" - see

Utility Programs
for more information.

The current version of this software is restricted to there being no more than 1000 objects in an individual file. As a result, the databases for comets, asteroids, and Earth-orbiting satellites are split up into several different files:

```
asteroids_numbered_1.uof - Numbered asteroids from 1 to 1000
asteroids_numbered_2.uof - Numbered asteroids from 1001 to 2000
asteroids_numbered_3.uof - Numbered asteroids from 2001 to 3000
asteroids_numbered_4.uof - Numbered asteroids from 3001 to 4000
asteroids_numbered_5.uof - Numbered asteroids from 4001 to 5000
asteroids_numbered_6.uof - Numbered asteroids from 5001 to 6000
asteroids_numbered_7.uof - Numbered asteroids from 6001 to 7000
asteroids_precise_1.uof - Designated asteroids from 29TD1 to 81WS1
asteroids_precise_2.uof - Designated asteroids from 81WE9 to 89SR
asteroids_precise_3.uof - Designated asteroids from 89SA3 to 92CU
asteroids_precise_4.uof - Designated asteroids from 92DA to 94RZ
asteroids_precise_5.uof - Designated asteroids from 94RCB to 95DW
comets_1.uof - Comets with perihelion dates prior to Sep, 1973
comets_2.uof - Comets with perihelion dates from Oct, 1973 to
                Sep, 2042
comets_3.uof - Comets with perihelion dates after Oct, 2042
misc.uof - File to which the user can add orbit information
                for newly discovered objects
satellite_molczan.uof - Earth-orbiting satellites from Ted Molczan
satellite_tle.uof - Earth-orbiting satellites from T. S. Kelso
```

When the program is first started, it defaults to loading comets_2.uof.

NOTE: Since this is a demonstration version of "The Digital Universe", only the files "satellite_molczan.uof" and "comets_2.uof" are included.

There are a few points which should be remembered about the files. The brightest asteroids are those in the asteroids_numbered files. See

The Brightest Asteroids

for a list of the hundred brightest asteroids, most of which can be found in `asteroids_numbered_1.uof`.

Since periodic comets are typically in highly eccentric orbits and are strongly perturbed by the larger planets, their orbits are often substantially different from one appearance to the next. As a result, a separate orbit is provided for each appearance of these comets. When predicting the path of a comet, it is best to use the orbit with the perihelion date closest to the time of interest.

As comets and asteroids are continually being discovered, "The Digital Universe" allows the user to enter orbital elements manually. All additions should be made to the `misc.uof` file.

Updates to the asteroids and comets databases are available from Jost Jahn. If you require more up-to-date information than that supplied with the software, you can obtain the new data sets directly from him. His address is:

Jost Jahn
Neustädter Straße 11
29389 Bodenteich
Germany
Tel.: 05824-3197
FAX: 0581-14824
Internet: j.jahn@abbs.heide.de

At the time this documentation was written, he was charging DM 30 (30 Deutschmarks) for a new data set. You will need some of the utility programs supplied with the software to convert between his file formats and the "Universal Orbit Format" used by "The Digital Universe".

1.168 Objects in the File

This list shows the objects contained in the file selected with the Orbit File requester above. To add an object to your Selected Objects list (necessary for the computer to calculate the position of that object), double click the mouse pointer on the object.

If you wish to examine or change the orbital element data for any object, click once on the object and then select the

Edit button at the bottom of the window.

Ensure that you only change information in the "misc.uof" file!

1.169 Selected Objects

This list shows the miscellaneous objects which "The Digital Universe" will consider when displaying the appearance of the sky. Items are added to this list by double clicking the mouse pointer on objects presented in the

Objects in the File list, and are removed by clicking once on the object to remove, then selecting the Remove button at the bottom of the window. There is a limit of 100 miscellaneous objects which can be selected at any one time.

If you close the window, the display will be recalculated to consider any new miscellaneous objects that you might have added. If you would like to save your current list of miscellaneous objects so that it is loaded the next time "The Digital Universe" is started, you must click on the

Save button at the bottom of the window.

1.170 Sort By..

This gadget enables you to specify how you want the objects in the list above to be sorted. If the list contains comets or asteroids, you can choose between an alphabetical sorting by name or a chronological ordering by perihelion date. If the list contains Earth-orbiting satellites, you can choose between an alphabetical list by name or a chronological ordering by epoch. Some satellites in low Earth orbit are strongly affected by the atmosphere and other phenomena in unpredictable manners. As a result, it is important to ensure that you obtain more recent orbital information for a satellite if its Epoch Date is getting old. See Orbit File for information on obtaining more recent data sets.

1.171 Edit

If you select on an object in the list above and then press the "Edit" button, the

Miscellaneous Object Orbit Entry window will appear enabling you to edit the orbital elements and related information for the object. Ensure that you only edit or add orbits to the misc.uof file!

1.172 Add

If there are less than 1000 objects in the current file, clicking ↵ on this entry brings up the Miscellaneous Object Orbit Entry window allowing you to add additional objects. Ensure that you only edit or add orbits to the misc.uof file!

1.173 Remove

If you click on an object in the Selected Objects list and then press the "Remove" button, the object will be removed from the list. The computer will no longer consider the position of that object when generating a view of the sky.

1.174 Save

Pressing the "Save" button allows you to save the contents of the Selected Objects list. The next time you start "The Digital Universe", these objects will automatically be loaded into your "Selected Objects" list.

If you merely want to use the list of selected objects without saving your preferences to disk, just close the Miscellaneous Objects window.

1.175 The Brightest Asteroids

The following table provides the names and mean opposition magnitudes of the 100 brightest asteroids. Keep in mind that since asteroid orbits are fairly eccentric, an asteroid may appear substantially brighter or fainter at any particular opposition. "The Digital Universe" can simulate the position of any of these asteroids, most of which can be found in the orbit file entitled "asteroids_numbered_1.uof".

	Asteroid	Opposition Magnitude
	-----	-----
4	Vesta	5.7
1	Ceres	6.8
2	Pallas	7.6
7	Iris	8.1
6	Hebe	8.4
15	Eunomia	8.5

3	Juno	8.6
8	Flora	8.6
29	Amphitrite	8.8
9	Metis	8.9
18	Melpomene	8.9
20	Massalia	9.2
532	Herculina	9.3
40	Harmonia	9.3
11	Parthenope	9.3
14	Irene	9.4
27	Euterpe	9.5
39	Laetitia	9.5
10	Hygiea	9.6
89	Julia	9.6
16	Psyche	9.6
349	Dembowska	9.7
12	Victoria	9.7
44	Nysa	9.7
192	Nausikaa	9.8
13	Egeria	9.8
19	Fortuna	9.9
5	Astraea	9.9
51	Nemausa	9.9
230	Athamantis	9.9
354	Eleonora	9.9
704	Interamnia	10.0
43	Ariadne	10.0
21	Lutetia	10.1
115	Thyra	10.1
324	Bamberga	10.1
23	Thalia	10.1
30	Urania	10.1
63	Ausonia	10.2
22	Kalliope	10.2
68	Leto	10.3
42	Isis	10.3
433	Eros	10.3
4544	Xanthus	10.3
80	Sappho	10.3
52	Europa	10.4
511	Davida	10.4
471	Papagena	10.4
25	Phocaea	10.5
37	Fides	10.5
88	Thisbe	10.5
41	Daphne	10.6
28	Bellona	10.6
17	Thetis	10.6
32	Pomona	10.6
196	Philomela	10.6
346	Hermentari	10.6
129	Antigone	10.6
451	Patientia	10.6
409	Aspasia	10.7
79	Eurynome	10.7
26	Proserpina	10.7
71	Niobe	10.7

216	Kleopatra	10.8
387	Aquitania	10.8
45	Eugenia	10.8
194	Prokne	10.8
287	Nephtys	10.8
85	Io	10.8
60	Echo	10.8
92	Undina	10.8
270	Anahita	10.9
97	Klotho	10.9
31	Euphrosyne	10.9
654	Zelinda	10.9
128	Nemesis	10.9
69	Hesperia	10.9
135	Hertha	10.9
64	Angelina	10.9
67	Asia	11.0
103	Hera	11.0
48	Doris	11.0
54	Alexandra	11.0
389	Industria	11.0
185	Eunike	11.0
2063	Bacchus	11.0
1566	Icarus	11.0
4769	Castalia	11.0
173	Ino	11.1
148	Gallia	11.1
385	Ilmatar	11.1
198	Ampella	11.1
111	Ate	11.1
144	Vibilia	11.1
93	Minerva	11.1
386	Siegena	11.1
105	Artemis	11.1
345	Tercidina	11.2
344	Desiderata	11.2
674	Rachele	11.2

1.176 The Sun, Planets, and Moons

By clicking on the Sun, a planet, or a moon, "The Digital Universe ↔
" will adjust
the display so that the object of interest is centered in the field of view.
If the object is too dim to show up with your current settings for
limiting magnitude in the
Display/Object Preferences
window, the computer will
zoom in until the object is visible.

1.177 Constellation Selection

This window contains a list of all currently recognized ←
constellations. If you
click on an object in the list, "The Digital Universe" will adjust the display
so that the constellation is centered on the screen and fills the field of
view.

The constellation itself will only be visible if you have selected

Constellation Figures
or
Boundaries
in the
Display/Object Preferences
window.

1.178 Star Selection

This window allows you to find a star of interest. Stars can be ←
located based
upon a number of different designations - Proper Name, Bayer designation,
Flamsteed number, Yale Bright Star (YBS) catalogue number, Smithsonian
Astrophysical Observatory (SAO) catalogue number, or the Henry Draper (HD)
catalogue number.

The general process in selecting a star is to first pick the type of
designation that you will be searching for, and then fill in the appropriate
blanks or choosing the appropriate items from lists.

When you are done, your search criteria will be entered automatically into the

Criteria
requester at the bottom of the screen. If you are satisfied with ←
your
request, press the
Search
button and the computer will find the star of
interest (if it exists) and center it on the screen.

If you prefer, you can enter the search criteria directly in the blank before
pressing "Search". This can be faster than getting the computer to fill in the
blank for you once you know the format that the entries should take.

Help is also available for the following items:

Star Name

Bayer Designation

Flamsteed Number

YBS Number

SAO Number

HD Number

Criteria

Search

1.179 Star Name

If "Star Name" is selected, a list of currently recognized star names is displayed. To find a star from this list, just click on the star of interest and then press the Search button below.

1.180 Bayer Designation

If you are finding a star by Bayer designation, you must click on both the Greek letter and the constellation name to identify a unique object. Once you have entered your request, press the Search button to find the object. Some combinations of Greek letters and constellations are not associated with any particular star (there is no star designated Psi Arae, for example). In these cases, you will be presented with a little window describing that the object of interest could not be found.

1.181 Flamsteed Number

You can find a star by Flamsteed Number if you enter a number into the "Flamsteed #" box and press ENTER as well as pick a constellation from the list on the right. Once your request appears in the Criteria box, you can press the Search button to try and find the object. If it cannot be found, a window will appear to notify you. Otherwise, the star will appear in the center of the screen.

1.182 YBS Number

To find a star by its Yale Bright Star (YBS) Catalogue number, ↔
just enter the
number into the box provided and hit ENTER. If you are satisfied with the
result appearing in the
Criteria
box, press the
Search
button.

1.183 SAO Number

To find a star by its Smithsonian Astrophysical Observatory (SAO) ↔
Catalogue
number, just enter the number into the box provided and hit ENTER. If you are
satisfied with the result appearing in the
Criteria
box, press the
Search
button.

1.184 HD Number

To find a star by its Henry Draper (HD) Catalogue number, just ↔
enter the number
into the box provided and hit ENTER. If you are satisfied with the result
appearing in the
Criteria
box, press the
Search
button.

1.185 Criteria

This box performs two functions. If you enter a search request by ↔
using the
gadgets above the box, the request will be composed and appear within.
Alternately, you can enter a search criteria directly into this box if you use
the proper entry format.

You must press

Search
to get the computer to find the object of interest.

1.186 Search

After a search criteria has been composed and appears in the Criteria box (either automatically or manually), you must press the "Search" button to allow the computer to try and find the object of interest.

1.187 Deep Sky Object Selection

This window allows you to find a deep sky object of interest. You may search according to a number of different designations - Proper Name, Messier number, NGC number, or IC number.

The general process in selecting a deep sky object is to first pick the type of designation that you will be searching for, and then fill in the appropriate blanks or choosing the appropriate items from lists.

When you are done, your search criteria will be entered automatically into the

Criteria requester at the bottom of the screen. If you are satisfied with your request, press the Search button and the computer will find the object of interest (if it exists) and center it on the screen.

If you prefer, you can enter the search criteria directly in the blank before pressing "Search". This can be faster than getting the computer to fill in the blank for you once you know the format that the entries should take.

Help is also available for the following items:

Object Name

Messier number

NGC number

IC number

Criteria

Search

1.188 Deep Sky Object Name

If "Object Name" is selected, a list of currently recognized deep sky object names is displayed. To find an object from this list, just click on the name

of interest and press the
Search
button below.

1.189 Messier Number

If "Messier Number" is selected, you can find a deep sky object by Messier number. Just type the Messier number in the box provided and hit ENTER. A search request will be composed in the Criteria box. If it is acceptable, press the Search button to begin the search.

1.190 NGC Number

If "NGC Number" is selected, you can find a deep sky object by NGC number. Just type the NGC number in the box provided and hit ENTER. A search request will be composed in the Criteria box. If it is acceptable, press the Search button to begin the search.

1.191 IC Number

If "IC Number" is selected, you can find a deep sky object by IC number. Just type the IC number in the box provided and hit ENTER. A search request will be composed in the Criteria box. If it is acceptable, press the Search button to begin the search.

1.192 Criteria

This box performs two functions. If you enter a search request by using the gadgets above this box, the request will be composed and appear within. Alternately, you can enter a search criteria directly into this box if you use the proper entry format.

You must press

Search
to get the computer to find the object of interest.

1.193 Search

After a search criteria has been composed and appears in the Criteria box (either automatically or manually), you must press the "Search" button to allow the computer to try and find the object of interest.

1.194 Miscellaneous Object Selection

This window allows you to find a miscellaneous object. Simply click on the object of interest and the software will center the object on the screen. If the object is too dim to show up with your current settings for limiting magnitude in the Display/Object Preferences window, the computer will zoom in until the object becomes visible.

You will be allowed to choose from any objects appearing in the

Selected Objects
list of the
Miscellaneous Objects
window.

1.195 Animation Control Window

This window allows you to make user-definable animations. They are created and stored as "IFF ANIM5" files - the animation standard for Amiga computers. Many third party software packages can play these animations. The showanim utility is provided for just that purpose.

The

Lock Onto radio button in the Time Control window specifies what the animation should follow from frame to frame. You can tell "The Digital Universe" to keep its field of view fixed with respect to the horizon, follow the stars across the sky, or follow an object moving with respect to the stars. See the information provided on the "Time Control" window for further assistance.

Several parameters of the animation may be specified to further customize it. As a few examples, you can create an animation which slowly zooms in on an area of sky, or shows how the sky's appearance changes as you move in a southerly direction across the Earth's surface. The possibilities are limited only by your own imagination.

Help is available for the following gadgets:

Number of Frames

Advance

Advance Units

Right Ascension

Declination

Altitude

Azimuth

Latitude

Longitude

Field (ratio)

Start

1.196 Number of Frames

In this box, you can specify the number of frames of your animation. You cannot create an animation with less than 2 frames.

1.197 Advance

This box, in conjunction with the Advance Units gadget to the right is used to tell the computer how much time should elapse between each frame.

1.198 Advance Units

This gadget is used in conjunction with the Advance box to the left to tell the computer how much time should elapse between each frame.

You can choose between the following units of time:

- seconds
- minutes
- hours
- days
- Gregorian Years
- Julian Years
- Tropical Years
- Sidereal Years
- Anomalistic Years
- Eclipse Years
- Gaussian Years

1.199 Right Ascension

This box allows you to specify the value that should be added to the current right ascension of the center of the field of view between frames. It should be specified in decimal hours.

If you do not wish to advance the center of the field in right ascension, just leave the box blank.

1.200 Declination

This box allows you to specify the value that should be added to the current declination of the center of the field of view between frames. It should be specified in decimal degrees.

If you do not wish to advance the center of the field in declination, just leave the box blank.

1.201 Altitude

This box allows you to specify the value that should be added to the current altitude of the center of the field of view between frames. It should be specified in decimal degrees.

If you do not wish to advance the center of the field in altitude, just leave the box blank.

1.202 Azimuth

This box allows you to specify the value that should be added to the current azimuth of the center of the field of view between frames. It should be specified in decimal degrees.

If you do not wish to advance the center of the field in azimuth, just leave the box blank.

1.203 Latitude

This box allows you to specify the value that should be added to your current latitude between frames. It should be specified in decimal degrees.

If you do not wish to change latitude throughout the animation, just leave the box empty.

1.204 Longitude

This box allows you to specify the value that should be added to your current longitude between frames. It should be specified in decimal degrees.

If you do not wish to change longitude throughout the animation, just leave the box empty.

1.205 Field (ratio)

This box allows you to specify the value that should be multiplied to the current field of view between frames. If it is greater than one, the computer zooms out - if it is less than one, the computer zooms in.

If you do not wish to zoom in or out throughout the animation, leave the value at 1.0.

1.206 Start Generating Animation

When you have the parameters of the animation all set up the way you like, press the "Start" button. The software will first bring up a requester asking where you would like to store the animation. By convention, animation files should end in a .anim extension. Then, the computer will begin to generate the animation.

While "The Digital Universe" is calculating and drawing each frame of an animation, you will be unable to abort the process. However, while it is compressing the image into the animation file, you are given the opportunity to do so if you wish.

When the animation has been completely generated, the software provides an icon with the file. Workbench users can simply double click on the icon to play back the animation (using `showanim`, a utility provided with this package).

1.207 Report Generation Window

This window allows you to generate numerical reports. They can be \leftrightarrow output to either a file or an attached printer.

Each line in the report corresponds to a particular instant in time. Up to four columns of information may be generated per line. The information to be generated is selected using the lists in the center region of the window.

The initial line of the report corresponds to the current time used by the software when report generation begins.

More help is available for the following gadgets:

- Advance
- Advance Units
- Times
- Type of Information
- Particulars
- Save Report to File
- Print Report

1.208 Advance

This gadget, used in conjunction with the Advance Units gadget to the right, allows the user to specify how much time is to elapse between lines of the report.

1.209 Advance Units

This gadget, used in conjunction with the Advance gadget to the left, allows the user to specify how much time is to elapse between lines of the report.

You can choose between the following units of time:

- seconds
- minutes
- hours
- days
- Gregorian Years

Julian Years
Tropical Years
Sidereal Years
Anomalistic Years
Eclipse Years
Gaussian Years

1.210 Times

In this box, you can specify how often that time is to advance (ie: how many lines the report is to have).

1.211 Type of Information

With these lists (one per column), you can tell the software what type of information you would like to generate. The entry you select with the mouse affects the data appearing in the Particulars list below.

1.212 Particulars

These lists (one per column) are used to specify the particulars of the

Type of Information selected in the list above. For example, if you pick "Apparent RA/Dec" in the "Type of Information" list, the "Particulars" list presents you with a list of objects for which the apparent right ascension and declination can be calculated.

1.213 Save

If the user clicks on the "Save" button, a requester is brought up asking where he or she wishes to save the report. By default, all such reports should end in a .txt extension.

When the user specifies the filename, report generation begins.

1.214 Print

If the user clicks on the "Print" button, the report is generated and output to an attached printer, a line at a time. If you'd rather save the information to a file, press the Save button instead.

1.215 Search Hypertext Files

This window allows the user to search through all the Amigaguide hypertext files used with "The Digital Universe". You can search for a word, phrase or pattern.

Additional help is available for the following gadgets:

Search String

Search

1.216 Search String

You type the word, phrase, or pattern you are looking for in this box. The special characters used for pattern matches are displayed at the top of the window.

As an example, suppose that you wanted to find all occurrences of "Halley", but were unsure of its spelling. If you know that it begins with an "Hal" and ends in a "y", you could instruct "The Digital Universe" to look for:

```
Hal?*y
```

It would then find all occurrences to "Halley" (as well as anything else that starts with an "Hal" and ends with a "y", including "halfway").

Searches are case-insensitive. It doesn't matter if you specify your search in upper or lower case letters.

If you press the ENTER key after typing your search string, the software will automatically begin to do its work, as if you'd hit the Search button.

1.217 Search

When you are done entering your search phrase in the Search String

requester,
you can either press ENTER or the "Search" button to begin the search.

There are approximately 1.5 megabytes of hypertext provided with "The Digital Universe", so searching through it all can take a few moments. As it is searching, you are presented with the opportunity to abort your request.

Once it has scanned through all the files, "The Digital Universe" displays a list with hypertext links to all the matches it found.

1.218 Printing Status

This window provides you with information on the status of your print job, including what the software is currently doing and how much percent of the request has been completed. It also provides the ability to stop the current print job in progress by pressing the "Abort" button.

1.219 Object Information

If you click with the mouse pointer on an object on the screen, ↔
this window
will tell you information about it. The precise details of what is displayed are highly dependent on the object itself, but definitions for most of the terms used appear in the online dictionary of astronomy (accessible by selecting "Dictionary" from the "Help" menu).

Additional help is available for the following gadgets:

Print

More Info

1.220 Print

This button allows the user to print a copy of the information in the window to an attached printer. The software assumes that the printer uses the ECMA-94 Latin 1 character set (conforms to ISO/DIS 6429.2 and ANSI X3.64-1979 standards) for foreign language and special characters. This is the same character set used by the Amiga for screen text. If it does not use this standard, you may see inappropriate representations of characters like the degree symbol.

1.221 More Info

If this button is not "ghosted" (if is able to be depressed), more information is available for the object. By pressing the button, an Amigaguide hypertext window is displayed which may contain audiovisual information in addition to regular text.

1.222 Calculating...

This window appears when "The Digital Universe" has spent more than a few seconds calculating something. If you press the "Abort" button on the window, you can tell the software to stop the calculation in progress. Be aware that it may take a few seconds to regain control of the computer, however.

1.223 Miscellaneous Object Orbit Entry

This window allows you to enter or change orbital elements for ←
comets or
asteroids. In addition, it also allows you to specify locations for
user-defined fixed objects. Ensure that you only edit or add items to the
"misc.uof" file!

The window appears when you press
Edit
or
Add
on the
Miscellaneous Objects
window.

Additional help is available for the following gadgets:

Primary Name

Secondary Name

Object Type

Perihelion Date

Perihelion Distance

Eccentricity

Argument of Perihelion

Long. of Ascend. Node/RA

Inclination/Dec

Mag param. 1

Mag param. 2
Mag param. 3
Mag param. 4
Save

1.224 Primary Name

This requester allows you to specify the primary name of the object.

1.225 Secondary Name

This requester allows you to specify a secondary name for an object.

1.226 Object Type

These radio buttons specify the type of object being defined.

1.227 Perihelion Date

This requester allows you to define the perihelion date for the object. It is often designated by the symbol "T".

"The Digital Universe" expects the perihelion date to be given in the format yyyy/mm/dd.d.

If you are not given the perihelion date, you may be able to calculate it from other data. See

Calculating Missing Orbital Elements
for further details.

1.228 Perihelion Distance

You can use this requester to specify the distance in AU from the Sun when it is at perihelion. It is usually designated by the symbol "q". If you are not given the perihelion distance, you may be able to calculate it from other data. See

Calculating Missing Orbital Elements
for further details.

A perihelion distance of 0 has a special meaning to "The Digital Universe". In

this circumstance, the object is taken to be fixed in the sky. The right ascension of the object is to be specified in the

Long. of Ascend. Node/RA
 requester and the declination in
 Inclination/Dec
 . In

addition, the magnitude should be entered into
 Mag param. 1

.

1.229 Eccentricity

The eccentricity of the object's orbit should be entered into this requester. It is usually represented by the symbol "e".

1.230 Argument of Perihelion

The argument of perihelion (usually denoted by the lower case ←
 Greek letter

"omega") should be entered into this requester. If it is not supplied, you may be able to calculate it from information provided in the section entitled

Calculating Missing Orbital Elements

.

1.231 Long. of Ascend. Node/RA

One of two pieces of information can be found in this requester. ←
 If an asteroid

or comet is being defined, it will contain the longitude of the ascending node.

If a stationary object is being defined (by setting the

Perihelion Distance

to

0), it should contain the right ascension of the object.

The Longitude of the Ascending Node is usually represented by the upper case Greek letter "omega", and the right ascension by "alpha".

1.232 Inclination/Dec

One of two pieces of information can be found in this requester. ←
 If an asteroid

or comet is being defined, it will contain the inclination of the orbit. If a

stationary object is being defined (by setting the

Perihelion Distance

to 0),

it should contain the declination of the object.

The inclination is usually represented by the letter "i", and the declination by the Greek letter "delta".

1.233 Mag param. 1

The value in this box may represent one of several different things depending on what type of object is being defined. If the object is stationary (defined by setting the Perihelion Distance to 0), it simply represents the magnitude of the object. If the object being defined is a comet, it represents a brightness parameter designated H(1,0) of the coma. If the object is an asteroid, it represents a parameter designated "H".

1.234 Mag param. 2

The value in this box may represent one of two different things depending on what type of object is being defined. If the object is a comet, it represents a brightness parameter designated as "n" for the coma. If the object is an asteroid, it represents a parameter designated "G".

1.235 Mag param. 3

This requester only has meaning for comets. It represents a brightness parameter designated H(1,0) of the nucleus.

1.236 Mag param. 4

This requester only has meaning for comets. It represents a brightness parameter designated "n" of the nucleus.

1.237 Save

If this button is depressed, the updated orbital elements are written to the orbit file. You will have to double click on the entry in the

Objects in the File list in order to make it appear on the Selected Objects list if you want "The Digital Universe" to determine where the new object is.

1.238 Calculating Missing Orbital Elements

The orbit of an object can be specified in a wide variety of different ways. Sometimes you will be given orbital elements which may not correspond directly to the elements required by "The Digital Universe". If this is the case, you may be able to calculate the missing quantities by using the some of the relations given below:

a = semimajor axis, in AU
 e = eccentricity
 q = perihelion distance, in AU
 n = mean motion, in degrees/day.
 T = Julian Date of perihelion
 t = Julian Date of epoch
 M = mean anomaly
 omega = argument of perihelion
 Omega = longitude of the ascending node
 pi = longitude of perihelion
 L = mean longitude of the object

$$a = \frac{q}{1-e}$$

$$n = \frac{0.9856076686}{a \cdot \sqrt{a}}$$

$$\text{if } (M < 180) \quad T = \frac{-M}{n} + t$$

$$\text{else} \quad T = \frac{360-M}{n} + t$$

$$\text{omega} = \text{pi} - \text{Omega}$$

$$M = L - \text{omega} - \text{Omega}$$

1.239 Frequently Asked Questions

Though "The Digital Universe" is intended to be quite user-↔ friendly, there are periodically circumstances where people may become confused with its operation. This short section contains answers to a few frequently asked questions.

Question 1
 : Periodically I see quantities expressed as numbers separated by colons (such as 21:45:42). What does this mean?

Question 2
: What settings should I give the software to get the most accurate results? ←

Question 3
: What settings should I give the software to get results the quickest?

Question 4
: I'm trying to make an animation while zoomed in close to a planet, but it keeps moving off the screen. What's wrong?

Question 5
: Why am I unable to select some menu items or gadgets?

Question 6
: What is the difference between Planetarium and Local Mode, and when should I use one or the other?

Question 7
: I would like to see where a particular comet (or asteroid, or Earth-orbiting satellite) is, but the procedure seems a bit complicated.

Question 8
: I'm using the menu to try and open a window but nothing is appearing. What's wrong?

Question 9
: On some (but not all) windows, the font is much too small to be read. Why is this, and what should be done?

Question 10
: When I generate an animation, the first frame looks like it doesn't belong. What's causing this?

Question 11
: When I open up the Time Control window, I'm presented with ten different boxes where I can enter the time. Where should I enter it?

Question 12
: When I click on an object, I see that the rise and set times are "Unavailable". How can I see what they are?

1.240 Question 1

Periodically I see quantities expressed as numbers separated by colons (such as 21:45:42.1). What does this mean?

Astronomers often deal with angular measurements. For example, they may need

to know how many degrees above the horizon an object is, or how large an object appears to be. Though they can specify these measurements in decimal notation (21.7617 degrees), this is not commonly done. Normally, a measurement system called "degree-minute-second" is used to deal with fractional degrees. In this system, there are 60 minutes in a degree and 60 seconds in a minute. Thus, 21.7617 degrees can be expressed as 21 degrees, 45 minutes, and 42.1 seconds.

Though it may seem a bit needlessly confusing, it is not without precedent. After all, we have been dividing the hour up into minutes and seconds in the same manner for centuries.

The "official" notation for such a quantity would be written as $21^{\circ}45'42''.1$

(where in actuality the " symbol would appear directly above the decimal point, not in front of it). However, this notation is somewhat cumbersome to enter on a standard keyboard. To simplify the process, the scheme of using colons (:) to separate the various quantities has been "unofficially" adopted by "The Digital Universe". Thus, the quantity may be expressed as 21:45:42.1. The user must decide whether a quantity expressed like this refers to an angular measurement or a measurement of time by context.

1.241 Question 2

What settings should I give the software to get the most accurate results?

If you are interested in obtaining the highly accurate results that "The Digital Universe" is capable of generating, there are several parameters that you should manipulate. Naturally, the more that the computer has to consider, the slower it will become. Therefore, unless you have an extremely fast Amiga it is not recommended that you leave these parameters set for everyday use.

In the

Display/Object Preferences window, set all of the options under

"Precision" - namely precession, proper motion, nutation, aberration, and refraction. If you are interested in obtaining rise and set time information for objects, ensure that you unselect

Fast info
 . Click on
 Use
 or
 Save
 . Then,

open up the

Time Control window and enter "DATE" in the box marked Epoch before

pressing

Use
 .

Once this has all been accomplished, "The Digital Universe" will provide the most accurate calculations it is capable of, at the expense of taking longer to

do so.

1.242 Question 3

What settings should I give the software to get results the ←
quickest?

"The Digital Universe" was originally designed to provide the most accurate astronomical calculations generally available to the owner of a personal computer. As such, it may be slower than some competing products.

To some extent, the user can tell the computer to ignore some effects it would otherwise consider, speeding up calculations and screen updates. Of course, the results will not be as accurate, but they may be acceptable for most everyday use.

In the

Display/Object Preferences
window, unselect all of the options under

"Precision" - namely precession, proper motion, nutation, aberration, and refraction. If you are not interested in obtaining rise and set time information for objects, ensure that you select

Fast info
. Selecting

Fast Labels

as well will reduce the amount of time the software requires to
label objects on the screen. Click on

Use
or
Save
. Then, open up the

Time Control

window and enter "J2000" in the box marked
Epoch
before pressing

Use

.

Once this has all been accomplished, "The Digital Universe" will require less time in performing its calculations, at the expense of a loss of accuracy.

1.243 Question 4

I'm trying to make an animation while zoomed in close to a planet, ←
but it keeps
moving off the screen. What's wrong?

When making an animation, the computer needs to be told what it should be following between frames. When you first start "The Digital Universe", it

assumes that it should follow the stars across the sky. But since planets move with respect to the stars, it won't be too long before the planet has moved out of your field of view.

To get the software to lock onto a planet or other object during an animation, open up the

Time Control
window, and bring up the "Time Advancement" section.

With the

Lock Onto
radio buttons, select "Object". Then, click on the object

you wish to follow in the list to the right. After pressing

Use
at the bottom

of the window, you should then be able to generate your animation and automatically follow the planet as it moves.

1.244 Question 5

Why am I unable to select some menu items or gadgets?

If you are unable to select one of these objects, chances are that it is "ghosted" (shaded out). Sometimes some options do not make sense unless other options are set. For example, if you use the menu to open up the

Time Control
window, it cannot be opened up a second time. As a result, the ←
menu item

becomes ghosted while the window remains open.

As another example, it does not make sense to label deep sky objects or search for these objects if they are not being displayed on the screen.

To enable a "ghosted" option, you just have to change the status of whatever is causing it to be "ghosted". There are too many dependencies like this throughout the program to list in detail, but most of them should be fairly straightforward to discover.

1.245 Question 6

What is the difference between Planetarium and Local mode, and when should I use one or the other?

Planetarium and Local mode merely differ in the orientation they give to the appearance of the sky. Local mode draws the sky as it appears from your location on Earth. Up is up and left is left. For most people just beginning to develop an interest in astronomy, this way of viewing the sky is the most natural.

But the orientation and appearance of the night sky is highly dependent on the time and geographical position of the observer. As a result, astronomers have developed a "standard" way of representing the sky, similar to the way terrestrial maps have been defined. In this representation, up is the

direction towards the north celestial pole. To the left is east (opposite to a terrestrial map since instead of looking down upon the Earth, we're looking up into the sky). If Planetarium Mode is selected, "The Digital Universe" will orient the display in this manner. This enables the user to generate star maps appearing like those published in printed star atlases.

If you are generating an animation of a planet's rotation about its axis, you should be in Planetarium mode. Otherwise, in addition to the planet's rotation, you will see it "wobble" back and forth. This apparent motion isn't something the planet actually does, but results from the planet's changing orientation with respect to the user's horizon throughout the day.

1.246 Question 7

I would like to see where a particular comet (or asteroid, or ←
Earth-orbiting
satellite) is, but the procedure seems a bit complicated.

The procedure is a bit complicated since "The Digital Universe" contains information on tens of thousands of these objects. If it were to figure out where each and every one was located, it would take a very long time to do so.

Therefore, you must first select which of these "miscellaneous objects" you want "The Digital Universe" to consider. First, open up the

Miscellaneous Objects
window and choose the objects you are interested in,
ensuring that they appear in your
Selected Objects
list. For more information
on this process, see the help for the "Miscellaneous Objects" window.

Then, close the window (or optionally
Save
your preferences to disk so that
they remain in effect the next time you start the software). Open up the

Display/Object Preferences
window and ensure that you have told the computer to
plot miscellaneous objects (by selecting the
Misc. Object
gadget in the
"Objects" section of "Calculation & Display"). It wouldn't hurt to pick

Misc. Object Names
under "Object Preferences" on this window either, to label
the object. Then, the computer should be calculating and plotting the position
of the object you're interested in. You can find the object of interest from
the "FIND" menu if it doesn't appear on your screen.

1.247 Question 8

I'm using the menu to try and open a window but nothing is appearing. What's wrong?

First, make sure the menu option is not "ghosted" (shaded out). If it is, then the option is not currently available. See Question 5 for more information.

If the window should be appearing but isn't, there are two possible explanations. You may be out of chip (graphics) memory. Every window opening on the screen takes a certain amount of chip memory. If you have too many windows open, or your graphics memory has become too fragmented, it is possible that not enough memory remains to open the new window. Either try closing some windows or exit from "The Digital Universe" and reboot the computer to unfragment the memory and try again.

Another possibility, if you are using a non-interlaced screen, is that the windows are too big to fit on the screen. They should all be able to fit on a 640 X 200 screen if you have selected Topaz Font in the Setting Screen Mode window. Ensure that it has been selected.

1.248 Question 9

On some (but not all) windows, the font is much too small to be read. Why is this, and what should be done?

If you find this occurring, you are probably using a screen that is too small to fit the windows properly. If you are running a 640 X 200 screen, make sure that you have selected Topaz Font in the Setting Screen Mode window.

1.249 Question 10

When I generate an animation, the first frame looks like it doesn't belong. What's causing this?

When an animation is made, the initial frame is always a copy of the screen at the instant you press Start - it doesn't recalculate and redraw the screen first. If you have specified that the computer should lock onto a particular object (in the

Time Control window), the software will follow this object throughout the animation. But if the object is not centered on the screen before the animation starts, the first frame will not "belong" with the rest.

To avoid this problem, choose

Recalculate

from the "Project" menu immediately

before generating the animation. This will ensure that the software centers the field of view on whatever is being locked onto before the animation begins. This step should only be necessary if you are locked onto an object and have manually changed your field of view since you left the "Time Control" window.

1.250 Question 11

When I open up the

Time Control

window, I'm presented with ten different boxes

where I can enter the time. Where should I enter it?

For full details on what all these boxes mean, refer to the help given for the "Time Control" window itself. For those who just want to see what the sky will look like at 10:00 pm tonight without worrying about all the other details, just enter your local time into the top left box (Conventional Local Mean Time). Remember that you have to enter the time in 24 hour format (in this case, 10:00 pm is entered as 22:00), that you need the date as well as the time, and that you must press ENTER when you are done.

Provided that you have set up your

Time Zone

properly in the

Setting Environment Parameters

window, when you click on the

Use

button, the

software should show you a view of the sky for the time you specified.

1.251 Question 12

When I click on an object, I see that the rise and set times are " ← Unavailable".

How can I see what they are?

For objects which move with respect to the background stars (such as planets), a computation of the rise and set times is a rather complicated procedure. On some computers, this may slow down the speed at which the

Object Information

window appears to unacceptable levels, particularly when such ← information is

not required. The user is therefore given the option of whether or not to display rise and set times with object information.

To allow the computer to calculate these times, unselect the
Fast Info
button

in the

Display/Object Preferences
window and press
Use
or
Save
.

Note that the times for different phases of the Moon are also marked as being unavailable if this option is selected.

1.252 Keyboard and Mouse Operations

You should already be familiar with using the mouse to select ←
items from the
menu bar and click on gadgets, as well as using the keyboard to enter
information. However, there are a few ways that you can use the keyboard and
mouse to control the operation of "The Digital Universe" that may not be as
obvious.

Mouse Operations

Keyboard Operations

Combined Operations

1.253 Mouse Operations

There are two things that you can do with the mouse in addition to ←
clicking on
gadgets and menu items.

1. If you click on a star, planet, or other object on the screen, a window will appear with information about the object.
2. If you click and hold down the left mouse button and move the mouse you will drag out a "zoom box". When the mouse button is released, the screen will zoom in to show those objects which were enclosed by the box. Since it is impossible to accurately portray the celestial sphere on a flat computer monitor, distortion will occur near the edges of the screen. It is at its strongest when large fields of view are being displayed. The "zoom box" will distort itself to more accurately indicate which objects will be displayed on the screen when the mouse button is released. If you zoom in sufficiently close to a planet or moon, the appearance of the object's disk will be generated. Maps of Venus, the Moon, Mars, Jupiter, and Saturn are provided with the software to provide

a realistic view of the object. These maps will be used if

Features & Flattening
has been enabled on the
Display/Object Preferences
window.

1.254 Keyboard Operations

There are several things which can be done directly from the ←
keyboard to
control the operation of "The Digital Universe".

1. Menu shortcuts - beside most menu options you will find a stylized "A" followed by a letter or symbol. This indicates a method of choosing the menu item without using the mouse. Just hold down the right Amiga key (to the right of the spacebar) and press the letter or symbol indicated.
2. Gadget shortcuts - some gadgets have one of the characters in their labels underlined. If the window containing the gadget is currently active and you type the underlined letter, the gadget itself will become active. In this manner, you do not have to choose a gadget to type in with the mouse.
3. Tab cycling - if you press the TAB key (to the left of the 'Q' key) when a window with multiple gadgets is active, you will cycle through making the various gadgets active. If you hold down the SHIFT key while typing the TAB key, the gadgets will cycle in the reverse order.
4. Escape key - if you press the escape key (marked ESC) while a window is active, the window will be closed.
5. Number keys - if the background window (the window upon which all the stars are drawn) is active, you can press one of the number keys (above the standard keyboard) to instantly zoom to one of the fields of view that you preset in the
Field of View Preferences
window.
6. Numeric keypad - on most models of Amiga, the numeric keypad is located to the right of the standard keyboard. If the background window is active and you press one of the keys numbered 1, 2, 3, 4, 6, 7, 8, or 9 the screen will pan in the appropriate direction. If 5 is pressed, the field of view will zoom out by a factor of 1.5, and if the decimal point (.) on the numeric keypad is pressed, the field will zoom in by a factor of 1.5.
6. Arrow keys - If the background window is selected and you press the right arrow key, the time will be advanced by the amount specified in the
Time Control
window for manual advancement.
Likewise, if you press the left arrow key, the time used by the

software will be decreased by the same amount.

7. HELP key - if you press the HELP key while the background window is active, you will receive online help for "The Digital Universe". If you depress this key while the mouse pointer is above some gadget or window, information about the use of the gadget or window will be displayed.

1.255 Combined Operations

There are two operations which can be done through a combined use of the mouse and keyboard.

1. If you hold down the SHIFT key while clicking at a spot on the screen, the software will center this location in your field of view.
2. If you hold down the Control key (marked CTRL) while dragging with the mouse (moving the mouse with the left mouse button depressed) you will drag out a line that can be used to measure the distance between two points. When the mouse button is released, the angular distance between these points will be displayed.

1.256 Configuration of the software

Other than the configuration options available from the Setting Screen Mode

,

Setting Environment Parameters

, and

Display/Object Preferences

windows, there

are a few additional things that you can configure with the operation of "The Digital Universe".

When viewing hypertext, you will periodically come across links to pictures or audio samples. "The Digital Universe" calls the scripts named "playsound" and "showpic" in the DU: directory to deal with these files. The scripts are currently configured to use software programs called

DUAudio

and

ShowAnim

,

supplied with the package, but if you have software that you would rather use, you only need to modify these scripts with a text editor.

1.257 Starting The Digital Universe

If you would like to start "The Digital Universe" from the Workbench, you only have to double click upon the "DigitalUniverse" icon once the software has been installed from disk.

The introduction sequence to "The Digital Universe" may crash on some Amigas with 3rd party graphics boards. If this is the case with your machine, or you would merely like to run the software without seeing the introduction, just double click on the "DigitalUniverseNoIntro" icon instead.

On the other hand, if you would rather start the software from the command line (CLI), first ensure that you are using a stack of at least 6000 bytes. Type 'stack' at the CLI prompt if you are not sure. If you need to raise the stack, just type 'stack 6000'. Refer to your AmigaDOS manual for more information on the 'stack' command.

Once this is done, change to the DU: directory and type:

```
DigitalUniverse
```

If you would like to avoid the introduction, type:

```
DigitalUniverse nointro
```

One other option is available to CLI users. If your configuration somehow becomes corrupted or you would like to return your settings to the factory defaults, type:

```
DigitalUniverse init
```

Remember that if you do so, all your previous settings will be lost.

When you run the software for the first time, or after you have returned the settings to factory defaults, you should tell it where on the Earth you are located, and what time zone you are in. This can be done by choosing

```
Environment Prefs  
from the menu bar, to bring up the
```

```
Setting Environment Parameters  
window. See the help associated with this
```

window for more details.

1.258 Utilities - other software provided with the package

This information is not provided with the demonstration version of "The Digital Universe". Please consult *Ordering The Digital Universe* for more information on how to obtain a registered version.

1.259 ShowAnim

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.260 DUAudio

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.261 jahnprecise2uof

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.262 jahnsingle2uof

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.263 jahnnumber2uof

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.264 jahncomet2uof

This information is not provided with the demonstration version of "The Digital Universe". Please consult
Ordering The Digital Universe
for more information on how to obtain a registered version.

1.265 tle2uof

This information is not provided with the demonstration version of "The Digital Universe". Please consult
 Ordering The Digital Universe
 for more information on how to obtain a registered version.

1.266 Ordering The Digital Universe

This demonstration version of "The Digital Universe" has several disabled features (such as only displaying the stars in one small region of the sky, not allowing you to advance the time past October 15, 1995, and providing only a small portion of the hypertext encyclopedia of astronomy). By ordering the registered version of this software, these restrictions will be removed.

There are two packages which may be of interest to the amateur astronomer. First and foremost is "The Digital Universe" software itself, which comes provided with a 138 page user manual. Secondly, in the process of creating the package, more than 700 pages of a hypertext multimedia encyclopedia was created (the electronic version of which is shipped with the software). However, since many individuals prefer reading from paper than the computer screen, a printed version of this information is also available.

The introductory prices of "The Digital Universe" software and printed encyclopedia can be found in the following table. All prices include shipping and handling, and Canadian prices include 7% GST. Note that the prices for Canadian orders are quoted in Canadian dollars, whereas US and International orders are quoted in US dollars.

These figures will only remain valid until October 31, 1995 at which time the introductory period will expire and the prices will increase by approximately 50%. If it is after this date and you would like updated pricing information, please contact us.

	Canada (CAN \$)	US (US \$)*	Inter.(US \$)*
	-----	-----	-----
Software and User Manual	114.95	89.95	99.95
700 page printed Encyclopedia	49.95	44.95	54.95

*NOTE: Since we must process all credit card transactions in Canadian dollars, the US prices provided above should only be considered as an estimate if you are using a credit card for payment. Due to exchange rate fluctuations between the time of purchase and the time your credit card company processes the transaction, the actual amount may be a few dollars more or less than that quoted above. However, the prices will be accurate for cheque or money order transactions.

We need to know your name and address for the registration, and the shipping address (if different). In addition, if you are paying by Visa or Mastercard, the cardholder's name, credit card number, and expiry date are required. See the file entitled "ProductInfo", included with this archive, for more information (such as system requirements)

and a sample order form.

Orders may be sent to:

Syzygy Research & Technology Ltd.
Box 75
Legal, AB
T0G 1L0
CANADA

Internet email: sales@syz.com

or you can visit our WWW site with the following URL:

<http://www.syz.com>
