The Digital Universe Help File

COLLABORATORS

	TITLE : The Digital Universe Help File		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY		January 18, 2023	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

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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

1.2 Menus

Help is available on the following menu items:

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Environment Prefs

Screenmode Prefs

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            Spacecraft
              --------------------

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              --------------------

            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
 ===
 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
 =====================
  Display

                Ra/dec grid

                Horizon

                Fast Labels

                Fast info

                Show Time

                Show Titlebar

                Flip Horizontal

                Flip Vertical

                Star trails

                Show FOV

                Earth's Shadow
                   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 Show Titlebar

Most Amiga programs have a title bar at the top of their screen. However,
users of "The Digital Universe" may find its title bar distracting when viewing
dim stars. Thus, the user is provided with the option of disabling the title
bar, if desired.

Note that if the title bar is disabled, the user will be unable to use the
regular screen rearrangement gadgets normally appearing within it.

1.78 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.

1.79 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.

1.80 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.

1.81   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.

1.82   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.

1.83   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.

1.84   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.

1.85   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.

1.86 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.

1.87 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.

1.88 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.

1.89 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.

1.90   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.

1.91   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.

1.92   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.

1.93 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.

1.94 Constellation Figures

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

As of version 1.01 of "The Digital Universe", constellation figures will follow
the stars in proper motion calculations. As a result, it may take a short time
to draw constellation figures if proper motion is selected in the

            Display/Object Prefs
             window.

1.95 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.

1.96   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.

1.97   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.

1.98   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.

1.99   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.

1.100   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.

1.101   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.

1.102   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 that 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.

1.103   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.

1.104   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.

1.105   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.

1.106   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.

1.107   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.

1.108   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.
```

1.109   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.
```

1.110   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.
```

1.111   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.
```

1.112   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.

1.113 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.

1.114 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.

1.115 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
```

1.116   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

            Planetarium
             or
            Local Sky
             mode. If you are in Planetarium 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.

1.117   Zoom Out

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

1.118   Zoom In

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

1.119   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.

1.120   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.
```

1.121 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.
```

1.122 Stars

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

            Display/Object Preferences
             window.
```

1.123 Bayer designation

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

            Display/Object Preferences
             window.
```

1.124 Flamsteed designation

```
            This button is provided as a shortcut to the
            Flamsteed designation
             gadget in
the
            Display/Object Preferences
             window.
```

1.125 Star Names

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

Display/Object Preferences
 window.

1.126 Constellation Figures

This button is provided as a shortcut to the
Constellation Figures
 gadget in
the
Display/Object Preferences
 window.

1.127 Constellation Boundaries

This button is provided as a shortcut to the
Constellation Boundaries
 gadget in
the
Display/Object Preferences
 window.

1.128 Constellation Names

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

Display/Object Preferences
 window.

1.129 RA/Dec Grid

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

Display/Object Preferences
 window.

1.130 Horizon

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

Display/Object Preferences
 window.
```

1.131 Deep Sky Objects

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

Display/Object Preferences
 window.
```

1.132 NGC/IC

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

Display/Object Preferences
 window.
```

1.133 Messier

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

Display/Object Preferences
 window.
```

1.134 Deep Sky Names

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

Display/Object Preferences
 window.
```

1.135 Miscellaneous Objects

```
            This button is provided as a shortcut to the
            Miscellaneous Objects
             gadget in
the
            Display/Object Preferences
             window.
```

1.136 Misc. Object Names

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

            Display/Object Preferences
             window.
```

1.137 Earth's Shadow

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

            Display/Object Preferences
             window.
```

1.138 Flip Horizontal

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

            Display/Object Preferences
             window.
```

1.139 Flip Vertical

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

            Display/Object Preferences
             window.
```

1.140 Sun/Planet/Moon

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

Display/Object Preferences
 window.
```

1.141 Show Phase

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

Display/Object Preferences
 window.
```

1.142 Features & Flattening

```
This button is provided as a shortcut to the
Features & Flattening
 gadget in
```
the
```
Display/Object Preferences
 window.
```

1.143 Show Grid

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

Display/Object Preferences
 window.
```

1.144 Sun/Planet/Moon Names

```
This button is provided as a shortcut to the
Sun/Planet/Moon Names
 gadget in
```
the
```
Display/Object Preferences
 window.
```

1.145 Star Trails

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

Display/Object Preferences
 window.

1.146 Show FOV

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

Display/Object Preferences
 window.

1.147 Show Time

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

Display/Object Preferences
 window.

1.148 Time Control Window

This window contains the controls necessary to set the current ←
          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

1.149   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

1.150   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

1.151   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

1.152   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.

1.153   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.

1.154   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

1.155   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
```

1.156 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.
```

1.157 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.
```

1.158 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.nn      - 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.
```

1.159 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.

1.160 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
```

1.161 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.

1.162 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

1.163 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.

1.164 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.

1.165   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.

1.166   Use

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

1.167   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
```

1.168   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.

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".

Earth-orbiting satellites are strongly affected by atmospheric drag and other
phenomenae. While "The Digital Universe" uses NORAD's highly accurate SGP4
model to consider these effects, the most accurate results are always obtained
with recent satellite data sets. This software package contains the program

                tle2uof
                  to convert between NORAD's standard three-line element format and ←
                    the
"Universal Orbit Format". Two good sources of updated satellite orbit
information are available to users with a modem:

  Dr. T. S. Kelso's (email: tkelso@afit.af.mil) orbital elements:
  - Celestial BBS at (334) 409-9280
  - Internet anonymous FTP at archive.afit.af.mil
    (file: /pub/space/tle.new)

  Ted J. Molczan's orbital elements:
  - Canadian Space Society BBS at (905) 458-5907

        – Internet anonymous FTP at kilroy.jpl.nasa.gov
          (file: /pub/space/elements/molczan/new_molc.Z)

In addition, satellite orbit files pre-converted to the "Universal Orbit
Format" will periodically be available at our own Internet World Wide Web (WWW)
site at the following URL:

    http://www.syz.com

1.169   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!

1.170   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.

1.171   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
phenomenae 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.

1.172   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!

1.173   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!

1.174   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.

1.175   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.

1.176   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   Nephthys          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
```

1.177   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.

1.178   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.

1.179   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

1.180   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.

1.181   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.

1.182   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.

1.183   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.

1.184   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.

1.185   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.

1.186 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.

1.187 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.

1.188 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

1.189   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.

1.190   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.

1.191   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.

1.192   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.

1.193   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.

1.194   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.

1.195   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.

1.196   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

1.197   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.

1.198   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.

1.199   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

1.200   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.

1.201   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.

1.202   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.

1.203   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.

1.204   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.

1.205   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.

1.206   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.

1.207   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).

1.208   Report Generation Window

This window allows you to generate numerical reports. They can be ←
                  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

1.209   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.

1.210   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

1.211   Times

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

1.212   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.

1.213   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.

1.214 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.

1.215 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.

1.216 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

1.217 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 being to do its work, as if you'd hit the
                  Search
                   button.

1.218   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.

1.219   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.

1.220   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

1.221 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.

1.222 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.

1.223 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.

1.224 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
```

1.225 Primary Name

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

1.226 Secondary Name

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

1.227 Object Type

These radio buttons specify the type of object being defined.

1.228 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.

1.229   Perihelion Distance

You can use this requester to specify the distance in AU from the ←
object to 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
.

1.230   Eccentricity

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

1.231   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
.

1.232   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".

1.233 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 orject 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".

1.234 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".

1.235 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".

1.236 Mag param. 3

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

1.237 Mag param. 4

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

1.238 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.

1.239 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
```

```
        q
    a = -----
        1-e
```

```
      0.9856076686
    n = ------------
         a*sqrt(a)
```

```
                  -M
    if (M<180) T = --- + t
                    n
```

```
                 360-M
    else      T = ----- + t
                    n
```

```
    omega = pi - Omega
```

```
    M = L - omega - Omega
```

1.240   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?

1.241   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\textdegree $\hookleftarrow$
{}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.

1.242   Question 2

What settings should I give the software to get the most accurate $\hookleftarrow$
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.

1.243   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.

1.244   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.

1.245   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.

1.246   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.

1.247   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.

1.248   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.

1.249   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.

1.250   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.

1.251   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.

1.252   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.

1.253   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

1.254   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.

1.255 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.

1.256 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.

1.257 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.
```

1.258 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.
```

1.259 Utilities - other software provided with the package

When you purchased "The Digital Universe", you obtained more than ←
just a single
program. Several support software has been provided as well, and is available
in the DU: directory.

showanim
 – Displays IFF ANIM5 animations or ILBM pictures

duaudio
 – Plays IFF 8SVX audio samples

jahnprecise2uof
 – Converts Jost Jahn's "precise" minor planet format
files to the Universal Orbit Format

jahnsingle2uof
 – Converts Jost Jahn's "single" minor planet format
files to the Universal Orbit Format

jahnnumber2uof
 – Converts Jost Jahn's "number" minor planet format
files to the Universal Orbit Format

jahncomet2uof
 – Converts Jost Jahn's "comet" files to the Universal
Orbit Format

tle2uof
 – Converts NORAD three-line element orbit files (for Earth-
orbiting satellites) to the Universal Orbit Format.

1.260 ShowAnim

This utility displays IFF ANIM5 animations or ILBM pictures. It is used by
"The Digital Universe" to display pictures from within hypertext. As well, when
you save a picture or animation and later view it by double clicking on its
icon, "showanim" displays it for you.

Showanim can be used to display these types of files "manually" as well. There
are two methods by which it can be executed. Workbench users can single click
on "showanim's" icon, and then double click on the icon of the picture or
animation to be displayed. Command line (CLI) users just have to type
"showanim" followed by the name of the file to be displayed. Showanim has
additional functionality available to CLI users as well. If you type
"showanim" followed by the name of the file to be displayed, and follow that
with a number, the animation will be played while pausing (number/60) seconds
for each frame. For example:

  showanim myanimation.anim 30

will play the animation entitled "myanimation.anim", pausing 30/60=0.5 seconds

between each frame.

To exit from an animation or viewing a picture, just click the left mouse
button or press the escape (ESC) key.

1.261   DUAudio

DUAudio plays IFF 8SVX sound files. Of course, to hear these files you require
speakers to be hooked up to your computer – either contained within the monitor
or externally.

"The Digital Universe" uses DUAudio to play the audio samples provided in the
hypertext. But command line (CLI) users can use it to play any audio sample,
provided that the sample is less than 102400 bytes. Just type "DUAudio"
followed by the name of the sample to play.

1.262   jahnprecise2uof

                 Orbital elements for thousands of asteroids are provided with "The ←↩
                    Digital
Universe". However, new asteroids are continually being discovered, and our
knowledge of the orbits of known asteroids is always improving. If a serious
asteroid observer wishes to obtain more recent data files for these objects
directly from Jost Jahn – the person who contributed them to "The Digital
Universe" – they will need the software to convert his data files to the
"Universal Orbit Format" used by this package.

jahnprecise2uof is a small utility to convert the data found in his
PRECISE.MPC, PREC_PL.MPC, PREC_T1.MPC, PREC_T2.MPC, and PREC_T3.MPC files.
Just type "jahnprecise2uof" followed by the file to convert, without the ".MPC"
extension. When it is done, you will see one or more files starting with
"asteroids_" that can be copied directly to DU:data/orbits so that "The Digital
Universe" can load the information contained within.

Mr. Jahn supplies the information on IBM formatted disks, so you must have a
utility to read such disks on your Amiga. As well, they are often compressed
with PKZip, so you will require additional software to uncompress the files.

Since Mr. Jahn may change the format of his files at any time, Syzygy Research &
Technology Ltd. cannot be held in any way responsible if this utility fails to
operate properly. All that can be said is that it was compatible with the
format he used as of March 17, 1995.

For information on how to contact Jost Jahn, see the help for
                 Orbit File
                     .

1.263   jahnsingle2uof

Orbital elements for thousands of asteroids are provided with "The ←
Digital
Universe". However, new asteroids are continually being discovered, and our
knowledge of the orbits of known asteroids is always improving. If a serious
asteroid observer wishes to obtain more recent data files for these objects
directly from Jost Jahn - the person who contributed them to "The Digital
Universe" - they will need the software to convert his data files to the
"Universal Orbit Format" used by this package.

jahnsingle2uof is a small utility to convert the data found in his SINGLE.MPC,
SING_PL.MPC, SING_T1.MPC, SING_T2.MPC, and SING_T3.MPC files. Just type
"jahnsingle2uof" followed by the file to convert, without the ".MPC" extension.
When it is done, you will see one or more files starting with "asteroids_" that
can be copied directly to DU:data/orbits so that "The Digital Universe" can
load the information contained within.

Mr. Jahn supplies the information on IBM formatted disks, so you must have a
utility to read such disks on your Amiga. As well, they are often compressed
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format he used as of March 17, 1995.

For information on how to contact Jost Jahn, see the help for
Orbit File
.

1.264   jahnnumber2uof

Orbital elements for thousands of asteroids are provided with "The ←
Digital
Universe". However, new asteroids are continually being discovered, and our
knowledge of the orbits of known asteroids is always improving. If a serious
asteroid observer wishes to obtain more recent data files for these objects
directly from Jost Jahn - the person who contributed them to "The Digital
Universe" - they will need the software to convert his data files to the
"Universal Orbit Format" used by this package.

jahnnumber2uof is a small utility to convert the data found in his NAMEN.NEW,
NAMEN_ID.MPC, and NUMBER.MPC files. Ensure that you are in the same directory
as all three of these files, then type "jahnnumber2uof". When the conversion
process is completed, you will see one or more files starting with "asteroids_"
that can be copied directly to DU:data/orbits so that "The Digital Universe"
can load the information contained within.

Mr. Jahn supplies the information on IBM formatted disks, so you must have a
utility to read such disks on your Amiga. As well, they are often compressed
with PKZip, so you will require additional software to uncompress the files.

Since Mr. Jahn may change the format of his files at any time, Syzygy Research &
Technology Ltd. cannot be held in any way responsible if this utility fails to
operate properly. All that can be said is that it was compatible with the

format he used as of March 17, 1995.

For information on how to contact Jost Jahn, see the help for
                Orbit File
                        .

1.265   jahncomet2uof

                Orbital elements for thousands of comets are provided with "The ←
                        Digital
Universe". However, new comets are continually being discovered, and our
knowledge of the orbits of known comets is always improving. If a serious
comet observer wishes to obtain more recent data files for these objects
directly from Jost Jahn - the person who contributed them to "The Digital
Universe" - they will need the software to convert his data files to the
"Universal Orbit Format" used by this package.

jahncomet2uof is a small utility to convert the data found in his COMETS.REL
file. Ensure that you are in the same directory as this file, then type
"jahncomet2uof". When the conversion process is completed, you will see one or
more files starting with "comets_" that can be copied directly to
DU:data/orbits so that "The Digital Universe" can load the information
contained within.

Mr. Jahn supplies the information on IBM formatted disks, so you must have a
utility to read such disks on your Amiga. As well, they are often compressed
with PKZip, so you will require additional software to uncompress the files.

Since Mr. Jahn may change the format of his files at any time, Syzygy Research &
Technology Ltd. cannot be held in any way responsible if this utility fails to
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format he used as of March 17, 1995.

For information on how to contact Jost Jahn, see the help for
                Orbit File
                        .

1.266   tle2uof

                Orbital elements for hundreds of Earth-orbiting satellites are ←
                        provided with
"The Digital Universe". This software package uses the highly accurate SGP4
model, developed by NORAD, to determine where these satellites will be at any
given moment. Unfortunately, these elements are only valid for a relatively
short period of time as atmospheric drag and similar phenomenae cause the
orbits to change unpredictably. While every effort was made to ensure that you
obtained a recent set of orbital elements when you purchased this program, it
is inevitable that you will eventually need to update the databases used by
"The Digital Universe".

For information on where to obtain updated orbital elements, see the help for

                              Orbit File
                              . Any elements you are likely to see will be in NORAD's "Three- ←
                                 line"
element format. tle2uof is a small utility to allow you to convert this format
to the "Universal Orbit Format" used by "The Digital Universe".

Three-line element (TLE) files can be read and manipulated with any text
editor. Sometimes, the distributor of a TLE file adds information to the
beginning and/or end of the file. This must first be removed with an editor
(of course, you may want to read the information first – Ted Molczan in
particular often puts interesting observing notes there). Each valid entry in
the file occupies three lines, which appear something like this:

 Vanguard 1   0.2 0.0 0.0 12.4
 1 00005U 58002 B 95240.51434398 −.00000005 00000−0 21206−6 0   362
 2 00005 34.2646 358.6738 1860978 349.1330   7.3813 10.81798706222458

Ensure that the only lines in the file appear like the one above, and then save
the file.

When this is done, you are ready to convert the data. Type "tle2uof" followed
by the name of the file containing the three-line element data, followed by the
name of the file you want to write the Universal Orbit Format (UOF) information
to. By convention, this filename should end in a .uof extension.

If you would like to have the satellites referenced by their NORAD number
instead of their name, type a space followed by the word 'NORAD' before
pressing enter.

As a brief summary, the usage of tle2uof is as follows (this is the text that
appears if you just type tle2uof and press ENTER):

    Usage: tle2uof <tlefile> <uoffile> [NORAD]
    The keyword "NORAD" is optional. If it is provided, satellites
    will be named according to their NORAD number instead of their
    stated designations.

While tle2uof is processing the file, you may periodically see messages like:

 Intelsat 4-3 r is a deep space object. Calculations will not be accurate.

The SGP4 model of orbital motion is only accurate for satellites relatively
near to the Earth. This warning just reminds you that the satellite in
question is fairly distant and that no guarantees can be made for the accuracy
of the results.

When tle2uof is finished, you will be left with a UOF file which can be copied
to DU:data/orbits so that "The Digital Universe" can use the information
contained within.

Remember that UOF files can only contain a maximum of 1000 objects. If the TLE
file contains information for more satellites than this, it should be broken
into smaller pieces before running through tle2uof.