TheSky Astronomy Software

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Open command (File menu)

Use this command to display the Open dialog box where you can select an existing .SAV file. A .SAV file contains all the information about the current viewing state of the Sky Display. The viewing state of the Sky Display consists of the following options.

Current field width of the Sky Display.
Current orientation of the Sky Display.
Control Panel state and orientation.
Status Box state, on or off.
Current object labeling state.
Current state (on or off) of all commands in the Lines menu.
The state of all object types displayed (on or off).
Magnitude limits of all catalogs.
Window stateeither maximized or normal.
The currently selected catalogs.
The current field of view indicator (eyepiece or CCD).
The Brightness and Contrast settings for the stars.
The Object Plotting Density setting (high, medium or low).

Select a file name with the extension .SAV from the File Name list box in the Open dialog box and choose OK. The Sky Display is automatically updated to display the new viewing state.

Each time TheSky is launched, it loads the viewing state information from the default start-up file named STARTUP.SAV. If you wish to customize the viewing state at start-up, use the Save As command to save your viewing state as STARTUP.SAV.

See also:
Save As command

Save command (File menu)

Use this command to save the current viewing state of the Sky Display. Unless you have loaded a different viewing state by selecting the Open command, the current viewing state is saved with the file name STARTUP.SAV.

See also:
Open command
Save As command

Save As command (File menu)

Use this command to display the Save As dialog box where you can specify a file name to save the current viewing state for the Sky Display. The Save As dialog box allows you to enter a new file name for the current viewing state. If you wish to use the current display settings each time the program is started, name the file STARTUP. The extension .SAV is appended automatically to the file name.

See also:
Open command

Print command (File menu)

Use this command to print a star chart of the current Sky Display. The output Sky Chart uses all the current Sky Display option settings when printing, such as displaying constellation boundaries, constellation lines, and object labels.

Printing an Inset on your Sky Chart
When a zoom box is present on the Sky Display while printing Sky Charts, the area within the zoom box appears "blown-up" on the star chart. Use the Page Setup command to set the options that appear in the inset of the star chart.

To Print a rectangular inset on a Sky Chart
Normally, the zoom box is always a square on the Sky Display. When printing a star chart with an inset, however, you can select a rectangular zoom region by pressing the CTRL key in conjunction with the left mouse button while creating a zoom box.

Related Topics:

Page Setup

Page Setup command (File menu)

Use this command to set the printing options for the sky chart output to the printer.

Sky Chart Title
Specify a title for the Sky Chart. The title only appears if the Print Legend option is selected.

Orientation
Select the desired format for the output star chart, either portrait or landscape.

Print Legend
Prints a legend on the Sky Chart showing:
1. The title of the star chart.
2. Symbols used to represent the different types of celestial objects.
3. Coordinates of the center of the star chart.
4. Date and time of the star chart.

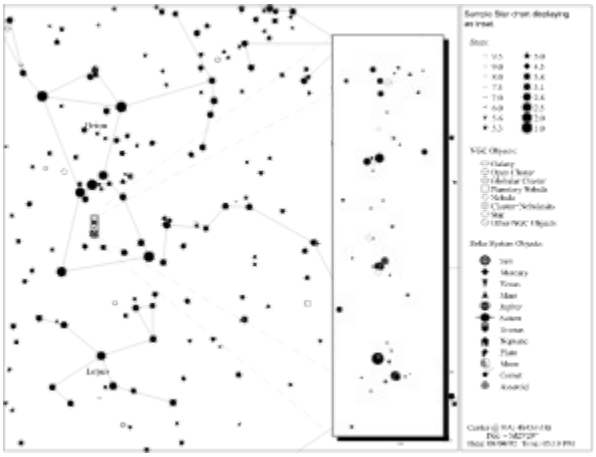
Print Inverse
Print Sky Charts with white objects on a black background (use of this option is only recommended for laser jet printers).

Print Greek Symbols
Print the Greek designation for stars in each constellation. (Note: This option significantly increases the time required to print star charts.)

Printer Fonts
Select the fonts you wish to use for your Sky Chart labeling. Each label type can have a different font type. Only the fonts supported by the current printer are displayed.

Zoom Box Plotting Options
If the zoom box is present on the Sky Display while printing a star chart, an inset is created on the star chart representing a magnified view of the area of the sky within the zoom box. The labeling and line options that appear within the star chart inset are explained below.

The following is an example star chart with a inset:



Coordinate Grid
Checking this box places a coordinate grid within the inset portion of the star chart.
Mirror Image

Checking this box causes the inset portion of the star chart to appear as would looking through an inverting telescope.

Common Name Labels

Prints the common names of stars within the inset portion of the star chart.

Extended NGC Labeling

Prints the extended NGC labels within the inset portion of the star chart.

Extended Star Labels

Prints the extended SAO labels within the inset portion of the star chart.

Best results are obtained when the portion of the sky you wish to magnify is placed in the upper left portion of the screen, since the star chart inset is placed in the lower right half of the printed Sky Chart.

Sky Cache command (File menu)

Use this command to copy portions of the GSC data to your hard drive. The primary purpose of the Sky Cache command is to allow you to transfer from the CD-ROM drive to your hard drive complete GSC data for small areas of interest. Using this command, you can, for example, use TheSky GSC on your laptop with the cached areas. This allows use of complete GSC data for a particular area without requiring the entire Guide Star Catalog.

To select the area of the sky you wish to cache

1. Center the desired area of the Sky Display to be cached, then zoom in so that the field width is less than 50 degrees.
2. Choose the Cache Selection command from the Display menu to enter the cache selection mode. The cursor changes from the mouse pointer to the cache selection wand.
3. Place the cache selection wand near the center of the desired area and click the left mouse button. A small square two and a half degrees in size shown on the Sky Display. This square represents a single block of GSC data. Continue selecting the cache regions until the entire area you wish to cache is outlined.

To de-select a selected area.

1. Click the left mouse button within the cache square to de-select it.

Copying Selected Blocks to the Cache

Once you have selected the blocks to be cached, choose the Sky Cache command from the File menu. The Sky Cache dialog box displays information about the existing cache as well as the currently selected blocks. To copy the selected blocks to the hard disk cache, choose the Copy Selected To Disk button.

Purging the Existing Cache

To delete the existing cache of GSC data, choose the Purge Cache button from the Sky Cache dialog box.

Showing the Cached Areas

If you want to see the areas that are part of the existing cache, select the Show Cached Areas checkbox in the Sky Cache dialog box and choose OK. The current field width must be 50 degrees or less to see the currently cached areas.

Cache File Name

The file names for the cache depend on the current declination of the center of the Sky Display. The file names used for each area of the celestial sphere are listed below.

For declinations greater than 33 degrees:
NORCACHE.PLT and NORCACHE.INF.

For declinations greater than -33 degrees and less than +33 degrees:
MIDCACHE.PLT and MIDCACHE.INF

For declinations less than -33 degrees:
SOUCACHE.PLT and SOUCACHE.INF

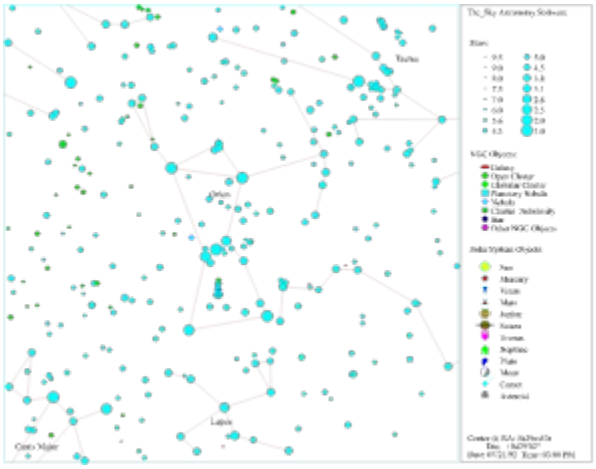
The directory path of the cache files can be changed in the SKYW.INI file under the DATABASE section using the CACHEPATH selector.

Export Chart command (File menu)

Use this command to save star charts as "placeable" metafiles. The placeable metafile format is a standard file format used for saving and retrieving graphics information. This file format can then be imported into and edited by many Windows applications.

Filename
Type the exported file name into the Save As dialog box and choose OK to create a metafile with this file name. The exported files have the extension .WMF, for **W**indows **M**eta**F**iles.
Orientation
Export the star chart metafile in either portrait or landscape orientation.
Color
Export the star chart metafile in color or black and white.

The following landscape, color star chart was exported by TheSky and inserted into Microsoft Word:



Export Data command (File menu)

The Export Data command creates a text file listing the right ascension, declination, rise, transit and set times for all of the nonstellar objects plotted on screen. This function is useful for creating observer lists.

The following is a sample text file created with the Export Data command.

Catalog ID	Object Type	Mag.	RA	Declin.	Rise	Set	Size
NGC 206	Cluster+Neb.		0h 40m 16s	+40d 41m 59s	13h 20m	7h 38m	0.0
NGC224	Galaxy	4.0	0h 42m 24s	+41d 14m 7s	13h 17m	7h 45m	188.8
NGC205	Galaxy	8.9	0h 40m 2s	+41d 39m 11s	13h 11m	7h 46m	21.9
NGC221	Galaxy	9.1	0h 42m 22s	+40d 49m 54s	13h 21m	7h 41m	8.8
UGC344	Galaxy	15.1	0h 34m 31s	+39d 30m 41s	13h 24m	7h 23m	1.0
UGC394	Galaxy	15.1	0h 38m 23s	+41d 57m 47s	13h 7m	7h 48m	2.0
UGC372	Galaxy	15.5	0h 37m 11s	+42d 52m 28s	12h 57m	7h 55m	1.5
UGC338	Galaxy	15.5	0h 34m 2s	+39d 34m 5s	13h 23m	7h 23m	0.9
MK957	Galaxy	15.7	0h 41m 33s	+40d 19m 17s	13h 25m	7h 36m	0.0
MCG7-2-12	Galaxy	15.8	0h 37m 35s	+39d 51m 28s	13h 24m	7h 29m	0.4
MCG7-2-11	Galaxy	16.5	0h 37m 35s	+39d 52m 28s	13h 24m	7h 29m	0.2
MCG7-2-10	Galaxy	16.5	0h 37m 16s	+39d 48m 28s	13h 24m	7h 28m	0.2
5ZW29	Galaxy	16.8	0h 38m 47s	+40d 32m 27s	13h 20m	7h 35m	0.0
5ZW27	Galaxy	16.8	0h 38m 29s	+40d 32m 27s	13h 20m	7h 35m	0.0
ZW-COMPACT	Galaxy	17.6	0h 46m 43s	+41d 11m 22s	13h 22m	7h 49m	0.0
4ZW29	Galaxy	18.2	0h 41m 56s	+40d 17m 35s	13h 25m	7h 36m	0.0
6ZW1	Galaxy	18.4	0h 41m 36s	+40d 20m 25s	13h 24m	7h 36m	0.0
(5ZW32)	Galaxy	18.5	0h 41m 23s	+40d 14m 20s	13h 25m	7h 35m	0.0
(5ZW32)	Galaxy	18.5	0h 41m 24s	+40d 14m 31s	13h 25m	7h 35m	0.0
PGC 02304	Galaxy		0h 38m 12s	+41d 26m 52s	13h 11m	7h 43m	0.0
AndIV	Galaxy		0h 42m 12s	+40d 32m 26s	13h 23m	7h 39m	0.0

Sample Output of Exported Nonstellar Data

Exit command (File menu)

Use this command to quit TheSky.

Observer Logs (Identification dialog box)

Use this command to display information about the currently identified object. You can easily add comments and notes to the observer log file for later reference. Remember to save your file before exiting Notepad.

Observer log files created during a viewing session are named using the current date with the extension .LOG. For example, a log created on June, 20, 1993 is saved with the filename 06201993.LOG. When the file is created, all the information about the observed object is stored at the beginning of the file.

Edit Menu

Undo
Find
Copy
Paste Image

Undo command (Edit menu)

Use this command to undo you last movement command. For example, if you zoom into a small field width using a zoom box or the Zoom To command, then want to quickly return to your previous field width, select the Move/Zoom Previous command. You may undo up to fifteen previous moving or zooming commands.

Pressing CTRL+Z also "undoes" your previous move/zoom command.

Find command (Edit menu)

Use this command if you wish to locate a particular object in the database. Every object in the database can be located using the Find command.

Object Name Type
Select the type of object for which to Find. The Object Name Type list box automatically displays all the object names in the database for the selected object type.

If you select an object in the list box, the *Find* edit control displays the current selection. By double clicking the left mouse button on the list box, the TheSky searches the database for the selected object.

Find text box
Type in the common name of the object, or type in a search prefix for that object type, followed by the particular number of the object. For example, to find the planet Mars, type MARS (letters are automatically converted to upper case). To find NGC 224, type NGC 244.

Find button
Uses the text string in the *Find* text box and begins searching the database for that object.

"Fuzzy" Searches
If the find string entered in the *Find* text box is not found by a direct search, TheSky attempts to find the closest phonetic match. For example, typing BETELJUICE finds Betelgeuse 58.

GSC Objects
To find stars and nonstellar objects from the Guide Star Catalog, type GSCbbbb:oooo (where bbbb is the guide star block number from 1-9537 and oooo is the offset of the object in the block) and choose the Find button.

SAO Objects
To find stars by their SAO designation, type SAOxxxx in the Find text box (where xxxx is the SAO catalog number of the star) and choose the Find button.

Messier Objects
If the object is a Messier object, type Mxxxx in the Find text box (where xxxx is the Messier number of the object) and choose the Find button. For instance, to search for the Great Nebula in Orion, type M42 in the Find text box.

NGC Objects
If the object is a NGC object, type NGCxxxx in the Find text box (where xxxx is the NGC catalog number of the object) and choose the Find button.

PGC Galaxies
If the object is a PGC galaxy, type PGCxxxx in the Find text box (where xxxx is the PGC catalog number of the object) and choose the Find button.

IC Objects
If the object is an IC object, type ICxxxx in the Find text box (where xxxx is the IC catalog number of the object) and choose the Find button.

Other Galaxy Catalog Designations
Numerous other catalog designators can be used to find objects. Below is a list of the catalog prefixes available. Also shown is the number of galaxies which use the corresponding prefix and

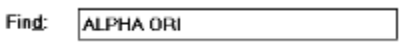
sample search text.

Catalog Prefix	Count	Example/*Notes*
1SZ	26	1SZ 37
2SZ	32	2SZ 4
1ZW	238	1ZW 1
2ZW	199	2ZW 1
3ZW	158	3ZW 1
4ZW	203	4ZW 1
5ZW	531	5ZW 1
6ZW	238	6ZW 1
7ZW	1145	7ZW 1
8ZW	645	8ZW 1
ARAK	595	ARAK 38
ARP	560	ARP 70
CGCG	29809	CGCG 502- 64
DDO	242	DDO 11
ESO	16239	ESO 152- 5
FAIR	1185	FAIR 700
IC	3815	IC 434
IRAS	9347	IRAS 01293-2548 *5 digit numeric prefix must be padded with zeros.*
KARA	183	KARA 4
KAZ	581	KAZ 9
KUG	5455	KUG 0001+311 *4 digit numeric prefix must be padded with zeros.*
LGS	5	POX 4
SBS	259	SBS 1209+550
TOL	111	TOL 29
UGC	13073	UGC 8100
UM	652	UM 533
VV	1161	VV 222
VCC	2097	VCC 3
WEIN	207	WEIN 1

The second method of locating objects is to select the object you wish to find in the Object Name Type list box and press ENTER or double-click the mouse.

Objects by type
You can select one of the six object name type radio buttons to display a list of all the names in each category. Once you find the desired object in the list, press ENTER or double-click on the object name to display information on that object. For example, to find the Great Nebula in Orion, select the NGC Name option then double-click on the Great Nebula in Orion in the list box.

Bayer designation
You can search for an object by its Bayer designation using the Find command. For example, to find the star Alpha Orionis (Betelguese), type the Greek letter followed by the constellation abbreviation.



Sometimes more than one star in a constellation shares the same Greek letter, in which case a number follows the Greek letter to distinguish it from other objects. In Orion, a number of stars share the Greek letter "pi". There is a pi1, pi2...pi6. To find these objects, type in the Greek letter, the number then the constellation abbreviation. Type pi 4 ori to find Pi 4 Orion.

Flamsteed Numbers
Another popular stellar designation is the Flamsteed numbers. These consist of a number followed an optional Bayer designation, then the constellation abbreviation. The star Betelguese in Orion has a Flamsteed number of 58, so it can be found by typing any of the following:

58 ORI
58 ALPHA ORI
ALPHA ORI

Other sample Bayer/Flamsteed search strings:

19 tau5 Eri	90 Tau
69 lambda Eri	gam1Vel
xi 2Cen	mu Lup
12 gam2 Del	33 iota Aqr
71 eps psc	73xi 2Cet
10 Tau	69 UPS TAU
94 tau Tau	75 SIG GEM

Multiple Find
If you enter a search criteria and there exists more than one object that matches this criteria, you are presented with a list of all the matching object names. For example, if you enter the Find text "POLARIS" and choose OK, the Multiple Find dialog box displays Polaris, Polarissima Australis, and Polarissima Borealis. Select the object you wish to find, and choose OK.

Uranometria 2000.0 Find
You can automatically locate any Uranometria star chart using the Find command. This option can also be used to automatically sets many printing options so that star charts similar to the ones found in the book Uranometria 2000.0 can be printed.

To locate any Uranometria star chart
In the Find text box, type URAxxx, where xxx is the desired Uranometria 2000.0 star chart number, then choose the Find button. The Sky Display is automatically adjusted to the portion of the sky that corresponds to the input Uranometria 2000.0 star chart number.

To automatically setup the Sky Display for printing "Uranometria-like" Sky Charts
If you wish to print a Sky Chart that corresponding a desired Uranometria 2000.0 chart number, type URAxxx + (that is, the chart number followed by a plus sign) in the Find text box. The following options are also automatically set.

The Equatorial grid is toggled on.
The Ecliptic is turned on.
Star, NGC and IC labels are turned on.
All catalogs are displayed.
The magnitude limit for stars is set to 10; 15 for nonstellar objects.
The non-existent NGC's type is toggled off.
The Sky Orientation option is set to Celestial Pole Up.
The High Density grid spacing option is toggled on.
Extended labels for NGC, IC, PGC, GCVS and PLN catalogs are turned on.

Select the Print command to create a Sky Chart of this area.

Planetary Nebulae Find
You can search for Planetary Nebulae by their corresponding PK number. To find PK 118 +2.1, for example, type PK 118+2.1 into the Find text box and choose Find.

Variable Star Find
You can search for variable stars by entering the star designator followed by the constellation abbreviation. For example, to find GCVS RR Andromeda, type GCVS RR AND into the Find text box and choose Find.

Copy command (Edit menu)

Use the Copy command to copy the current Sky Display to the Clipboard. The star chart can then be pasted into any Windows application that accepts the Metafile file format.

The Clipboard options include the star chart orientation, either portrait or landscape and the Color options, either black and white or color.

Related Topics:

Export Chart command

Paste Image command (Edit menu)

Use this command to paste a bitmap on the Sky Display from the clipboard. The pasted image can be used in conjunction with the Image Link command (Level IV only) to align CCD images with objects displayed by TheSky.

Related topics:

Image Link

Display Menu

Object Types
Catalog Selection
Density
Sky Orientation
Mirror Image
Rotate
Brightness & Contrast
Cache Selection
Zoom to
Nonstellar Options
Redraw Screen

Object Types command (Display menu)

Use this command to toggle on/off each of the different object types on the Sky Display. TheSky represents different types of objects with different shaped symbols. Further, the symbol for a given object type changes according to the current field width.

Density command (Display menu)

Use this command to change the maximum number of objects that are plotted on the Sky Display at a given time. Three density levels are available: low, medium and high.

Low density maintains several thousand objects in memory at all times. Since relatively fewer objects are loaded and plotted, the Low Density option results in the fastest plotting of celestial objects.

Medium density maximizes the number of objects which can be loaded in memory, resulting in a minimum amount of hard disk access. Although more objects are loaded into memory at once, small adjustments to the center of the Sky Display do not require reloading objects so plotting remains faster than the high density option.

High density plots all objects that are stored disk, subject to some logical constraints. If the entire Guide Star Catalog is plotted on the computer screen at a field width of 50 degrees, for example, virtually every pixel on the display is filled! Therefore, the number of objects displayed is limited at various zoom levels. When zooming in from 235 degrees, there are two major "steps" where additional objects appear. These steps occur at a 50 degree field width then again at a 10 degree field width. When plotting field widths less than 10 degrees in high density mode, all objects from the GSC are displayed.

Sky Orientation command (Display menu)

Use the Sky Orientation command to alter the current orientation of the Sky Display. TheSky provides three unique options for defining the orientation of the celestial objects. When using star charts to find objects in the night sky, one of the most difficult tasks is orienting the chart with the actual sky. The orientation of constellations and other patterns in the night sky depends on your location on Earth and the viewing time.

User Defined
The User Defined orientation option gives you complete control over the orientation of the Sky Display. Selecting a default orientation of zero degrees causes the celestial sphere to be displayed with the North Celestial Pole toward the top of the screen in most cases. When zoomed in near the polar regions, the direction of the North Celestial Pole depends on the current right ascension.

You can change the orientation of the Sky Display by selecting the Rotate command from the Display menu or clicking the Rotate button on the Control Panel. Note that the User Defined orientation option is automatically selected when the Rotate command is selected. When the other two screen orientation modes are used (Celestial Pole Up and Zenith Up), they force a particular rotation angle, overriding the user defined rotation.

Celestial Pole Up
Selecting the Celestial Pole Up option causes the star fields to be rotated such that the North or South celestial pole is always toward the top of the screen. If your input latitude is greater than zero degrees, the North Celestial Pole is always up, otherwise, the South Celestial Pole is always up. Moving the Sky Display left or right causes motion in right ascension; moving the Sky Display up and down causes motion in declination.

Zenith Up
Selecting the Zenith Up option rotates the Sky Display so that the zenith (90 degrees altitude) is toward the top of the screen. This is the most intuitive way to look at large areas of the night sky. Note that each of the viewing direction commands (North, East, South, West and Zenith) automatically set this option when they are selected. This causes the horizon line to be displayed horizontally, similar to its appearance when viewing from Earth.

When time skips are performed with the Zenith Up option selected, the center of the screen remains fixed in altitude and azimuth. This causes all the non-solar system objects (stars, galaxies, open clusters, etc.) to move during the time skip animation.

Mirror Image command (Display menu)

Use this command to show the Sky Display as a mirror image. This is useful if you are looking through a inverting telescope and wish to compare what you are seeing in the eyepiece to what you see on the Sky Display.

Rotate command (Display menu)

The Rotate command allows you to rotate the Sky Display to any orientation. This facilitates matching the screen display or printed star charts to the actual night sky or acquired images.

To Display the Rotate Control

1. Choose the Rotate command from the Display menu or click the Rotate button on the Control Panel. The Rotate Control consists of a line plotted from the center of the Sky Display toward the North Celestial Pole (NCP). The end nearest the NCP displays the letter 'N' enclosed in a small circle.

Rotating the Sky Display with the Rotate Control

To rotate the Sky Display, place the cursor inside or near the encircled N on the rotate control. Now drag the control to the desired orientation using the left mouse button. When the rotate control is moved, a reference line remains on the Sky Display showing the original orientation of the North indicator. Once you have dragged the Rotate Control the desired amount, the Sky Display is redrawn with the new orientation.

If the CTRL key is depressed during the drag, the rotate control moves in 15 degree increments.

Brightness & Contrast command (Display menu)

Use the Brightness & Contrast command to adjust the stellar brightness and contrast. This causes the relative brightness of each of the stars to change on the Sky Display. When adjusting the brightness and contrast, you are effectively performing image processing on the star fields.

Brightness
Increasing the brightness moves each star up to the next higher bin, while decreasing the brightness moves each star into the next lower bin. Since a single gray dot is the faintest possible representation of a star on the computer screen, lowering the brightness to the lowest level causes nearly all stars to plot as single gray dots.

Contrast
Increasing the contrast causes a larger variation of stellar brightness by placing more of the faint stars into the dimmest bin. Decreasing the contrast causes less variation in stellar brightness by placing more of the fainter stars into higher bins.

Decreasing the contrast can be helpful when looking at a small field of view to effectively brighten up the dimmer stars and make the star field look more realistic.

Cache Selection command (Display menu)

Use this command to select portions of the Guide Star Catalog to be cached to the hard disk from the CD-ROM drive. You can select from one to all of the two and one-half degree Guide Star Catalog data blocks to cache. Selecting the Cache Selection command changes mouse pointer to the Cache Selection Wand. Using the Cache Selection Wand, click the left mouse button to highlight blocks of GSC data. To de-select any block, click the left mouse button over that block. To exit the cache selection mode, click the right mouse button or press ESC.

Once you have selected all the blocks of GSC data you wish to cache, choose the Sky Cache command from the File menu to display the Sky Cache dialog box. Choose the Copy Selected to Disk button to transfer the Guide Star data to hard disk.

Related Topics:

Sky Cache command

Catalog Selection command (Display menu)

The Catalog Selection command allows you to select which of the available catalogs is displayed and/or set a magnitude plotting limit for each.

If a particular catalog is selected, the objects in it are plotted on the Sky Display. There are constraints placed on the number of objects that are displayed at once, so fainter objects may not appear until the field width is small.

The magnitude plotting limit can be specified for each of the available catalogs in the Magnitude Limit text boxes.

Guide Star Catalog
The Guide Star Catalog was originally constructed to support the operational need of the Hubble Space Telescope (HST) for off-axis guide stars. The GSC contains nearly 19 million objects brighter than sixteenth magnitude, of which more than 15 million are classified as stars. For the GSC version of TheSky, a cross reference exists between the GSC data and the Smithsonian Astronomical Observatory (SAO) data. When a star is identified that belongs to both catalogs, both catalog numbers are shown in the Object Identification dialog box.

New General Catalog (NGC)
The popular New General Catalog contains information on 7,840 objects. Object types include galaxies, nebulae and clusters. Most of the NGC objects classified as galaxies are also included in the Principle Galaxy Catalog (PGC), causing an overlap of the catalogs.

Index Catalog (IC)
The Index Catalog is comprised of the same types of objects as the NGC catalog and contains 5,386 additional objects. Many of the IC objects also overlap with the galaxies provided in the PGC catalog.

Principle Galaxy Catalog (PGC)
This is one of the most comprehensive catalog of galaxies available. It contains over 73,000 galaxies with a great amount of detailed information on each galaxy. More importantly, the catalog contains numerous cross references to other catalogs of galaxies. Using the Find command, over 130,000 cross references can be used to find galaxies using popular catalog designations such as the Uppsala General Catalog of Galaxies (UGC), the Catalog of Galaxies and Clusters of Galaxies (CGCG), the Morphological Catalog of Galaxies (MCG) and many more.

Washington Catalog of Double Stars (WDS)
TheSky contains about 12,000 of the brighter doubles from the Washington catalog of visual double stars. The symbol used to represent a double star is a small yellow uppercase D. If the distance between the two stars in the pair is great enough to plot on screen, then the double star is represented by a yellow line from the WDS coordinates of star 1 to star 2.

It is important to note that the coordinates given in the WDS do not match the coordinates from the SAO or GSC catalogs of stars. Therefore, when you zoom to high magnifications, the designator for the double star may be in a different position than the star it is indicating as a double.

General Catalog of Variable Stars (GCVS)
Approximately 16,000 variable stars are included from the General Catalog of Variable Stars. The symbol used to represent variable stars is a small cyan colored V placed directly above the star that is variable. The V then points to the star.

Zoom to command (Display menu)

Use this command to move to one of seven different field widths of the Sky Display. The different field widths are displayed below.

1 Degree	Zoom to a field width of 1 degree.
10 Degrees	Zoom to a field width of 10 degrees.
50 Degrees	Zoom to a field width of 50 degrees.
150 Degrees	Zoom to a field width of 150 degrees.
180 Degrees	Zoom to a field width of 180 degrees.
235 Degrees	Zoom to a field width of 235 degrees.

By pressing ALT+Z, you can automatically zoom out to 235 degrees.

Nonstellar Options command (Display menu)

Use the Nonstellar Options command to select the appearance of various nonstellar objects on the Sky Display.

Nonstellar GSC Objects
The Guide Star Catalog contains well over three million objects that are classified as nonstellar. Although sophisticated equipment was used to determine the positions and types of objects found on the Schmidt plates, actual determination of the stellar or nonstellar nature of objects on these plates is nearly an impossible task. Many of the objects with a nonstellar classification are actually stars. Therefore, you have the option to plot the Nonstellar GSC objects as either stars or as galaxies.

If the Plot as Stars option is selected, the objects classified as nonstellar plot identically to those classified as stars. The Plot as Galaxies option causes nonstellar GSC objects to be plotted as galaxies (the red galaxy symbol) on the Sky Display.

This option has some interesting ramifications when printing star charts at small field widths. Many of the galaxies contained in the nonstellar catalogs are also contained in the GSC. When star charts are printed with both object types turned on there is an annoying "star" plotted near the center of most of the galaxies. Even if an object is classified correctly in the GSC as nonstellar, no information is provided in the GSC data as to the size and orientation of this object.

If the Plot as Galaxies option is selected, the nonstellar GSC objects are printed with the same gray fill pattern as the other galaxies. They are, therefore, not visible when inside a galaxy, yet are visible when they fall outside any galaxy. This provides a very unique solution to the overlapping problem. Alternate solutions such as removing all nonstellar GSC objects which are near the center of galaxies can sometimes result in the loss of important data.

Examples of the GSC nonstellar object classification are shown in the user's guide.

Overlapping Catalogs
Many of the IC and NGC objects are also contained in the PGC catalog of galaxies. If the Plot Only Equivalent option is selected, then only a single object is plotted for a particular object using the coordinates from the PGC catalog.

It is often interesting and informative to see the data from both the PGC and the NGC or IC catalogs plotted for comparison. If the Plot Both Objects option is selected, objects from both catalogs are plotted.

Nonstellar Fill Option
When an object is sufficiently large to cover an area of the Sky Display, it can be plotted with just an outline or with the area filled with the color of the object.

When the Outline Only option is selected, the border of the object is plotted, but the center area plots with the current background color.

The Filled option causes the inside area of the nonstellar shape to be filled with the corresponding color of the object.

Redraw Screen command (Display menu)

Use this command to redraw the entire Sky Display. Interrupting the plotting of the Sky Display by pressing ESC can cause only part of the display to be updated. Choosing the Redraw Screen command updates the display according the currently selected screen density and catalog options.

Options Menu

The Options menu contains the commands available for the Sky Display.

Control Panel
Status Box
Full Screen
Chart Mode
Night Vision Mode
Orthographic
Preferences

Control Panel Options command (Options menu)

Use this command to turn off or change the orientation of the Control Panel. The Control Panel command includes the following options.

Off
The Control Panel is closed and not visible on the Sky Display.
Horizontal
The Control Panel is displayed horizontally.
Vertical
The Control Panel is displayed vertically.

Status Box command (Options menu)

Use this command display a small status window at the bottom of the Sky Display. The Local Sidereal Time, current right ascension, declination, altitude, azimuthim of the center of the Sky Display and the current field width are all displayed in the Status Box and continuously updated as you move around the sky. The current location description is also displayed (space permitting).

Full Screen command (Options menu)

Use this command to remove the menu from the Sky Display window and display only objects over the entire screen. All menu commands are still accessible by using the accelerator keystroke commands (ALT+KEYBOARD KEYS).

You can toggle on/off the full screen mode by pressing the menu button on the Control Panel. To enter/exit the Full Screen mode using the keyboard, press the SPACEBAR.

Night Vision Mode command (Options menu)

Use this command to change the screen colors to red. The color red does not appreciably affect your ability to see fainter objects at night. Note: This command changes the system colors to red so that all applications have red screens.

Chart Mode command (Options menu)

Use this command to change the Sky Display so that it looks like a color star chart. Objects are plotted on a white background with different magnitudes differentiated by size. Stars are plotted as ellipsis, and NGC objects are plotted using the star chart symbols.

Orthographic command (Options menu)

Use this command to change the mapping projection from rectangular or polar to orthographic. This projection is best for matching CCD images to the Sky Display using the Image Link for Level IV databases.

Preferences command (Options menu)

Use this command to change the appearance of the Sky Display. All labels and lines on the Sky Display can be changed in the Preferences dialog box.

Labeling Options

To change the font or color of a particular object label, select the desired label type from the list box and press the Font button. The Font selection box lists all the available fonts and font colors. A sample of the current font and its color is displayed on the Preferences dialog box.

Line Options

To change the color of one of the line types, select the desired line type from the Line Type list box and choose the Color button. The Color dialog box lists the available colors for each line type. A sample of the current line color is displayed on the Preferences dialog box.

High Density Grid

Select the High Density Grid option to decrease the grid line spacing so that more grid lines appear on the Sky Display. For example, the grid line spacing at a field width of 20 degrees.is normally 7.5 degrees. The high density grid line spacing at 20 degrees field width is one degree.

Tools Menu

Move To
Look
Time Skip
Compute Solar System
Compute Minor Planets
Precess Grid
Solar System View
Conjunction Finder
Eclipse Finder
Jovian Moons
Moon Phases
Show Pictures
Slide Show

Move To command (Tools menu)

Use this command to position the center of the Sky Display on any right ascension (RA), declination (Dec) coordinate pair or an altitude (Alt), azimuth (Az) coordinate pair

Entry Mode
Select the coordinates you wish to use in the Move To dialog box, either right ascension, declination or altitude, azimuth.

Right Ascension
Input the hours, minutes and seconds of the right ascension you wish to move to, or use the scroll bar to change the RA hours to a value between 0 and 24 hours.

Declination
Input the degrees, minutes and seconds of the declination you wish to move to, or use the scroll bar to change the declination degrees to a value between 0 and 90 degrees North or South.

Azimuth
Input the degrees, minutes and seconds of the azimuth you wish to move to, or use the scroll bar to quickly change the azimuth degrees to a value between 0 and 360 degrees.

Altitude
Input the degrees, minutes and seconds of the altitude you wish to move to, or use the scroll bar to change the altitude degrees to a value between 0 and 90 degrees North or South.

Look command (Tools menu)

The Look command contains five commands that uniquely orient the Sky Display. Choose the North, East, South, or West commands to display a view of the sky looking in that compass direction. The local horizon is shown at the bottom of the Sky Display, with the zenith at the top. These commands are very useful to determine which objects are visible in a specific area of the sky. The Up (Zenith) command automatically adjusts the Sky Display to a field width of 180 degrees, looking directly overhead. This is the view printed in many astronomy publications when displaying the entire night sky.

To Look to a Specific Direction

1. Choose the North, East, South, West, or Up (Zenith) commands under the Tools, Look menu item or click the desired direction button on the Control Panel to orient the Sky Display in that direction.

The Look commands automatically override the current Sky Orientation settings.

Related Topics:

Sky Orientation

Time Skip command (Tools menu)

Use this command to skip specified intervals of time and observe the motion of the planets, stars and other objects over time.

Date
The default starting date is the date entered in the Date & Time command of the Input menu when the program is started. The start date of the time skip may be set to any value by choosing the Date button and inputting the desired starting date.
Time
The default time is the time entered in the Date & Time command of the Input menu when the program is started. The starting time of the time skip can be set to any value by choosing the Time button, and inputting the desired starting time.
Now
Choose the Now button to use the computer's date and time for the start of the time skip session.
Objects Displayed
Select which object(s) you wish to view during the time skip session.

While in the Time Skip mode, the Time Skip window is always present. The Time Skip window allows you to control the options during a time skip session. The available time skip options are explained below. To cancel the time skip session, choose the Close command on the Time Skip window's system menu.

Choose the OK button to begin the time skip session. The following commands are available during a time skip session:

Go
Starts the time skip beginning at the date and time displayed at the bottom of the window. The time skip increment is displayed in the list box, and can be changed at any time during the time skip session.

Step
Steps one time increment and replots the planets and/or stars.

Time Skip list box
Select the desired time skip increment using the time skip list box. Choose from one second, one minute, one hour, one day or one Sidereal day for the skip increment.

To skip increments other than these values, simply type the time skip increment into the list box edit control. The available skip increments can be abbreviated as follows:

1s	to skip one second
6m	to skip six minutes
4h	to skip four hours
10d	to skip ten days

For example, to skip two days, five hours and three minutes, type the following:

2d 5h 3m

Reverse
Select the Reverse option to move backwards in time.

Trails List Box
You can plot the solar system objects with no trails, full size object trails, or trails as dots during a time

skip session.

Compute Solar System command (Tools menu)

Use this command to recompute the positions of all the planets, comets and minor planets for the current time. The current positions of the solar system objects are automatically computed only during program startup.

Compute Minor Planets command (Tools menu)

Use this command to compute and display the positions of minor planets (asteroids) for the time entered in the Date and Time command. There are two types of minor planet data files. The local minor planet file can display up to 50 minor planets at once, while the extended minor planet file can plot up to 5000 minor planets on the Sky Display.

Local Minor Planet File (MINORPL.SKY)
This file contains the orbital elements for a limited number of minor planets (up to 50) which are loaded in memory and whose orbits can be modeled using the Time-Skip function. The "local" minor planets also appear in the Find dialog box under the Solar System list box. These are automatically computed and plotted as cyan triangles on the Sky Display each time TheSky is started.

Extended Minor Planet File(s) (*.MPL)
These files contain orbital elements for any number of minor planets. The performance of TheSky will be slowed when thousands of minor planets are plotted. You can have any number of .MPL files available to TheSky. You may wish to have only the 100 brightest in a file named 100.MPL so they can be computed quickly.

When the Compute Minor Planets command is selected, you must choose the desired MPL text file from the Open dialog box. Once selected, TheSky computes the position and magnitude of each minor planet in the extended file. These are plotted as yellow triangles (verses cyan like the local objects).

Computing the Extended Minor Planet
Choose Compute Minor Planets from the main menu to compute the positions of the minor planets contained in the selected extended minor planet file. The minor planet positions are computed for the current date and time and saved in a file named MINORPL.TMP.

The time taken to compute the positions depends on the number of objects in the .MPL file and the speed of your computer. It takes approximately one minute to compute 5,000 minor planets on a 486-66DX. Once computed, the positions plot relatively quickly and can be used for the remainder of the viewing session, or updated as needed.

The date and time are stored in the .TMP file so that a warning can be issued when the current date and time differ from that of the computed minor planet positions. This warning is displayed when the times differ by more than 3 hours. This warning lets you know when the minor planet positions may have significantly changed. If the Extended Minor Planets are not selected on the Object Types dialog box, they will not be displayed and this warning will not be issued.

Copying Minor Planets from the Extended Area to the Local Area
If you wish to copy one of the 4,500 or so extended minor planets to the local area so that you can examine its path by performing a time skip or changing the date and time, follow these steps:

1. Compute the positions of the extended minor planets by choosing Compute Minor Planets.
2. Turn on the extended minor planets on the Display Object Types dialog box.
3. Click on the desired minor planet to display the Object Identification Dialog Box.
4. Choose the To Local Text button on the Object Identification Dialog Box to copy the orbital elements to the local minor planet file (MINORPL.SKY). The orbital elements of the selected object will be appended to MINORPL.SKY.
5. Choose Compute Minor Planets to activate the new object which was appended to the local minor planet file.

Sample Minor Planet Object Identification:

Asteroid: 1700 ZVEZDARA Distance from Earth(au): 1.548577Distance from Sun (au): 2.292509Heliocentric: l:354.2777 b: 25.2598 r: 5.3723Magnitude: 16.5RA, Dec: 16h 51m 37.5s , 29d 10m 29s SAz, Alt: 74d 4m 49s , 64d 38m 14s SRise:15h 57m Transit:20h 10m Set: 0h 26m RA, Dec: 16h 51m 56.0s , 29d 11m 2s S (E2000)

Precess Grid command (Tools menu)

Use this command to toggle on/off precession of the equatorial coordinate grid. Precessing the equatorial coordinate grid increases the time required to plot the grid on machines without a math coprocessor.

Solar System View command (Tools menu)

Use this command to display a three-dimensional view of the solar system. The starting position is from a view point directly above the Sun. At any time you may click on an object to display its name.

View Point
There are two angles that define your view point for observing the solar system. These angles are Theta and Phi. The angle Theta is measured in the plane of the ecliptic from the first point of Aries. The angle Phi is measured from an axis perpendicular to the plane of the ecliptic through the sun. Please refer to the figure in TheSky User's Guide for a graphical representation of the angles Theta and Phi.

To change the view point
Use the scroll bars on the solar system display to change the current view point, or drag the solar system display to the desired view point with the right mouse button.

To exit the Solar System Display
To exit the Solar System Display, use the Close command in the window's system menu.

Start Date command (Options menu)
Use this command to set the starting date to view the solar system. The default value is the date and time entered in the Date & Time command of the Input menu.

Select Planets command (Options menu)
Select the planets you wish to view in the solar system display.

Skip
The number of days skipped before replotting the planets. This value may be a positive or negative. Pressing the SHIFT key while pressing the spin button increments or decrements the number of days skipped by 10. Pressing the CTRL key while pressing the spin button increments or decrements the number of days skipped by 0.04 days or about one hour.

Go
Sets the planets in motion about the Sun.

Stop
Stop the planets' motion.

Step
Watch the motion of the planets one time skip increment at a time.

Orbits
Display the complete path of the selected planets around the Sun.

Ecliptic Grid
Plot a grid that represents the plane of the Ecliptic.

Trails
If the trails option is selected, a trail is left at the previous position of the planet.

Conjunction Finder command (Tools menu)

Use this command to watch the relative angular separation between up to four selected objects (including the Earth) and determine when they are close to each other in the sky. The date, universal time and local time used for computations, as well as a graph showing the angular separation between the selected objects, is continually updated.

Start Date
The default value is the date and time entered in the Date & Time command of the Input menu. The start date may be set to any value by pressing the Start Date button.

Skip Increment
The number of days skipped before recomputing the angular separation between the selected objects. This value may be a positive or negative.

Go
Begin the search for conjunctions between the selected objects.

Step
Skip one time skip increment and recalculate the angular separation between the selected objects.

Stop
Stop the computation of angular separation between the selected objects

Retain Vectors
When a conjunction within the specified tolerance is found, lines from the Earth to each of the selected objects is drawn. These vectors may be kept on the screen for comparison with other conjunctions.

Trails
Leave a trail at the previous position of the object.

Select Planets
A dialog box displaying selections for each planet, the Moon and any fixed object allows you to select up to four different objects for conjunction searches.

Eclipse Finder command (Tools menu)

Use this command to determine the time of occurrence of successive solar and lunar eclipses. The Eclipse Finder begins searching at the start date and displays the next occurrence of an eclipse. The type of eclipse, either Solar or Lunar, is displayed at the top of the eclipse display window. Once an eclipse is found, it can be put into motion by choosing the Watch button.

Input Data
The starting date and elevation for eclipse computations may be changed in the Edit Input Data dialog box.

Next
Computes the next solar or lunar eclipses from the start date or from the date of the last computed eclipse.

Watch
Sets the moon into motion. When the eclipse reaches a maximum, the animation stops. To continue, press the Next, or Step button.

Stop
Stops the animation of the eclipse.

Step
Shows the occurrence of the eclipse in small increments.

Lunar Eclipses

Lunar eclipses occur whenever the moon passes through the Earth's shadow. The shadow of Earth consists of two components, called the penumbra and the umbra. The penumbra is a partial shadow from Earth cast into space where light from the Sun is only partially blocked. The umbra is the shadow cast by the Earth where light from the Sun is completely blocked.

Jovian Moons command (Tools menu)

Use this command to show the positions of Jupiter's four largest moons, Io, Europa, Ganymede and Callisto. At any time, you can click on the object to display its name. To exit the Jovian Moons screen, use the system menu located on the window's caption.

The two views of the Jupiter and its moons include an overhead and side view. You may rotate the overhead view at ten degree increments down to a ten degree viewing angle.

Start Date
The default value is the date and time entered in the Date & Time command of the Input menu. The start date may be set to any value by pressing the Start Date button.

Skip Increment
The number of days skipped before recomputing the moon's positions. This value may be a positive or negative.

Go
Sets Jupiter's moons into motion. The amount of movement depends on the skip increment value.

Step
Steps one skip increment at a time. This is useful when you wish to watch movement over short time increments.

Stop
Stops the movement of Jupiter's moons.

Rotation Angle
Select the angle at which to view Jupiter's moons. At 90 degrees, you are looking from directly above Jupiter.

Trails
Checking this box leaves a trail at the previous position of the moons.

Moon Phases command (Tools menu)

Use this command to display a calendar of the current month and the moon's phases for each day of the month. You can choose any month of any year to observe the phases of the moon.

Month
Select the month of the year to display the Moon's phases.

Year
Select the year to display the Moon's phases.

Print
Prints the Moon Phase Calendar on the selected output device.

Show Pictures command (Tools menu)

Use this command to display the pictures of objects. Type in the name of the desired picture file and choose OK. To exit the picture display, use the Close command in the system menu located on the window's caption.

You can display pictures full screen by selecting the Full Screen from the Options menu. To exit the full screen display mode, press the SPACE BAR.

Start Date

The Start Date dialog box allows you to quickly change the date computations begin.

Month
Select the month to begin computations.

Day
Enter the day to begin computations. The day must be between 0 and 31.

Year
Enter the year to begin computations.

Slide Show

Use this command to display the pictures of objects in a slide show format.

Dialog Box Options

Time between slides
Choose the length of time (in seconds) you wish to display a particular picture. This time is not dependent on the time required to load the picture from the hard drive.

View
Select the types of objects you wish to have displayed during the slide show.

Continuous Loop
Continually runs through the pictures on disk.

Random Order
Display the pictures in random order.

Display Name of Object
Display the name of each object at the bottom of the screen during the slide show.

Input Menu

Location
Date & Time
Comet Data
Asteroid Data
Load Local Horizon
Solar System Text
Auxiliary Objects
Pictures

Location command (Input menu)

Use this command to input your location on earth. You can also input the longitude, latitude and time zone of any point on earth and view the sky as it appears at that location. A list of about 300 predefined locations is available to choose from.

Dialog Box Options

Current Location
The current location data is used to compute the positions of the solar system objects, stars, and all other deep-sky objects.

Description
Input a description of your viewing location, such as the name of your city and state.
Longitude
Input the degrees, minutes and seconds, East or West of Greenwich, England, of your viewing location.
Latitude
Input the degrees, minutes and seconds, North or South of the equator, of your viewing location.
Time Zone
Input the number of time zones your viewing location is from Greenwich Mean Time.
Add to File
Saves the above location information and adds this data to the list of locations. Data for up to 100 additional locations can be added to the list of locations.

Locations on File
TheSky has a list of approximately 300 different locations to choose from. If your city is included in this list, simply select it from the list box, then choose the Set to Current button to automatically fill the description, longitude, latitude and time zone inputs in the Current Location section.

Set to Current
Sets the Current Location data to the longitude, latitude and time zone of the selected location.
Delete
Deletes the selected location from the list of saved locations.
Location File
Allows you to load an alternate list of saved locations. The Open dialog box lists the location files currently present on your hard disk.

Date & Time command (Input menu)

Use this command to enter the date and time you wish to view the sky.

Use the System Date & Time
Click on the check box to use the date and time values that are set in the Date & Time application in the Date/Time application in the Control Panel.

Date
Sets the date that TheSky uses to compute the positions of the planets, stars, and all other celestial objects.
Month
Select the desired month of the year to view the sky.
Day
Input the desired day of the month to view the sky.
Year
Input the desired year to view the sky.

Time
Sets the time to the hours and minutes entered in the Time edit boxes. The time is entered as military time, for example 1:00 PM is entered at 13 hours 0 minutes.
Hours
Input the hour of the day to view the sky.
Minutes
Input the minutes after the hour to view the sky.

Daylight Savings
Check this check box if your are currently in Daylight Savings Time.

Comet Data command (Input menu)

Use this command to input the orbital elements for a comet. TheSky uses these elements to compute the position of the comet and displays the comet on the Sky Display.

The text file used to store the comet data must be named COMETS.SKY and must **exactly** follow the file format outlined in TheSky User's manual.

Data for up to 25 different comets can be included in the COMETS.SKY file. Once the required data for a particular comet is entered, the comet is displayed on the Sky Display screen every time you start the program.

To input comet data

1. Choose Comet Data command from the Input menu. The Notepad application displays the file called COMETS.SKY.
2. Enter data for each comet following the format of example comet data within the COMETS.SKY file.
3. Once data for each comet is entered, choose File Save to save the COMETS.SKY file.

Note: Any line beginning with a semi-colon (;) in the COMETS.SKY file is ignored. Therefore to remove a comet from the Sky Display, place a semi-colon at the beginning of the line containing information about that comet. In the above text file, the comet HondaMrkos will not be displayed on the Sky Display.

Asteroid Data command (Input menu)

Use this command to input the orbital elements of an asteroid. Once the data for an asteroid is input, TheSky computes the position of the asteroid and displays it on the Sky Display.

The text file containing the asteroid data must be named ASTEROID.SKY.

Data for up to 50 different minor planets can be included in the ASTEROID.SKY file. Once the required data for a particular asteroid is entered, the asteroid is displayed on the Sky Display each time you start the program.

To input asteroid data

1. Choose Input Asteroid Data. The Notepad program is displayed with the file ASTEROID.SKY.
2. Enter data for each asteroid following the format of the example asteroid data within the ASTEROID.SKY file.
3. Once data for each asteroid is entered, choose File Save to save the ASTEROID.SKY file.

Note: Any line beginning with a semi-colon (;) is ignored. Therefore to remove an asteroid from the Sky Display, place a semi-colon at the beginning of the line containing information about that asteroid.

Load Local Horizon

Use this command to display a customized local horizon. You can create a local horizon line for a reference to which objects are above the horizon. This line is displayed on the Sky Display when the menu item Lines Local Horizon is checked.

To Create a Local Horizon
Using a text editor or word processor, you will need to create a text file which contains pairs of altitude and azimuth coordinates. Determining the altitude/azimuth coordinates for various points on the horizon may be a difficult task if you do not have access to a transit or such device. If you have a telescope connected to TheSky the task becomes easy and is described below. Use the extension .HRZ on the text file you create.

Once you have the coordinate pairs entered, choose Load Local Horizon from the Input menu in TheSky. When this command is issued, a local horizon file named HORIZON.CUR is created which is used by TheSky to display the complete horizon.

Below is an sample .HRZ file showing a number of altitude, azimuth coordinates:

```
37.34     19.08
52.40      3.41
58.95     23.67
76.37      5.02
89.37     22.33                  The file is "free format," i.e. you can
enter two
278.43     27.76                 numbers separated by spaces or tabs.
243.24     16.06
261.66     14.11
232.02      6.17
216.23      2.50
299.98      9.71
320.48     30.21
319.05      9.04
307.64     34.76
297.32     23.99
```

Note that you do not have to enter an altitude for each degree of azimuth or choose any consistent azimuth spacing. When TheSky creates the plot file HORIZON.CUR, it fills in the large gaps with a gradual change from point to point.

Creating a Local Horizon Using a Telescope Linked to TheSky
If you have a telescope connected to TheSky (such as the Meade LX-200 or any of the SGT-MAX systems) you can create a local horizon by simply pointing the telescope to the "high" points on your horizon.

- Establish a link with your telescope.
- Make sure the time, date and location information are correct.
- Move the telescope to a good starting point on the horizon, then press the F3 key. You should hear a beep each time you press the F3 key. Continue to move the telescope around the sky in increasing azimuth (i.e. N-E-S-W). You can start at any point but you must continue around in increasing azimuth.

Each time a point is added you will see the local horion adjusted to reflect the new point. Each of the altitude-azimuth pairs of coordinates are saved to a text file named "SCOPE.HRZ". Once you have completed the horizon, you can copy this file to a different name if you wish to create additional horizons for other locations.

Solar System Text command (Input menu)

Use this command to display ephemerides on the sun, moon and all the planets. Data for each object includes:

Right Ascension.
Declination.
Altitude.
Azimuth.
Apparent angular diameter (where applicable).
Phase (where applicable).
Apparent magnitude (where applicable).
Rise, Transit and Set times.

The text file PLANETS.SKY can be printed to your printer from the Notepad application using the Print command from the File menu.

Auxiliary Objects command (Input menu)

Use this command to either edit the auxiliary objects text file (AUXIL.TXT) or reload the auxiliary objects into TheSky once the AUXIL.TXT is altered.

Edit File
Reload

Edit File command (Auxiliary Objects menu)

The Auxiliary Objects Edit File command allows you to enter the coordinates of additional celestial objects that are plotted on the Sky Display. Data for up to 350 auxiliary objects can be input by choosing the Input Auxiliary Objects option. These objects are plotted on the Sky Display with other objects from the database.

The text file must be named AUXIL.TXT and the auxiliary data must have the following format.

```
;    Auxiliary Object Input - TheSky - EPOCH 2000.0 COORDINATES.
;GAL   = Galaxy                   OC    = Open Cluster
;GC    = Globular Cluster         PNEB  = Planetary Nebula
;CNEB  = Cluster+Nebulosity              NEB   = Nebula
;VAR   = Variable Star            DBL   = Double Star
;STAR  = Star                     CROSS = Pole or other Marker
;GRB   = Gamma Ray Burster
;
;         1111111111222222222233333333334444444444555555555566666666667777777777
;123456789 123456789 123456789 123456789 123456789 123456789 123456789 123456789
;                                  Major  Minor
;Object      Right Asc. Declinatn  Axis   Axis   Pos.
;Type   Mag. HH MM SS.S + DD MM SS (mins) (mins) Angle Description
;------|----|--|--|----|-|--|--|--|------|------|-----|----------------------
PNEB    10.0| 5  0  0.0|-  1  1  1|   100|    50|   45|This is a sample Galaxy.
STAR     1.2| 1  1  0.0|+  5  0  0|      |      |     |This is a sample Star.
MOVETO      | 1  0  0.0|+  1  0  0|      |      |     |
LINETO      | 1  0  0.0|+  2  0  0|      |      |     |
GAL         | 5  0  0  |+  1  0  0|    20|    40|    2|
GC          | 5  0  0  |+  2  0  0|    10|    20|    1|
CNEB        | 5  0  0  |+  3  0  0|    10|    30|    1|
VAR         | 5  0  0  |+  4  0  0|    10|    40|    1|
OC          | 5  0  0  |+  6  0  0|    10|    50|    1|
PNEB        | 5  0  0  |+  7  0  0|    10|    60|    1|
NEB         | 5  0  0  |+  8  0  0|    10|    70|     |
CROSS       | 0  0  0  |+ 90  0  0|      |      |     |
```

Note: Lines beginning with a semi-colon are ignored and can be used to add comments or notes. The above sample file plots a series of imaginary objects of differing sizes along the 5 hour right ascension line.

Gamma Ray Bursters (GRB), are a special object type and are always plotted using the same symbol on the screen, regardless of the magnification level.

The Celestial Pole object type marks the celestial poles on the Sky Display.

The description entered for an object appears in the Object Identification dialog box.

The default number of auxiliary objects that can be added to the database is 150. To increase this number, you must edit the SKYW.INI file to indicate the number of auxiliary objects desired. For example, to increase the number of objects from 150 to 300, add the following line to the SKYW.INI file:

auxiliary=300

Be sure to save the SKYW.INI file and restart TheSky.

Reload command (Auxiliary Objects menu)

Use this command to display auxiliary objects have been added to the AUXIL.TXT file. This command loads all the object data from the AUXIL.TXT file.

Pictures command (Input menu)

Use this command to associate your own pictures of NGC objects to a picture icon when the Objects with Pictures command is selected. To associate an image with a picture icon, you must edit an ASCII text file named PICTURES.TXT. This text file contains the necessary information to display a picture icon designating that an object has an associated picture on disk.

PICTURES.TXT is an ASCII text file that contains the following information: the right ascension, declination of the object to have a picture icon; the file name of the picture that is displayed when the picture icon is clicked; and a textual description of the object (up to 100 characters long). The textual description is displayed when the More Information command is selected from the Show Picture menu.

The following is an example PICTURES.TXT file.

```
12.53452h 00m 00s 30.23231d 00m 00s N NGC0224.GIF Text description
05.00000h 35m 05s 05.00000d 27m 14s S NGC1976.GIF My Orion Nebula
.
.
(up to 250 entries)
.
.
11,00000h 47m 33s 89.00000d 07m 24s N NGC3172.GIF Round Galaxy
```

Right ascension and declination can be entered in decimal form (for example, 12.53452h) or in hours/degrees, minutes and seconds (for example, 05.00000h 27m 14s). However, you must maintain the above spacing format. The DOS file name must be eight characters, including NGCxxxx, (where xxxx is the four digit NGC number) following by the .GIF extension. The textual description for the object can be up to 100 characters.

Up to 250 picture icons can be added for a given PICTURES.TXT file. You can optionally specify a location for the PICTURES.TXT file so that any directory can contain a PICTURES.TXT file. In this way, you could have an associated picture icon for all 7,840 NGC objects using multiple PICTURES.TXT files located in different directories. If you own any Astronomical Research Network CD-ROM's, look for the presence of a PICTURES.TXT file so that you can associate picture icons with the pictures on that CD-ROM.

Label Menu

Toggle on/off the following object types:

Stars	Labels SAO stars on the Sky Display.
NGC Objects	Labels the NGC objects on the Sky Display.
Constellations	Labels all 88 constellations on the Sky Display.
Messier Objects	Labels the Messier objects on the Sky Display.
Solar System Objects	Labels the solar system objects on the Sky Display, including any input comets and asteroid.
Objects with Pictures	Labels all objects in the database with pictures.
Bayer (Greek) designation	Labels stars in each constellation with a Greek letter (alpha, beta, gamma, etc.) indicating relative magnitude in that constellation.
Flamsteed Numbers	Labels stars using the Flamsteed number designation.
Extended Labeling	Displays the Extended Labeling dialog box. Allows you to label every object in the database with its catalog number, magnitude and other object specific information.
None	Turns off all labels.

Extended Labeling command (Label menu)

The Extended Labeling command allows you to label every object in the database with its catalog number, magnitude, size, spectral class or description.

Nonstellar Labeling Option
Choose between labeling none of the nonstellar objects, only the brightest nonstellar objects or all the nonstellar objects on the Sky Display. The extended label may consist of an objects identification number, its apparent magnitude, its size and/or its Dryer description.

Nonstellar Object Types
Select the types of nonstellar objects to have extended labeling.

Stellar Labeling Option
Choose between labeling none of the stellar objects, only the brightest stellar objects or all the stellar objects on the Sky Display. The extended labeling for stellar objects may consist of an objects' identification number, its apparent magnitude, and its spectral class.

Lines Menu

Constellation Boundaries	Toggle on/off the constellation boundary lines.
Constellation Lines	Toggle on/off the constellation lines.
Equatorial Grid	Toggle on/of the right ascension- and declination-based coordinate grid lines.
Horizon Grid	Toggle on/off the horizon-based coordinate grid lines.
Horizon Line	Toggle on/off the horizon line. This is an "absolute" horizon with no obstructions (no buildings, trees, or mountains) for a particular location.
Local Horizon Line	Toggle on/off the local horizon line. This is an "actual" horizon defined by the user to show local obstructions (mountains, buildings, trees, etc.).
Ecliptic	Toggle on/off the ecliptic.
Eyepiece	Display a circle on the Sky Display that represents the view through a particular telescope and eyepiece or rectangle representing the size of a CCD chip.
None	Toggle off all lines.

Eyepiece command (Lines menu)

The Eyepiece command is used to show the effective field of view of an eyepiece or a CCD chip on the Sky Display. A third option allows plotting the popular Telrad finder circles on the Sky Display. Up to 50 different eyepieces and/or CCD chip sizes can be stored for later recall from the Eyepiece Indicator dialog box in the text file EYEPIECE.SKY.

Hidden
When this option is selected, the field of view indicator is not displayed.

Circular
The circular field of view option causes an ellipse to be plotted on the Sky Display with the dimensions entered in the width and height text boxes. Normally, the width and height are entered as the same value, creating a circle on the Sky Display that approximates the circular field of view of a telescope with a particular eyepiece. The ability to show ellipses of varying sizes on the screen is useful for approximating the size of galaxies.

Rectangular
The rectangular field of view option plots a rectangle on the Sky Display with the dimensions entered in the width and height input prompts. This is very useful when comparing CCD images to the Sky Display. First, it can help you establish the effective size of the CCD chip while using your telescope. Once the chip dimensions are established (in arc minutes) the difficult task of matching star patterns to CCD images becomes much easier.

Telrad
The Telrad finder size indicator plots a series of circles on the Sky Display which closely approximate the circles seen in an actual Telrad finder. The outer circle is 4 degrees, the middle circle is 2 degrees and the inner circle is about 1/2 of a degree.

Width and Height in arc minutes
Enter the dimensions of the field of view indicator here. The values must be in arc minutes. Decimal values can be entered at these prompts to achieve sizes to the nearest second of arc.

Editing the Eyepiece/CCD List
Eyepiece and CCD sizes and descriptions are saved to the text file EYEPIECE.SKY. This text file can be altered using the NOTEPAD text editor. The format of the file is as follows.

```
;  EYE PIECE TYPES:
;     Rectangle - Places a rectangular shaped
;                 eye piece at the center of the
;                 screen.
;     Circle    - Places a circular eye piece
;                 at the center of the screen.
;
;         1111111111222222222233333333334444444444
;123456789 123456789 123456789 123456789 123456789
;
;                                     Eye Piece
;Eye Piece Description    Width Height    Type
;------------------------|-----|------|---------
ST-6 on Mt.Wilson 24"    |   15|    11|Rectangle
ST-6 on 8" LX200         |   20|    15|Rectangle
SP 7.5 mm, 2032 mm F.L.  |10.12| 10.12|Circle
MA 9 mm, 2032 mm F.L.    | 2.36|  2.36|Circle
```

All lines preceded by a semi-colon are ignored. All information must fall exactly within the column headers as in the above examples. The width and height are entered in arc minutes. If more than 50 items are entered, those past 50 are ignored.

Telescope Menu

Data
Link
Comm Test
Digital Setting Circles

Data command (Telescope menu)

Use this command to set the options for the computer-telescope link. The Data dialog box contains the required telescope, optical encoder and communications input when linking your telescope to TheSky.

Communications Port
Select the port through which the telescope link system communicates.

Baud Rate
Select the baud rate of the serial communications.

Communications Box
TheSky supports several types of serial communication devices. Select the appropriate type.

Azimuth Direction
Select the azimuth direction depending on the direction of increasing RA for the encoders. Clockwise in RA means that the encoder increases in count as the telescope is rotated clockwise while looking down the RA axis.

Altitude Direction
Select depending on the direction of increasing declination for the encoders. Clockwise in declination means that the encoder increases in count as the telescope is moved from 90 degrees to the 0 degrees in the primary quadrant. The primary quadrant is the quadrant in which both of the alignment stars will be pointed.

Telescope
Select the appropriate model telescope.

Configure Box
Configures the serial communication device with the values input for encoder tics per revolution.

Tics/Rev (RA, Azim)
Input the number of counts per revolution for the optical encoder mounted on the Right Ascension (or Azimuth) axis of your telescope.

Tics/Revolution (Dec, Alt)
Input the number of counts per revolution for the optical encoder mounted on the Declination (or Altitude) axis of your telescope.

Link command (Telescope menu)

Use this command to establish/terminate communications with the currently installed serial communications device.

Comm Test command (Telescope menu)

Use this command to test the link between TheSky and the currently installed serial communications device. If a link is established, the right ascension and declination encoder readings are displayed.

Digital Setting Circles (Telescope menu)

Use this command to display numerically the current right ascension and declination of your telescope. This command is only enabled when the telescope link is established.

Help Menu

Help Index
How to use Help
Edit Ini
About

Help Index command (Help menu)

Use this command to display help for TheSky. For more information on using Window's help, see the How to use Help command in the Help menu.

How to use Help command (Help menu)

Use this command to displays the How to use Help screen. Detailed information on how to use Windows help screens is available with this command.

Tutorial command (Help menu)

Use this command to display the on-line book **Patterns in TheSky**. **Patterns in TheSky** contains many fundamental concepts on astronomy and includes sample demonstrations using TheSky to illustrate these concepts.

Edit Ini command (Help menu)

Use this command to display the SKYW.INI initialization file for TheSky.

TheSky stores start-up settings and preferences for database files, auxiliary objects, and many other options a text file named SKYW.INI file. When you start TheSky, it interrogates the SKYW.INI file to determine the location of the database files, printer options and other miscellaneous options. Altering SKYW.INI is only required for users who want to change the default start-up settings used by TheSky.

SKYW.INI Options
The SKYW.INI file is divided into sections. Each section starts with a heading enclosed in square brackets. The sections and options for each section are listed below. The sections can appear in any order and the options within each section can appear in any order within SKYW.INI.

Section Name	**Contents**
[DATABASE]	The path of the database files and the maximum number of auxiliary objects that can be loaded.
[EDITOR]	The name of the text editor used by TheSky.
[STARTING POSITION]	The starting azimuth and altitude of the Sky Display.
[MISCELLANEOUS]	Various options for setting default start-up options.
[PRINTER]	The scaling factor applied to the output star chart.
[CHART]	Sets the default symbols used to label object on star charts
[PICTURES]	Sets the default directory for the PICTURES.TXT file.

[DATABASE]
This section lists the path and level for TheSky database files. In general, you do not need to edit this option; it is only changed if you update your database files.

The options can appear in any order.

Option	**Explanation**
largeplotpath=*[drive]:LARGEPLT***	Specifies the full path name of the directory where TheSky GSC database files are located. [drive] represents the
largeinfopath=*[drive]:LARGEINF***	
smallplotpath=*[drive]:*	

SMALLPLT	letter of the disk drive
smallinfopath=*[drive]:*	where the files are located
SMALLINF	(CD-ROM or hard disk).
nstpath=*[drive]:\NST*	Note: the backslash at the
singlepath=*[drive]:SINGLE***	end of the path name
indexpath=*[drive]:\INDEX*	must be present.
textpath=*[drive]:TEXT***	
cachepath=*[drive]:T2***	

auxiliary=*number*	Sets the maximum number of auxiliary objects that can be loaded at any time. This number must be between 10 and 350.

[EDITOR]
This section lists the name of the text editor that is used to input and display comet data, asteroid data, and observer logs. This editor must be a Windows application.

Option	**Explanation**
name=*editor name*	Specifies the name of the text editor used during textual input. The full name of the editor including the .EXE extension must be used.

[STARTING POSITION]
This section lists the default starting position of the Sky Display in azimuth and altitude coordinates.

Option	**Explanation**
alt=*number*	Sets the starting altitude for the Sky Display. This number must be between -90 and 90.
az=*number*	Sets the starting azimuth for the Sky Display. This number must be between 0 and 360.

[PRINTER]
This section sets a scaling factor for the size of printed star charts. The scaling factor is expressed as a percentage of the normal star chart size. Use the scaling factor to shrink a star chart down to one-half its normal size.

Option	**Explanation**
scalefactor=*number*	Sets the scaling factor for the printed star chart as a percentage of the full page star chart. This number must be between 50 and 100.

[MISCELLANEOUS]
Use this section to set miscellaneous start-up options. Each option is described below.

Option	Explanation
NightVisionUponLink= ***TRUE or FALSE***	Turns on or off the Night Vision command when a telescope link is established.
QuickMoveToAltAz=*TRUE or FALSE*	Sets the coordinate system to be displayed in the Quick Move To window. Set TRUE to display altitude and azimuth. FALSE displays right ascension and declination coordinates.
EnterNegativeTimeZones = *TRUE or FALSE*	For cities near the Greenwich meridian (within one time zone), this options overrides TheSky's automatic computation of time zone and allows the user to enter a negative time zone. TheSky by default uses a city's longitude to determine if the time zone is negative (east of Greenwich) or positive (west of Greenwich).
Monochrome= 0 or 1	Monochrome=1 plots nonstellar objects as white for monochrome displays

[CHART]
Use this section to specify the alphabetic symbols used to identify objects on star charts.

Option	Explanation
saoprefix=*letter*	Specifies the character that is placed before the SAO catalog number that is on printed star charts.
ngcprefix=*letter*	Specifies the character that is placed before the NGC catalog number that is on printed star charts.
icprefix=*letter*	Specifies the character that is placed before the IC catalog number that is on printed star charts.
pointer=*symbol*	Specifies the symbol used as a pointer to objects for extended labels on printed star charts. For example, use a > or .

[PICTURES]
Use this section to specify the default directory for the PICTURES.TXT file.

Option	Explanation
path=*full path name where PICTURES.TXT resides*	Specifies the complete path name of the default directory where the pictures file PICTURES.TXT resides.

[SLIDESHOW]
Use this section to specify the default directory for the PICTURES.SKY file. This file is used for the slide show command and its path should not be altered.

Option	Explanation
path=*full path name where PICTURES.SKY resides*	Specifies the complete path name of the default directory where the pictures file PICTURES.SKY resides.

Sample SKYW.INI file:

```
[DATABASE]
largeplotpath=D:\LARGEPLT\
largeinfopath=F:\LARGEINF\
smallplotpath=F:\SMALLPLT\
smallinfopath=F:\SMALLINF\
nstpath=D:\NST\
singlepath=D:\SINGLE\
indexpath=D:\INDEX\
textpath=D:\TEXT\
cachepath=C:\T2\
auxiliary=100

[EDITOR]
name=notepad.exe

[PICTURES]
path=D:\GIFIMAGES

[CHART]
saoprefix=s
ngcprefix=n
icprefix=i
pointer=

[PRINTER]
scalefactor=100

[MISCELLANEOUS]
NghtVIsionUponLink=FALSE
QuickMoveToAltAz=TRUE
Monochrome=1
```

About command (Help menu)

Displays the About dialog box containing system, version and copyright information.

Sky Display Commands

You may use the keyboard or the Control Panel to move/zoom, the Sky Display or toggle the Sky Display Options. The Sky Display Commands are:

Mouse Command:	**Result:**
Clicking the left mouse button on any object.	Displays the Identification dialog box containing information on the identified object.
Holding down the left button.	Creates a rubber banding square for quick zooming. To accept the desired zoom, release and click the left mouse button. To reject the desired zoom, press the right mouse button or the ESCAPE key.
Double clicking the right mouse button.	Displays the quick move window.
Holding down the right button.	Drags the Sky Display.

Object Identification command

Use this command to identify any object on the Sky Display. Click the left mouse button over the object you wish to identify. The Object Identification dialog box displays information about the object, such as its rise and set time and its Right ascension and declination.

If two objects are close to each other when identified, the Object Identification box displays Previous and Next buttons, allowing you to look at each object's information.

If the object identified has a picture available on disk, pressing the Show Picture button displays the picture of the object.

Zoom in button

Pressing the zoom in button with the left mouse button or pressing the PGDN key causes the Sky Display field width to decrease by 10 degree increments. Holding down the right mouse button key or the PGDN key continuously decreases the Sky Display field width down to a minimum field width of one-half of one degree. By holding down the Shift key while pressing the zoom in button, the Sky Display field width decreases by approximately 1/2 degree increments.

Zoom out button

Pressing the zoom out button with the left mouse button or pressing the PGUP key causes the Sky Display field width to increase by 10 degree increments. Holding down the right mouse button or the PGDN key continuously increases the Sky Display field width out to a maximum of 180 degrees. By holding down the Shift key while pressing the zoom out button, the Sky Display field width increases by approximately 1/2 degree increments.

Up button

Pressing the up arrow button with the left mouse button or pressing the up arrow key causes the Sky Display declination (or altitude) to increase by 10 degree increments. Holding down the right mouse button or the up arrow key continuously increases the Sky Display declination (or altitude).

Down button

Pressing the down arrow button with the left mouse button or pressing the down arrow key causes the Sky Display declination (or altitude) to decrease by 10 degree increments. Holding down the right mouse button or the down arrow key continuously decreases the Sky Display declination (or altitude).

Left button

Pressing the left arrow button with the left mouse button or pressing the left arrow key cause the Sky Display to scroll right by 10 degree increments Holding down the right mouse button or the down arrow key continuously scrolls the Sky Display to the right.

Right button

Pressing the right arrow button with the left mouse button or pressing the right arrow key causes the Sky Display to scroll left by 10 degree increments. Holding down the right mouse button or the down arrow key continuously scrolls the Sky Display to the left.

Constellation button

Pressing the constellation lines button toggles on/off the constellation lines on the Sky Display. The constellation lines may also be turned on and off using the Constellation Boundaries command in the Lines menu.

Constellation boundary button

Pressing the constellation boundary button toggles on/off the constellation boundaries on the Sky Display. The boundary lines may also be turned on and off using the Constellation Boundaries command in the Lines menu.

Coordinate grid button

Pressing the coordinate grid line button toggles on/off the coordinate grid on the Sky Display. The coordinate grid may also be turned on and off using the Constellation Boundaries command in the Lines menu.

Find button

Pressing the find button displays the Find dialog box. You may type in the name of an object, its right ascension and declination (separated by a comma or space),SAO, NGC, Messier or IC number to perform a search. If the object is found in the database, the Object Identification box is displayed.

Related Topics:

Find command

Menu button

Pressing the menu button toggles on/off the full screen display. The full screen display may also be turned on and off using the Full Screen command in the Options menu.

Quick move button

Pressing the quick move button displays the quick move window. The current location of the center of the Sky Display is indicated with small cross hairs on the window. To move to a different location, simply click anywhere in the display area. Holding down the left mouse button displays a cross hair cursor for reference purposes.

Telescope button

The Telescope button is only used for the SGT-MAX or other telescope link. When the telescope is aligned, depressing the telescope button hides the telescope cross hairs and allows you to move about the sky as if there were no telescope link. Clicking this button on centers the Sky Display on the telescope cross hairs.

Printer button

The printer button prints a star chart on the default printer. If you wish to use a printer other than the default printer, choose the Print command in the File menu.

Solar system objects button

Pressing the solar system button toggles on/off the solar system objects on the Sky Display. Solar system objects include all the planets, the sun, moon, comets and minor planets. Solar system objects may also be turned on/off by selecting Solar System Objects option in the Object Types dialog box.

Stars button

Pressing the stars button toggles on/off the stars on the Sky Display. Stars may also be turned on/off by selecting the Stars option in the Object Types dialog box.

Nonstellar button

Pressing the nonstellar button toggles on/off all the objects that are not stars on Sky Display.

Brightness and Contrast button

Choose the Brightness/Contrast button to display the Stellar Brightness and Contrast dialog box. Adjusting the stellar brightness and contrast causes the relative brightness of each of the stars to change on the Sky Display. When adjusting the brightness and contrast, you are effectively performing image processing on the star fields.

Brightness
Increasing the brightness moves each star up to the next higher bin, while decreasing the brightness moves each star into the next lower bin. Since a single gray dot is the faintest possible representation of a star on the computer screen, decreasing brightness to the lowest level causes nearly all stars to plot as single gray dots.

Contrast
Increasing the contrast causes a larger variation of stellar brightness by placing more of the faint stars into the dimmest bin. Decreasing the contrast causes less variation in stellar brightness by placing more of the fainter stars into higher bins.

High Density button

Choose the High Density button to display the Object Density dialog box. This gives you control over the number of objects that are plotted on the Sky Display at a given time. Three density levels are available: low, medium and high.

Related Topics:

Density command

North button

Choose the North button to orient the Sky Display looking North. The local horizon centered on the compass direction North is displayed at the bottom of the Sky Display with the zenith at the top. The Sky Orientation is automatically adjusted so that the zenith is always up.

Related topics:

Sky Orientation command

South button

Choose the South button to orient the Sky Display looking South. The local horizon centered on the compass direction South is displayed at the bottom of the Sky Display with the zenith at the top. The Sky Orientation is automatically adjusted so that the zenith is always up.

Related topics:

Sky Orientation command

East button

Choose the East button to orient the Sky Display looking East. The local horizon centered on the compass direction East is displayed at the bottom of the Sky Display with the zenith at the top. The Sky Orientation is automatically adjusted so that the zenith is always up.

Related topics:

Sky Orientation command

West button

Choose the West button to orient the Sky Display looking West. The local horizon centered on the compass direction West is displayed at the bottom of the Sky Display with the zenith at the top. The Sky Orientation is automatically adjusted so that the zenith is always up.

Related topics:

Sky Orientation command

Up (Zenith) button

Choose the Up (zenith) button to orient the Sky Display looking directly overhead for the current location, date and time. The Sky Display is centered at the current zenith with a field width of 180 degrees. The Sky Orientation is automatically adjusted so that the zenith is always up.

Related topics:

Sky Orientation command

Rotate button

Choose the Rotate button to display the Rotate Control on the Sky Display. The Rotate Control allows you to rotate the Sky Display to any orientation. This facilitates matching the display or printed star charts to the actual night sky or acquired images.

Rotating the Sky Display with the Rotate Control
To rotate the Sky Display, place the mouse cursor inside or near the encircled N on the Rotate Control. With the left mouse button drag the control to the desired orientation. When the Rotate Control is moved, a reference line remains on the Sky Display showing the original orientation of the North indicator. Once you have dragged the Rotate Control the desired amount, the Sky Display is redrawn with the new orientation.

If the CTRL key is depressed during the drag, the rotate control moves in 15 degree increments.

Related topics:

Sky Orientation command

Paste Image (Edit menu, Level IV Database only)

Use this command to paste a device-independent bitmap from the clipboard into the Sky Display. Normally, the bitmap is an actual CCD image.

This CCD image can be aligned with the stellar data on the Sky Display to identify objects within the image using the Image Link command.

Related topics:

Image Link

Image Link command (Tools menu, Level IV Database only)

What is Image Link?

Image Link is a set of tools that make it easy to identify database objects in your CCD images or scanned photographs. Image link places a digital image on the Sky Display, then provides a set of tools to quickly orient the data from the guide star catalogs database so that objects from the image directly overlay the graphically plotted data.

Once this alignment is achieved, images become interactive star charts rather than static pixel data. You can label objects, add grid lines, identify objects (such as galaxies, asteroids and nebulae), determine the coordinates of any object, on the image itself!

Performing an Image Link

There are two basic methods for establishing a link between a digital image and the Sky Display. The *Link Wizard* uses sophisticated pattern recognition to automatically align the image with cataloged celestial data. *Object Dragging* provides a set of tools for manually adjusting the Sky Display to match the image.

The following steps are common to both automatic and manual alignment:

Step One: Move to the approximate area of the sky where the image was taken.
Using the Find or Move command, adjust the Sky Display so that the area of the sky contained in the celestial image is also on the Sky Display. This is especially important when using the automatic alignment function since the pattern recognition uses the objects present on the display when searching for a match.

Step Two: Copy the image to the clipboard using SkyPro image processing software.
Image Link uses SkyPro image processing software to copy the image to the Windows clipboard.

Step Three: Paste the image onto the Sky Display using the Paste Image command in the Edit menu of TheSky. This image is copied as an 8-bit bitmap.

Link Wizard: Automatic Image Alignment

TheSky contains a very sophisticated pattern recognition function for aiding the process of aligning pasted images with the underlying stellar data from the Guide Star Catalog. The image alignment function has proved successful on hundreds of different images taken with various CCD sensors with fields of view from 8 arc minutes to over 30 degrees. Once a match is found, it computes the necessary rotation, translation and scaling so that the sky data and coordinates matches that of the image.

Image Requirements

Although the Alignment Wizard will work on a wide variety of images with varying image scales and star densities, there are certain requirements which must be met if it is to be successful.

One-to-One Aspect Ratio

Cameras which do not have a 1:1 aspect ratio must be scaled so that they do. For example, the ST-6 camera has pixels which are 23x27 microns so they are about 15% longer in the Y direction. To compensate, you need to scale the image from 375 pixels in the X direction to 320 pixels. Choose the Resample command from the Modify menu in SkyPro to rescale your image.

Sufficient Stars

There must be at least six or more well defined stars in the image which are also part of the GSC data-base. Since most imagery covers fields of 10 or more arc-minutes, and the GSC goes to nearly 15th magnitude in sparse areas of the sky, this requirement is usually easy to meet. If you

are working with an extremely long focal length instrument and your fields of view are a couple of arc minutes or less, then you will probably have to manually align the image.

White Stars on a Black Background
The image must not be an inverse or negative image which shows stars as small pixels values and the background as high pixel values.

Image Size
The image used for the link should be at least 100 pixels on a side, preferably larger. Smaller images make it difficult for the pattern recognition functions to differentiate patterns.

Using the Link Wizard

Once the image is displayed on the screen as described above, choose Tools Image Link to display the image link dialog. The various controls are explained below.

The Image Link Dialog
To display this dialog, choose Tools Image Link. This dialog contains commands for changing the display status of the digital image, performing small (single pixel) rotations and executing the Link Wizard.

Image Status
The following image status buttons control how the image is shown on the Sky Display.

Not Displayed Choose this button to erase the image from the Sky Display. It is important to note that the image will still be present in memory belonging to TheSky (i.e. not just in the clipboard) so that it may be turned on later even if the clipboard contents are changed.

Transparent Choose Transparent to display the image on the Sky Display while allowing the data (stellar and non-stellar) to show through the image. This is very useful when manually aligning an image and trying to see the relationship between sky data and the actual image. You can toggle between Not Displayed and Transparent quickly without redrawing the Sky Display.

Opaque Once you have achieved a "link" between the image and the Sky Display, you may want to see the image on the screen undistorted by the data base stars showing through. Choose Opaque to display the image "on top" of catalog data. All labels and grid lines (if present) will be drawn on the image but the corresponding stars and non-stellar object data will be hidden. This allows you to have your image on screen uncluttered by the celestial data, yet still be able to identify, add labels and lines!

CW and CCW Rotation Buttons
These buttons are used to rotate the Sky Display in very small increments, approximately one pixel of motion near the edge of the image. See Fine Tuning the Sky Display below for more information on adjusting the Sky Display to match exactly the displayed image.

Fine Tuning the Sky Display
Whenever the Image Link Dialog is displayed, all of the motion buttons and zoom buttons cause the sky display to move in single pixel movements rather than 10% of the screen size as it normally does. Additionally, the rotate buttons on this dialog box permit single pixel rotation. This permits fine tuning the position of the background Sky Display to achieve a very accurate match between image and data.

Link Wizard
Choosing Link Wizard from the Image Link dialog initiates the pattern recognition algorithm which searches for relationships between the star patterns on the image and the star patterns on the

screen. The search algorithm has a number of phases which attempt to find a match.

If all of the requirements of the image and the Sky Display position have been met as described above, Link Wizard should find a match in the first phase of looking. If the area of the sky is not known very well and the Sky Display shows considerably more of the sky than the image, it may require all phases to establish a link.

The single most important factor in helping the Alignment Wizard determine the orientation and scale of your image is setting the screen size so that it closely matches that of the image. Once you have determined this, you can set an eyepiece indicator so that it is not necessary to reset each time you use alignment feature. "Closely matches" means it should be within 50% of the size of the image. The closer the match, the quicker Link Wizard will find the match.

As the Alignment Wizard looks for patterns, a progress bar indicates that it is looking for matches. If it is not found on phase one, the chances are reduced that it will find a match. The subsequent phases partition the screen and look in smaller "chunks" so they are more likely to find matches if the Sky Display field size is significantly larger than that of the image.

When a match is found, the Sky Display is adjusted to match the image. The image display mode is set to Transparent so that it is easy to see the relationship between the Sky Display and the image. This is important for a couple of reasons. First, in some cases (although rare) Link Wizard will think it has found a match when it really did not. Transparent mode makes it easy to see it failed. Second, you may want to "fine-tune" the position of the Sky Display for very accurate matches.

Troubleshooting

If the Link Wizard cannot find a match when you think that it should, check the following:

- Make sure ST-6 images are scaled down by 15% in the X direction i.e. 320x242 instead of 375x242.
- Make sure you know your field of view and the screen size is set properly. It is better to make the Sky Display field size larger than the image field size. Make sure the image area is contained on the Sky Display.
- If you are using the Whirlpool galaxy (M51) obtained with a longer focal length telescope or small CCD detector, image link will find a match. The reason for this is three fold. First of all, there are very few well defined stars around the M51. Generally, there must be at least six well defined stars in the image before a good match can be found. The Guide Star Catalog also identifies two "knots" within the galaxy as stars. Finally, the brightest star near M51 is not in the Guide Star Catalog. Strike three, no match found!

Sometimes it is enjoyable, yet challenging to use the manual alignment on your images even if the Link Wizard is capable of finding the link.

Techniques for Manual Alignment

While the image is displayed on the Sky Display, you can often see the correspondence between data base objects and those in the image. It can be difficult to orient the Sky Display to match the positions of the corresponding objects in the image using the standard move, rotate and zoom functions. The Object Drag functions make this type of screen adjustments easier.

We have encountered a number of images which were taken at a very small scale (i.e. the field width is a few arc-minutes across) which had too few corresponding stars in the GSC. As long as there is an easily identifiable object such as a galaxy or relatively bright star, manual alignment becomes easy using the Drag functions and a bit of practice.

Orthographic Projection

The first step in performing a manual alignment is to choose the Orthographic option under the Options menu. When the Orthographic option is checked, an orthographic projection is used to plot all

of the celestial objects. This projection proves to be the best projection for matching the actual geometry of CCD images. If you attempt a manual alignment without this option set, you will be able to get stars to match in some parts of the image and not others. This option is automatically set when Link Wizard is used.

The orthographic projection is slower than the default projection used by TheSky. Therefore it is usually preferable to turn this option off (i.e. unchecked).

Dragging a Single Object
To drag an object (such as a star) to a corresponding position on the displayed image, press and hold the shift key, then using the mouse, drag from the object to its new desired position. You will see a green "destination arrow" drawn on the screen to the new position. To accept this "drag," press the left mouse button. To reject it, press the right mouse button.

Dragging Two Objects
If you can visually recognize where two objects should be moved so that they are in line with image pasted on the Sky Display, then you can add two "destination arrows." Using two arrows is completely different from using a single arrow. A single arrow is used for translation purposes only (i.e. moving the entire screen a specified amount). In addition to translation, two arrows also performs scaling (or zooming) and rotation.

Upgrading

This program is an entry-level version of TheSky Astronomy Software version 2.0. TheSky version 4 for Windows 95/NT contains dozens of new features and can access huge celestial databases (up to 19 million objects on CD-ROM). Version 4 also shows hundreds of full-color pictures, has control for computer-aided telescopes and much more!

If you would like further information, contact Software Bisque for a free catalog:

Internet:	smb@bisque.com
CompuServe:	71571,3502
BBS:	+303.279.9533
Facsimile:	+303.278.0045
Telephone:	+303.278.4478
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Home Page
You can also visit our home page at http://www.bisque.com/thesky.

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Alignment Star

One of two stars required to fix the telescope position with respect to the sky. Alignment stars are only used with the SGT-MAX telescope link option.

Apparent Magnitude

The apparent magnitude of an object is a measure of its brightness relative to other objects. An object is assigned a number according to its brightness; the higher an objects magnitude, the dimmer the object.

Asterism

A common figure in the sky which is not a constellation. The big dipper is an asterism in the constellation Ursa Major.

Altitude or Alt

The angle, measured in degrees, up from the horizon to a celestial object.

Azimuth or Azim

The angle round from the north point measured on the horizon using north as 0 degrees, east as 90 degrees, south as 180 degrees and west as 270 degrees.

Bin

Binning of stars is the process of placing the multitudes of star magnitudes into a select number of discrete categories or bins. For example, most star charts represent all star magnitudes with 16 different sized circles. Each of these different sized circles represents a different bin corresponding to a range of stellar magnitudes.

CCD Camera

A charge coupled device camera (CCD) is an extremely light sensitive computer chip used to obtain digital images (computer pictures) of celestial objects.

Cluster+nebulosity

A star cluster in which the gas and dust cloud of a nebula is also visible.

Control Panel

The Control Panel is an optional window on the Sky Display that allows you to quickly perform many commands available in TheSky.

The Control Panel may be closed using the Control Panel's system menu or by choosing Options Control Panel Off. Choose Options Control Horizontal or Vertical to display the Control Panel horizontally or vertically, respectively.

Click on any Control Panel button to display a description of its function.

Cross Hairs

A graphical circle containing four lines that is used to indicate the actual position of the telescope on the view of the Sky Display. The cross hairs are only displayed while using the telescope link option.

Database

A computer file that contains information (data) on a number of celestial objects.

Declination or Dec

Part of the location designation of celestial objects. Declination is to similar to Latitude on the celestial sphere.

Ecliptic

The plane containing the orbit of the Earth about the Sun.

Epoch

A particular moment used as the reference point from which time is measured.

Field Width

The amount of the sky (in degrees) that you are currently viewing. The Sky Display can show from 180 degrees of the sky down to 1/5 of one degree of the sky.

Galaxy

A large collection of stars in a relatively small region of space. Our solar system is located in the Milky Way galaxy.

General Catalog of Variable Stars

Approximately 16,000 variable stars are included from the General Catalog of Variable Stars. The symbol used to represent variable stars is a small cyan colored V placed directly above the star that is variable. The V points to the variable star.

Globular Cluster

A globular cluster is a cluster of stars in a spherical shape containing 50,000 to one million stars.

Grid

A set of lines that indicate the current right ascension and declination of the Sky Display.

Guide Cross hair

A set of graphic lines that are used to aid the user in pointing at a desired celestial object. Guide Cross hairs are only used with the SGT-MAX telescope option.

Guide Star Catalog (GSC)

The Hubble Guide Star Catalog contains nearly 19 million objects brighter than sixteenth magnitude, of which more than 15 million are classified as stars. For the GSC version of TheSky, a cross reference exists between the GSC data and the Smithsonian Astronomical Observatory (SAO) catalog.

Horizon

An object plotted on the Sky Display is displayed according to its altitude and azimuth coordinates, relative to a fixed local horizon, rather than its right ascension and declination coordinates.

IC Catalog

The Index Catalog. By 1908, J.L.E. Dryer had compiled over 5,300 non-stellar objects in addition to the objects included in his NGC Catalog.

Messier Object

One of 110 nebulae and star clusters that was compiled by astronomer Charles Messier (1730-1817). Messier objects are labeled with an M followed by the object's catalog number (M1-M110).

Metafile

A standard file format used to exchange graphical information between Windows applications.

Nebula

An expanse of dust and gas in space. A nebula is illuminated by light from stars shining through it.

NGC Objects

New General Catalog objects. The New General Catalog of Nebula and Star Clusters was compiled by astronomer J.L.E. Dreyer (1852-1926) and contains 5,386 non stellar objects. The Level I database contains 3500 of these objects, while Level II and III databases contain the complete NGC Catalog.

NGC Objects are labeled with the prefix NGC followed by the object's catalog number (for example, NGC1976).

NGCs that are stars

Objects initially included in the NGC Catalog identified as non-stellar objects that were eventually classified correctly as stars.

North View

The polar projection used by TheSky when the center of the Sky Display is greater than plus 50 degrees and the current field width is less than 50 degrees.

Open Cluster

A group of ten to 10,000 stars that are loosely bunched in one area of space.

Other NGC objects

As defined by TheSky, other NGC objects are objects that are not classified as a galaxy, open cluster, globular cluster, planetary nebula, nebula, cluster+nebulosity or an NGC object that is actually a star.

Principle Galaxy Catalog (PGC)

The Principle Galaxy Catalog is one of the most comprehensive catalog of galaxies available. It contains over 73,000 galaxies with a great amount of detailed information on each galaxy. More importantly, the catalog contains numerous cross references to other catalogs of galaxies. Using the Find command, over 130,000 cross references can be used to find galaxies using popular catalog designations such as the Uppsala General Catalog of Galaxies (UGC), the Catalog of Galaxies and Clusters of Galaxies (CGCG), the Morphological Catalog of Galaxies (MCG) and many more.

Planetary Nebula

An expanding sphere of gasses that was blown away from a developing star.

Right Ascension or RA

Part of the location designation of celestial objects. Right ascension is similar to longitude, but on the celestial sphere and is used as hours minutes and seconds rather than degrees minutes and seconds.

SAO Catalog

The Smithsonian Astrophysical Catalog which contains information on approximately 252,000 different stars.

SGT-MAX telescope link

The SGT-MAX (for Software Guided Telescope) hardware allows TheSky software to be connected to your telescope via optical encoders and a serial interface. This system gives amateur astronomers a powerful tool for locating and identifying celestial objects.

For more information on the SGT-MAX system, contact Software Bisque.

Sidereal Time

Also known as star time. Local Sidereal Time (LST) indicates which line of Right Ascension is directly overhead. If the LST is 12:30, then the RA line 12:30 is directly overhead (i.e. a line passing through the North and South celestial poles).

Sky Display

The portion of the computer screen that displays the stars, NGCs, and other celestial objects.

Solar System Object

Solar system objects in TheSky include the Sun, the Moon, the nine major planets, and any comets and asteroids input by the user. Each type of solar system object on the Sky Display is represented by a different color and size.

Spectral Class

A classification of a star based on the analysis of the spectrum of the light emitted from the star. Stars can be naturally grouped into ten different classes and are designated by the letters O, B, A, F, G, K, M, R, N, S. The surface temperature and color of the star is directly related to the spectral class letter:

Spectral Class	O	B	A	F	G	K	M	R	N	S
Temp. (in degrees K)	25,000	23,000	10,000	7,000	6,000	5,000	3,200	<3,200	<3,200	<3,200
Color	very blue	blue-white	white	yellow-white	yellow	orange	reddish	yellow-red	very red	red

Star

A large, self-luminous sphere of burning gas. Stars are represented by small ellipses on the Sky Display.

Status Box

The Status Box displays information about the current Sky Display This optional window displays the current field width, the RA and Dec of the center of the Sky Display and the local sidereal time.

Use the Status Box command in the Options menu to toggle on/off the Status Box.

Uranometria 2000.0

Uranometria 2000.0 is an excellent book of star charts. The bibliographical reference follows.

Lovi, G.; Rappaport, B.;Tirion, W. Uranometria 2000.0 Volume I. Richmond: Willmann-Bell; [1987].

Washington Catalog of Double Stars (WDS)

TheSky GSC contains approximately 12,000 of the brighter double stars from The Washington Catalog of Double Stars. Double stars are represented by an uppercase D.

Zenith

The zenith is the point on the celestial sphere at 90 degrees altitude (directly overhead).

Zoom Box

A graphical rectangle placed on the Sky Display that is used to quickly zoom to the portion of the sky delineated by this rectangle.

To Create a Zoom Box

1. Position the mouse pointer over the upper left corner of the area of the sky you wish to zoom to.
2. Drag the mouse in the Sky Display while holding down the left mouse button . The mouse pointer changes to a left-right arrow, and a rubber banding square is created.
3. Once the rubber banding square encloses the desired zoom area, release the left mouse button.

To zoom to the portion of the sky enclosed by the Zoom Box

1. Click the left mouse button.

To remove the Zoom Box and not zoom in

1. Click the right mouse button, or press the ESC key.

The Zoom Box can also be used to select an area of the sky and then create a blown-up view of the selected area on a printed star chart.

Related topics:

Page Setup

TheSky Astronomy Software, version 2.10

Using TheSky with your telescope

TheSky software can be linked to your telescope to provide the simplest means available for finding celestial objects. There are two basic categories in which the Telescope Link is created. In the first case, TheSky uses optical encoders mounted on both axes of the telescope to sense where the telescope is positioned. With an optical encoder setup, TheSky requires a serial interface box that turns the encoder counts into a number that describes how much the telescope has rotated. There are several serial interface boxes compatible with TheSky. These include the Bbox, provided with the SGT-MAX System by **Software Bisque** (Golden, CO), and the NGC-MAX from **Jim's Mobile, Inc.** (Lakewood, CO).

In addition to compatibility with the above systems, TheSky software can be used to drive the **LX200** series of telescopes by **Meade** and the **Coordinate I** drive system by **Quadrant Systems**. With these systems, TheSky acts as a graphical database to provide coordinates (through a serial cable) to the on board computers which drive the telescope.

An advantage to an encoder sensing system over a drive system is that an encoder system is typically less expensive yet provides an efficient means of finding celestial objects. While more expensive, the driving systems are the most powerful way of finding celestial objects.

Linking TheSky to a Telescope

TheSky software can be linked to your telescope to provide the simplest means available for finding celestial objects. There are two basic categories in which the Telescope Link is created. In the first case, TheSky uses optical encoders mounted on both axes of the telescope to sense where the telescope is positioned. With an optical encoder setup, TheSky requires a serial interface box that turns the encoder counts into a number that describes how much the telescope has rotated. There are several serial interface boxes compatible with TheSky. These include the Bbox provided with the SGT-MAX System, the NGC-MAX by JMI, the Sky Wizard by Orion, and the Sky Vector by Lumicon.

In addition to compatibility with the above systems, TheSky software can be used to drive the LX200 telescopes by Meade and the Coordinate I drive system by Quadrant Systems. With these systems TheSky acts as a graphical data base to provide coordinates (through a serial cable) to the on board computers which drive the telescope.

An advantage to an encoder sensing system over a drive system is that an encoder system is typically less expensive yet provides an efficient means of finding celestial objects. While more expensive, the driving systems are the most powerful way of finding celestial objects.

Regardless of the type of telescope linking system, to create a Telescope Link you must:

- Configure TheSky's telescope data for your particular system (i.e. SGT-MAX, LX200 etc.) in the Telescope Data menu option.
- Go through the alignment procedure, in the Telescope Link Establish menu.

Whether you have an encoder interface, or plan to drive your telescope, we recommended that you go through a mock setup to become familiar with the procedures for creating a Telescope Link.

Warning

Never attempt to observe the Sun through your telescope without proper solar filters! Observing the Sun without a solar filter, even for the shortest fraction of a second, causes instant and irreversible eye damage. When observing during the daytime, do not point the telescope even close to the Sun. Do not use the automatic slew capabilities of a telescope to find objects in the sky (such as planets) during the daytime.

The Telescope Button

The Telescope button on the Control Panel allows you to disable the Telescope Link so that you may use the software as if no Telescope Link existed. When the telescope button is down, the telescope has control over the software, and the scope cross hairs are displayed on screen. When the Telescope button is up, you may use TheSky any way you like. This option is particularly useful if you wish to zoom to an area of TheSky that is far away from where the telescope is pointed. Pressing the Scope button again, so that it is down, activates the scope and forces the screen to readjust to where the telescope is pointed.

Night Vision Mode

Once a Telescope Link is established, the night vision mode becomes active. The Night Vision mode turns most everything on screen red; even other Windows applications become red. Red light is easier on your eyes when your viewing the computer screen at night. This red mode is essentially the same as going to the Control Panel and setting all the window colors too red.

SGT-MAX, NGC-MAX, Sky Wizard And Sky Vector Systems

The following sections describe the procedures you must follow to create a Telescope Link with the SGT-MAX, NGC-MAX, Sky Wizard or the Sky Vector Systems. Instructions are also given on how to use the computer aided guiding system to find a particular object.

Entering Telescope Data (SGT-MAX, NGC-MAX, Sky Wizard or Sky Vector Systems)

Before a Telescope Link can be established, the telescope data under the Telescope Data menu command must be entered. This information is necessary for TheSky to properly communicate with SGT-MAX, NGC -MAX, Sky Wizard or Sky Vector systems.

To Enter Telescope Data (SGT-MAX, NGC-MAX, Sky Wizard or Sky Vector Systems)

1. Choose the Telescope Data menu command.
2. Select the appropriate port to which your serial communication box is connected.
3. Set the Baud rate to 9600.
4. Select the appropriate communication box from the communications box list box.
5. Select the appropriate telescope.
- Selecting the appropriate telescope simply fills in the correct encoder tics per revolution. If your telescope is not listed and you do not know your encoder tics per revolution, call Software Bisque.
6. For the communication box tics per revolution input the following:
- Set the communication box tics per revolution to the same values as the encoders resolutions for your particular telescope (see step 5). For example, if your encoder tics per revolution are 4000 for RA and 4096 for Dec, enter 4000 for RA and 4096 for Dec for the communications box tics per revolution. (Please note for Bbox and NGC-MAX versions 1.7 through 1.99 enter 32767 for both axes. To find the version number of a Bbox or an NGC-MAX, enter the Comm Test and turn the unit off and on.)
7. Choose the Configure button. (**Bboxes only**! All other systems require that you manually configure the unit for encoder resolutions).
- Choosing the configure button configures the Bbox for the selected encoder tics. This configuration procedure only has to be done once, since the serial box saves the encoder data in non-volatile memory. If you get the message "Cannot configure Bbox", retry several times. If you still cannot configure the box, please see the trouble shooting section on doing an alignment.
- The configure button only applies to Bbox versions 1.7 or greater , not to earlier versions or metal Bboxes.
8. Choose the OK button. This saves the input telescope data.

Creating a Telescope Link (SGT-MAX, NGC-MAX Sky Wizard, or Sky Vector Systems)

In order to create a Telescope Link, you must have the telescope data entered correctly (see the section on Entering Telescope Data) and you must go through an alignment procedure. The alignment procedure is a three step process requiring you to accurately point your telescope at 90 degrees declination and two known stars. This information is required for TheSky to set up its own coordinate system to become linked to your telescope and the actual night sky.

To Create a Telescope Link (SGT-MAX, NGC-MAX, Sky Wizard, or Sky Vector Systems)

1. Make the proper connections from the computer to the serial box. Also make the proper connections from the serial box to the encoders.

2. Choose the Telescope Link Establish menu command.
3. Point your telescope at 90 degrees declination.
- When the telescope points at 90 degrees declination or altitude, it is at a unique position of the telescope mount. In this position, rotation around the RA or Azimuth axes produces no actual motion (or very little) in the telescopic view.
4. Choose OK.
5. Point your telescope at the first alignment star.
- The first default alignment star is Polaris. If you wish to change the first alignment star simply identify the desired object (using the Find command or clicking the mouse), and choose the Alignment Star button on the Object Identification dialog box. This is the only time you may change the first alignment star.
6. Choose OK.
7. Point your telescope at the second alignment star.
- The second default alignment star is Capella. If you wish to change the second alignment star simply identify the desired object (using the Find command or clicking the mouse), and choose the Alignment Star button on the Object Identification dialog box. This is the only time you may change the second alignment star.
8. Choose OK.
- The difference in angular separation that the encoders swept out and the actual angular separation between the alignment stars is displayed. For a perfect alignment the difference is zero. Experience shows that a difference of less than five degrees is acceptable. (If the difference is extremely large, see the trouble shooting section on doing an alignment.)
9. Choose Accept.

You should now have a cross hair symbol on the Sky Display that indicates where your telescope points in the night sky.

As you move your telescope, the cross hairs move correspondingly. The telescope now has control over the software; the telescope cross hairs cannot leave the screen. However, you still have the ability to deactivate the Telescope Link without having to go through the alignment procedure again. The telescope button give you the ability to use the software as if no link exists (see the section on the Telescope Button).

Finding a Particular Object (SGT-MAX, NGC-MAX, Sky Wizard or Sky Vector System)

When a Telescope Link is established, finding any celestial object in the database is simple. Place the on screen telescope cross hairs over any object, and that object is in your eyepiece. There also is a computer aided "guide to" method to find a particular object described in the next section.

To Find a Particular Object with the SGT-MAX, NGC-MAX, Sky Wizard or Sky Vector

1. Identify the object you wish to view through your telescope. You may do this by clicking on the object or using the Tools Find command to identify the object. Each of these options displays the Object Identification dialog box.

2. From the Object Identification dialog box choose the Guide To button.
- The Guide To dialog box provides a simple means of guiding to a particular object. Simply align the guiding needles with the destination marks as described below.

3. Starting with the RA\Azim axis, align the guiding needle on the dial to the destination mark. When the needle is on the destination mark, use your telescope's fine adjustment to make the middle, red LED illuminate. When the middle, red LED is lit, lock the RA axis and follow the same procedure for the DEC/Alt axis. When both middle, red LED's are lit, the Guide To dialog box closes. The cross hairs on screen are now over the desired object. You should be able to look into your eyepiece and see the object.

The Coordinate I by Quadrant Systems

TheSky can communicate with the Coordinate I to drive a telescope to any object in TheSky's database. A standard serial cable connected between your PC and the Coordinate I is required. TheSky will automatically slew to any object in the data base by simply pressing the Slew To button in the Object Identification dialog box. Moreover, every function on the Coordinate I can be accessed by way of the Telescope Other Commands menu item.

Warning

Never attempt to observe the Sun through your telescope! Observing the Sun, even for the shortest fraction of a second, will cause instant and irreversible eye damage. When observing during the daytime, do not point the telescope even close to the Sun. Do not use the automatic slew capabilities of the telescope to find objects in the sky (such as planets) during the daytime.

Entering Telescope Data for the Coordinate I

Before a Telescope Link can be established with the Coordinate I, the telescope data under the Telescope Data menu command must be entered. This information is necessary for TheSky to properly communicate with the Coordinate I.

To Enter Telescope Data for the Coordinate I

1. Select the Telescope Data command from the menu.
2. From the Telescope Data dialog box, select the following.
3. Select the correct communications port.
4. Select the correct baud rate (9600 is recommended). Note, the selected baud rate for the Coordinate I and TheSky must be the same.
5. Select the communications box as the Coordinate I.
6. Choose OK.

Creating a Telescope Link with the Coordinate I by Quadrant Systems

In order to create a Telescope Link with the Coordinate I, you must have the telescope data entered correctly (see the section on Entering Telescope Data) and you must go through the alignment procedure. The alignment procedure is described below.

To Create a Telescope Link between TheSky and the Coordinate I

The Coordinate I must be properly aligned, configured (date, time, location, etc.), and must be in Remote mode. The Coordinate I does not **have** to be aligned, as you may later synchronize the Coordinate I and the Sky Display by way of the Synch Scope button on the Object Identification dialog box. Refer to the section Synchronizing the Coordinate I and the Sky Display for more information.

1. Select the Telescope Link Establish menu command.

- A message appears if TheSky cannot communicate with the Coordinate I. If you receive this message, make sure the connections and power to the Coordinate I are correct. The Coordinate I must be in Remote Mode (see the Coordinate I Operator's Manual for details).

When a Telescope Link is established, the screen adjusts and places cross hairs where your telescope is pointed. The telescope button on the Control Panel is automatically pressed indicating the telescope has control of the software. The telescope cross hairs always stay within the screen while the telescope button is pressed. At any time you can press the telescope button and

deactivate the Telescope Link. This allows you to use TheSky as if there was no Telescope Link. As soon as the telescope button is pressed again the Telescope Link is reestablished, the screen readjusts placing cross hairs where the scope is pointed.

Slewing to an Object with the Coordinate I

Once a Telescope Link is established, you may slew to any object within TheSky's data base by identifying the object and choosing the Slew To button in the Object Identification dialog box.

To slew to an Object with the Coordinate I:

1. Use the Tools Find command or the mouse (clicking on an object on screen) to display the Object's Identification dialog box.
2. Choose Slew To from the Object Identification dialog box.

- The Telescope is Slewing... window appears informing you that the telescope is slewing. This window stays on screen until the scope is finished slewing or you choose the Cancel button. Note, choosing Cancel while the scope is slewing will not stop the slew, but simply removes the slewing message box.

- While slewing to an object the telescope button may be pressed to deactivate the scope. Deactivating the scope allows you to use TheSky normally i.e., zoom to a different area, identify an object, etc. Once the scope is finished slewing, the slewing window is removed. You may then activate the scope, and the Sky Display adjusts and places cross hairs where the scope is pointing.

Synchronizing the Coordinate I and the Sky Display

If you identify an object while a Telescope Link is established, the Synch Scope button is available. Choosing the Synch Scope button sets the coordinates of the Coordinate I to those of the object identified. This feature allows you to use TheSky to synchronize the Sky Display and the Coordinate I.

To Synchronize the Coordinate I and the Sky Display

1. Place a known stellar object in the center of your eye piece.
- Use a stellar object rather than a planet or an NGC object. The coordinates of a star are probably more accurate than a planet, and an NGC object may not always be a single point.
2. Identify the same object within TheSky to display the Object's Identification dialog box.
3. Press the Synch Scope button to synchronize the Sky Display and the Coordinate I.
   You should see the screen cross hairs jump to the new object that you have synchronized upon.

Other Coordinate I commands

Under the Telescope Other Command menu item, you can send any command to the Coordinate I through the serial port. This function behaves like a terminal program. Simply type the commands in the Command edit box and choose the Send button. The response of the Coordinate I is displayed in the Response edit box. The ? gives a list of all the Coordinate I commands.

Meade LX200 Telescopes

TheSky can be used to drive Meade's LX200 telescopes. The only hardware required is a serial communication cable between your PC and the LX200 drive base. When a Telescope Link is created, cross hairs on screen show where the telescope is pointed. You may then slew the telescope to any object within TheSky's database by simply identifying the object and choosing the Slew To button.

The following sections describe the procedures you must follow to create a Telescope Link with an LX200 telescope. You must correctly enter the telescope data, and go through the alignment procedure.

Software Bisque recommends that you thoroughly read the LX200 owners manual, and become familiar with the LX200 before using TheSky in conjunction with the LX200.

Warning

Never attempt to observe the Sun through your Meade telescope without the proper solar filter! Observing the Sun, even for the shortest fraction of a second, causes instant and irreversible eye damage. When observing during the daytime, do not point the telescope even close to the Sun.

Do not use the automatic slew capabilities of the telescope to find objects in the sky (such as planets) during the daytime without first reading the section "Daytime Slewing" of your Meade telescope manual.

Entering Telescope Data (LX200 Telescopes)

Before a Telescope Link can be established with an LX200 telescope, the telescope data under the Telescope Data menu command must be entered. This information is necessary for TheSky to properly communicate with the LX200 's on board computer.

To Enter Telescope Data (LX200 Telescopes)

1. Select the Telescope Data command from the menu. From the Telescope Data dialog box, select the following: Select the correct communications port. Select the baud rate to 9600. Select the communications box as the Meade LX200.
2. Choose OK.

Creating a Telescope Link With a Meade LX200 Telescope

In order to create a Telescope Link with an LX200 telescope, you must have the telescope data entered correctly (see the section on Entering Telescope Data) and go through the alignment procedure described below.

To Create a Telescope Link with an LX200 Telescope

With the LX200 telescope leveled and aligned (the LX200 does not **have** to be aligned, after you establish a link, you may synchronize the Sky Display and the LX200 by way of the Synch Scope Button):

1. Select the Telescope Link Establish menu command.

A message appears if TheSky cannot communicate with the LX200. If you get the cannot establish communications message, make sure the connections to the LX200 telescope are correct and power is supplied to the telescope. When a Telescope Link is established, the screen adjusts and places cross hairs where the telescope is pointed. The telescope button on the Control Panel is automatically pressed meaning the telescope has control of the software. The telescope cross hairs always stay within the screen when the telescope button is pressed. At any time you can press the telescope button and deactivate the Telescope Link. This allows you to use TheSky as if there was no Telescope Link. As soon as the telescope button is pressed again, the screen readjusts, placing cross hairs where the scope is pointed.

Slewing to an Object

Once a Telescope Link is established, you may slew to any object within TheSky's data base by identifying the object and choosing the Slew To button in the Object Identification dialog box.

To slew to an Object with an LX200 Telescope:

1. Use the Tools Find command or the mouse (clicking on an object on screen), to display the desired Object's Identification dialog box.

2. Choose Slew To from the Object Identification dialog box.

The Telescope is Slewing... window appears informing you that the telescope is slewing. This window stays on screen until the scope is finished slewing or you choose the Cancel button. Choosing the Cancel button stops the telescope slew.

Note: While slewing to an object the telescope button may be pressed to deactivate the scope. Deactivating the scope allows you to use TheSky normally, so that you may zoom to a different area, identify an object, etc. Once the scope is finished slewing, the slewing window is removed. You may then activate the scope, and the Sky Display adjusts and places cross hairs where the scope is pointing.

Synchronizing the LX200 and the Sky Display

If you identify an object while a Telescope Link is established, the Synch Scope button is available. Choosing the Synch Scope button sets the coordinates of the LX200's on board computer to those of the object identified. This feature allows you to use TheSky to synchronize the Sky Display and the LX200 computer.

To Synchronize the LX200 and the Sky Display

1. Place a known stellar object in the center of your eye piece. Use a stellar object rather than a planet or an NGC object. The coordinates of a star are probably more accurate than a planet, and an NGC object may not always be a single point.
2. Identify the same object within TheSky to display the Object's Identification dialog box.
3. Press the Synch Scope button to synchronizes the Sky Display and the LX200 computer. You should see the screen cross hairs jump to the new object that you have synchronized upon.

LX200 Options

There are four options available through the LX200 Options menu command. These options include Set Up, Reticle, Focuser and Controls. These options are the more commonly used commands on the LX200. They now can be easily accessed by your PC. A more detailed explanation of each option follows.

Setup

The Set Up command allows you to set the time, date, location, and GMT of the LX200.

The computer date, computer time, and the location data from TheSky is displayed. To set any of the items above on your LX200, simply press the appropriate button. A message box will appear if TheSky cannot make the appropriate settings. If you get an error message, check the connections and power to the LX200.

Note: It is essential that the time on the LX200 be set as accurately as possible with the one star alignment procedure. If you plan to use the LX200 Set Up dialog box to set the time on your LX200, the time on your computer must be accurate as well. You can set the time on your computer in the Control Panel under the Date and Time Icon.

Once you have set the desired items on you LX200 choose the OK button.

Reticle

The Reticle command allows you to change the reticle brightness and reticle flash mode on the LX200. Once you have set the reticle brightness and flash mode, choose the OK button.

Focuser

The Focuser window gives you control of the focus and focus speed of an electric focuser connected to the LX200. Because you may want to use the focus control quit often, the Focus control dialog box can be kept on screen while other commands are carried out (i.e. Find, move, zoom). You can close the Focus control Dialog box by choosing the close button, or choosing the LX200 Options Focuser command again. The Focuser menu item will have a check mark next to it if the Focuser window is open, a check mark will be absent if the window is closed.

Controls

The Control window gives you the ability to move the LX200 in any direction, and change the slewing rates. Because you may want to use the Control window quit often, the Controls dialog box can be kept on screen while other commands are carried out (i.e. Find, move, zoom). You can close the Controls Dialog box by choosing the close button, or choosing the LX200 Options Controls command again. The Controls menu item will have a check mark next to it if the Control window is open, and a check mark will be absent if the window is closed.

Sky Commander by SkyComm Engineering

TheSky can be used to in conjunction with the Sky Commander by SkyComm Engineering. The hardware required is a serial communication cable between your PC and the Sky Commander base. When a Telescope Link is created, cross hairs on screen show where the telescope is pointed. You may then easily find many objects by simply placing the telescope cross hair over the desired object.

The following sections describe the procedures you must follow to create a Telescope Link with the Sky Commander. You must correctly enter the configure the telescope data, and go through the alignment procedure.

Software Bisque recommends that you thoroughly read the Sky Commander's owners manual, and become familiar with the Sky Commander before using TheSky in conjunction with the Sky Commander.

Entering Telescope Data (Sky Commander)

Before a Telescope Link can be established with the Sky Commander, the telescope data under the Telescope Data menu command must be entered. This information is necessary for TheSky to properly communicate with the Sky Commander.

To Enter Telescope Data (Sky Commander)

1. Select the Telescope Data command from the menu. From the Telescope Data dialog box, select the following:
   Select the correct communications port.
   Select the baud rate to 9600.
   Select the communications box as the Sky Commander.
2. Choose OK.

Creating a Telescope Link with the Sky Commander

In order to create a Telescope Link with the Sky Commander telescope, you must have the telescope data entered correctly (see the section on Entering Telescope Data) and go through the alignment procedure described below.

To Create a Telescope Link with the Sky Commander

With the Sky Commander powered up and aligned:

1. Select the Telescope Link Establish menu command.

A message appears if TheSky cannot communicate with the Sky Commander. If you get this message, make sure the connections to the Sky Commander are correct and ample power is available. When a Telescope Link is established, the screen adjusts and places cross hairs where the telescope is pointed. The telescope button on the Control Panel is automatically pressed meaning the telescope has control of the software. The telescope cross hairs always stay within the screen when the telescope button is pressed. At any time you can press the telescope button and deactivate the Telescope Link. This allows you to use TheSky as if there was no Telescope Link. As soon as the telescope button is pressed again, the screen readjusts, placing cross hairs where the scope is pointed.

Finding an Object

After you have a link established, the cross hair indicates where the telescope is positioned. Manually move your telescope to place the cross hair over a desired object. Look in your eye piece to see the object!

Troubleshooting

The trouble shooting section describes some of the more common problems encountered when creating a Telescope Link. Please read these sections thoroughly and carefully before implementing the suggested solutions.

Cannot Align SGT-MAX, NGC-MAX, Sky Wizard or Sky Vector

If you attempt to align and get a very large difference in angular separation between the encoder readings and actual angular separation, run the communication test. Choose the Telescope Data Comm Test command. There must not be any errors on the RA or DEC axis, and the battery status must be OK. As you manually move your telescope, the raw encoder readings should change. These numbers should be between half the encoder resolutions on the negative side and half the encoder resolution on the positive side. For Bboxes and NGC MAX versions 1.7 to 1.99 these numbers are between -16383 and 16383 (if you own an older metal Bbox these numbers are in hexadecimal form.) If there is "NO RESPONSE" on any of these outputs check the power and connections to your serial box. You will not be able to create a Telescope Link if the encoder readings are not changing as you move your scope! **Fix the problem here before attempting to align**!

If the difference in angular separations is always large, make sure you are communicating with your serial interface through the communication test program. Make sure power is supplied to you interface box (the red LED is on). Check to ensure cables are connected properly.

If the communication test verifies that you have proper communication, but the difference in angular separation is still in error, configure your box for your encoder resolutions (see the section on Entering Telescope Data).

Cannot Align the Coordinate I

If you cannot align the Coordinate I, and are getting the message "Coordinate I not responding", try to establish serial communications either through the Telescope Comm Test command or through any terminal program (for example Windows Terminal Program, Xtalk, ProComm). If you send the Coordinate I an "R<Enter>" the response must be a coordinate string like "RA02:24:20 DEC+10:36:12." If you do not get a response make sure:

1. There is **ample** power supplied to the Coordinate I.
2. You have the correct telescope data entered.
3. The serial cable and any nine or 25 pin adapter used are in good working order.