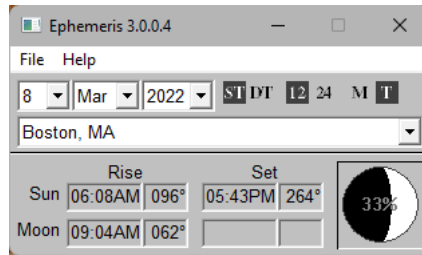


# Ephemeris 3.0.0.4



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Ephemeris is a program created for photographers for computing information about sunrise, sunset, moonrise and moonset for a given date and location. In addition to reporting the times of these events, it also gives compass bearings so you can predict not only when but also where on the horizon the sun or moon will rise or set. Information about the phase of the moon is also displayed.

Ephemeris has a built-in database of locations you can select from a menu, or you can add your own locations to the database using readily available geographical data.

# Using Ephemeris

When you start the program, Ephemeris sets the date to the current date and the location to the last location used.

## Changing the Date

You can change the date using the drop down menus for the day, month and year.

## Standard, Daylight Savings, or Universal Time

You can select Standard Time (*ST*) or Daylight Savings Time (*DT*). On startup, this control is set to *DT* if Windows reports that daylight savings time is currently in effect and *ST* otherwise, but Daylight Savings Time is not applicable to all locations.

## 12-Hour or 24-Hour Clock

To display times using a 12-hour clock (AM/PM), click the button labeled 12; for 24-hour (military) time format, click the button labeled 24.

## Magnetic or True North

Ephemeris displays azimuth bearings to help you predict where on the horizon sunrise, sunset, moonrise and moonset will occur. These bearings can be referenced either to magnetic north to correspond to compass readings or to true north for use with most maps. To reference bearings to magnetic north, click the button labeled *M*; for true north click the button labeled *T*.

## Selecting a Location

You can select from among the built-in locations using the location drop down control. For information on modifying location data or adding new locations, see below.

## Sun/Moon Rise/Set Information

In the bottom half of its window, Ephemeris displays the times and bearings of sunrise, sunset, moonrise and moonset as well a diagram illustrating the phase of the moon labeled with % illumination (0% for a new moon and 100% for a full moon). Times are in 12- or 24-hour notation depending on the 12/24 setting (see above). Bearings are in the range 0°..360° with 0° corresponding to Magnetic North or True North depending on the M/T setting (see above).

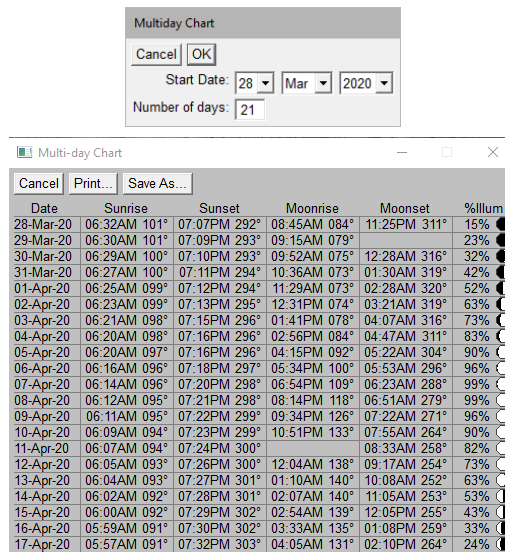
If there is no moonrise, moonset, sunrise or sunset on a given day, the corresponding field is left blank. This situation normally occurs roughly once a month for the moon; for the sun or moon it can also happen for extended periods as you approach the north or south poles.

A sighting compass such as the Suunto KB-20 or KB-14 provides a convenient way to determine the exact location on the horizon where sun/moon rise/set will occur using magnetic bearings since it superimposes the compass bearing viewed with one eye over the scene viewed with the other eye.



# Creating Multi-day Rise/Set Charts

To create a multi-day table of sun/moon rise/set information, first select the location and other settings for which you want the chart generated, and then select the *File/Multiday Chart* command from the main menu. This displays a secondary dialog box to let you specify the starting date and the number of days for the chart. To produce the chart, click *OK*; this displays a third window containing the actual table.



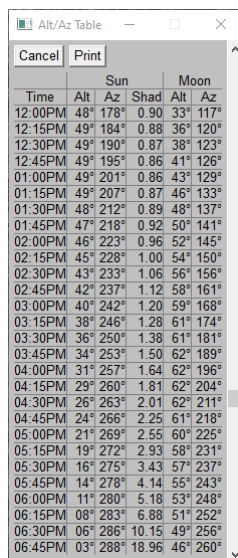
To print a copy of the chart, click the *Print...* button. This displays a standard *Print* dialog box to let you select a printer and initiate the printing.

To save the chart as a text file, click the *Save As...* button. This displays a standard *File Save* dialog box to let you select the name, location and type of file you want to save. Currently, the only supported file type is Text (.txt). In the resulting text file, columns of information are separated by tab characters. This is called tab-delimited text and can be imported into Microsoft Word and converted to a table or imported into Microsoft Excel as tabular data.

# Creating Altitude/Azimuth Tables

To create a table of sun/moon altitude and azimuth at 15 minute intervals during the current day, first select the location and other settings for which you want the chart generated, and then select the *File/Alt/Az Table* command from the main menu. This displays a scrolling list of altitudes and azimuths for the sun and moon. In addition, there is a column in the table giving the length of a shadow cast by sun of a vertical pole of unit height.

To change the day, change the date controls in the main window – this will automatically update the alt/az window.



The screenshot shows a window titled "Alt/Az Table" with a "Cancel" and "Print" button at the top. The table below contains data for the Sun and Moon at 15-minute intervals from 12:00PM to 06:45PM. The columns are Time, Alt, Az, Shad, Alt, and Az. The Shad column represents the shadow length of a vertical pole of unit height.

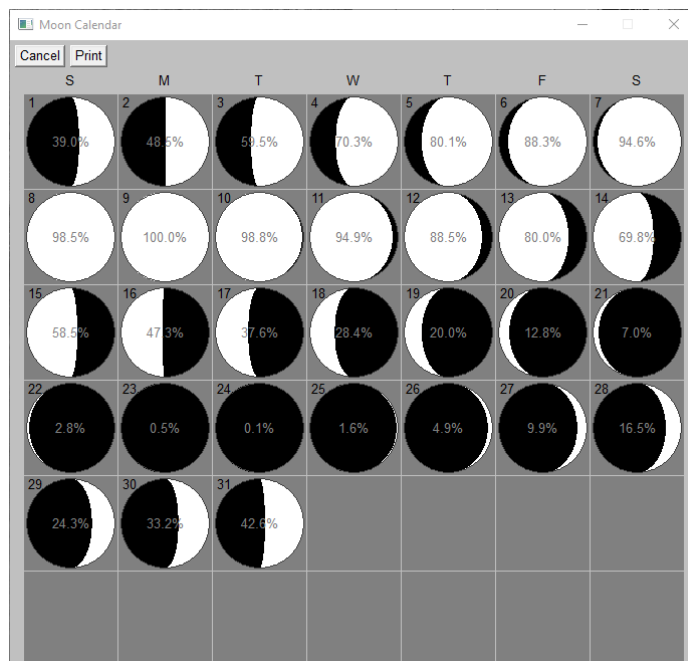
Time	Sun			Moon	
	Alt	Az	Shad	Alt	Az
12.00PM	48°	178°	0.90	33°	117°
12.15PM	49°	184°	0.88	36°	120°
12.30PM	49°	190°	0.87	38°	123°
12.45PM	49°	195°	0.86	41°	126°
01.00PM	49°	201°	0.86	43°	129°
01.15PM	49°	207°	0.87	46°	133°
01.30PM	48°	212°	0.89	48°	137°
01.45PM	47°	218°	0.92	50°	141°
02.00PM	46°	223°	0.96	52°	145°
02.15PM	45°	228°	1.00	54°	150°
02.30PM	43°	233°	1.06	56°	156°
02.45PM	42°	237°	1.12	58°	161°
03.00PM	40°	242°	1.20	59°	168°
03.15PM	38°	246°	1.28	61°	174°
03.30PM	36°	250°	1.38	61°	181°
03.45PM	34°	253°	1.50	62°	189°
04.00PM	31°	257°	1.64	62°	196°
04.15PM	29°	260°	1.81	62°	204°
04.30PM	26°	263°	2.01	62°	211°
04.45PM	24°	266°	2.25	61°	218°
05.00PM	21°	269°	2.55	60°	225°
05.15PM	19°	272°	2.93	58°	231°
05.30PM	16°	275°	3.43	57°	237°
05.45PM	14°	278°	4.14	55°	243°
06.00PM	11°	280°	5.18	53°	248°
06.15PM	08°	283°	6.88	51°	252°
06.30PM	06°	286°	10.15	49°	256°
06.45PM	03°	288°	18.96	46°	260°

To print a copy of the table, click the *Print...* button. This displays a standard *Print* dialog box to let you select a printer and initiate the printing.

# Creating a Moon Phase Calendar

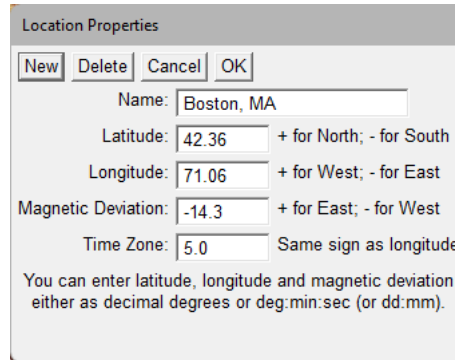
To display a calendar showing the phases of the moon for each day of the current month, first select the location and other settings for which you want the chart generated, and then select the *File/Moon Calendar* command from the main menu.

To change the month, change the date controls in the main window – this will automatically update the calendar window.



To print a copy of the calendar, click the *Print...* button. This displays a standard *Print* dialog box to let you select a printer and initiate the printing.

# Modifying Existing or Adding New Locations



To modify an existing location, first select it from the location list and then select *File/Location* from the main menu. This displays the *Location* dialog box with the information for the current location filled in. Enter new information into the relevant fields and click *OK*.

To create a new location, issue the *File/Location* command from the main menu. This displays the *Location* dialog box. Click the *New* button and then enter the new information and click *OK*.

To delete an existing location, first select it from the drop down location list and then issue the *File/Location* command from the main menu. This displays the *Location* dialog box. Click the *Delete* button and then click *OK*.

To modify an existing location or to create a new location, you will need the following information:

## **Name**

This is whatever name you choose for the location.

## **Latitude and Longitude**

Latitudes and longitudes and magnetic deviations are always displayed as decimal degrees but may be entered either in decimal degrees (e.g. enter 41.5 for 41°30') or as degrees, minutes and seconds (entered as: dd:mm:ss or dd:mm). Latitudes run from minus 90.00° at the South pole to plus 90.0° at the North pole. Longitudes run from minus 180.00° to plus 180.00°. West longitudes (locations West of the Greenwich meridian) are positive while East longitudes (locations East of the Greenwich meridian) are negative.

## **Magnetic Deviation**

Magnetic deviation (sometimes referred to as Magnetic Declination) is the difference in degrees between true north and magnetic north. Using values reported by the NOAA web site (see below), negative values are West and positive values are East. Other sources of magnetic deviation data may use a different convention. By knowing the magnetic deviation for the current location, Ephemeris can report azimuth angles for sunrise, sunset, moonrise and moonset as magnetic bearings so you can work directly from compass readings. Magnetic deviation varies with location on the earth and also changes slowly with time.

## **Obtaining Latitude, Longitude and Magnetic Deviation Information**

Accurate Latitude, Longitude and Magnetic Deviation can be obtained from the following web site: <https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml>

## **Time zone**

Time zones represent a time shift in hours relative to Greenwich Mean Time (GMT). While time zones are normally integers, in some locations time zones are fractional hours. Positive time zone values correspond to positive longitudes (West of Greenwich) and negative values correspond to negative longitudes (East of Greenwich).

For the USA and Canada, the principal time zones are:

Atlantic	4
Eastern	5
Central	6
Mountain	7

Pacific	8
Alaskan	9
Hawaiian	10