

Accuracy of Delphi 1.20 / astrolib 1.03

This document aims to give a detailed account of the accuracy of Delphi. Three charts have been calculated using Delphi 1.20 in combination with astrolib 1.03. The reference data has been obtained from the free chart service of Astrodienst (www.astro.ch), whose calculations are based on JPL (NASA) data.

Chart 1: Paris 1982

Chart 2: Melbourne 1955

Chart 3: Rome 800

General Comments

Planetary positions are calculated with an accuracy of the order of one arc minute for dates less than a century away from now.

The position of Pluto is calculated from a numerical fit to its orbit, which seems to be optimized for the 20th century. Outside this range, precision deteriorates more quickly than for the other objects.

The position of the true moon node is of the order of 5 times less precise than the position of the moon. The largest error I have seen in the 20th century was 10'.

Time zones are calculated from UNIX time zone data, which ranges back to dates when countries observed local mean time. There are about 350 UNIX time zone locations, plus about 2000 additional locations (recognizable by the dimmed clock symbol in Delphi) of which each one has been assigned to one of the UNIX time zone locations. The data for the additional locations has been collected as follows.

For US locations, latitude and longitude have been electronically extracted from the US 1990 Census data and time zones have been determined from the 1995 Rand McNally Road Atlas in combination with UNIX location comments. For non-US locations, latitude and longitude have been entered manually from paper sources, then plotted and verified visually in order to exclude any gross errors. Time zones have been determined from various maps in combination with UNIX location comments.

Please refer to [astrolib's documentation](#) and source code for further information.

Chart 1

Paris (France), 15 May 1982, 10.55 am local time

Item	Astrodienst (www.astro.ch)	Delphi+astrolib 1.03	Difference
Longitude	2e20	2e20	0'
Latitude	48n52	48n52	0'

Time Zone	+2	+2 [CEST]	0 min
Sun	24 Tau 12'06"	24 Tau 13'	1'
Moon	14 Aqu 38'14"	14 Aqu 37'	1'
Mercury	13 Gem 51'26"	13 Gem 52'	1'
Venus	12 Ari 12'46"	12 Ari 14'	1'
Mars	00 Lib 27'37"	00 Lib 27'	1'
Jupiter	03 Sco 05'16" r	03 Sco 05' r	0'
Saturn	16 Lib 25'39" r	16 Lib 25' r	1'
Uranus	02 Sag 59'03" r	02 Sag 59' r	0'
Neptune	26 Sag 29'43" r	26 Sag 30' r	0'
Pluto	24 Lib 45'45" r	24 Lib 46' r	0'
True Moon Node	14 Can 31'30"	14 Can 34'	4'
Ascendent	01 Leo 07'	01 Leo 08'	1'
Midheaven	09 Ari 38'	09 Ari 38'	0'
Placidus 2nd	18 Leo 33'	18 Leo 35'	2'
Placidus 3rd	10 Vir 18'	10 Vir 19'	1'
Placidus 11th	18 Tau 15'	18 Tau 16'	1'
Placidus 12th	28 Gem 47'	28 Gem 48'	1'
Koch 2nd	23 Leo 59'	23 Leo 59'	0'
Koch 3rd	16 Vir 44'	16 Vir 44'	0'
Koch 11th	03 Gem 54'	03 Gem 55'	1'
Koch 12th	06 Can 21'	06 Can 21'	0'

Chart 2

Melbourne (Australia), 6 October 1955, 10.01 pm local time

Item	Astrodienst (www.astro.ch)	Delphi+astrolib 1.03	Difference
Longitude	144e58	144e58	0'
Latitude	37s49	37s49	0'
Time Zone	+10	+10 [EST]	0 min
Sun	12 Lib 27'24"	12 Lib 28'	1'
Moon	14 Gem 57'17"	14 Gem 59'	2'
Mercury	27 Lib 08'04" r	27 Lib 08' r	0'
Venus	21 Lib 51'52"	21 Lib 53'	1'
Mars	25 Vir 32'25"	25 Vir 33'	1'
Jupiter	24 Leo 09'10"	24 Leo 10'	1'

Saturn	19 Sco 04'41"	19 Sco 05'	0'
Uranus	01 Leo 51'00"	01 Leo 49'	2'
Neptune	27 Lib 23'52"	27 Lib 24'	0'
Pluto	27 Leo 52'43"	27 Leo 53'	0'
True Moon Node	19 Sag 40'22" r	19 Sag 36 [*]	4'
Ascendent	26 Tau 09'	26 Tau 09'	0'
Midheaven	07 Pis 56'	07 Pis 57'	1'
Placidus 2nd	26 Gem 48'	26 Gem 48'	0'
Placidus 3rd	01 Leo 57'	01 Leo 57'	0'
Placidus 11th	09 Ari 23'	09 Ari 24'	1'
Placidus 12th	04 Tau 54'	04 Tau 54'	0'
Koch 2nd	22 Gem 59'	22 Gem 59'	0'
Koch 3rd	24 Can 38'	24 Can 39'	1'
Koch 11th	04 Ari 09'	04 Ari 10'	1'
Koch 12th	00 Tau 18'	00 Tau 18'	0'

Chart 3

Rome (Italy), 25 December 800, noon local time (Julian Calendar)

Item	Astrodienst (www.astro.ch)	Delphi+astrolib 1.03	Difference
Longitude	12e29	12e29	0'
Latitude	41n54	41n54	0'
Time Zone	+0:49:56	+0:50 [LMT]	0 min
Sun	08 Cap 27'55"	08 Cap 24'	4'
Moon	22 Pis 31'18"	22 Pis 27'	4'
Mercury	14 Sag 53'08"	14 Sag 49'	4'
Venus	02 Sag 10'06"	02 Sag 06'	4'
Mars	20 Lib 19'07"	20 Lib 14'	5'
Jupiter	09 Pis 33'49"	09 Pis 31'	3'
Saturn	00 Vir 50'31" r	00 Vir 47' r	4'
Uranus	26 Lib 31'32"	25 Lib 26'	1 deg 6'
Neptune	10 Lib 27'52"	11 Lib 05'	37'
Pluto	06 Aqu 26'06"	10 Aqu 50'	4 deg 24'
True Moon Node	05 Cap 18'09" r	05 Cap 20' [*]	2'
Ascendent	14 Ari 05'	14 Ari 03'	2'
Midheaven	07 Cap 15'	07 Cap 14'	1'

Placidus 2nd	21 Tau 55'	21 Tau 53'	2'
Placidus 3rd	16 Gem 31'	16 Gem 30'	1'
Placidus 11th	29 Cap 13'	29 Cap 12'	1'
Placidus 12th	28 Aqu 18'	28 Aqu 17'	1'
Koch 2nd	19 Tau 25'	19 Tau 23'	2'
Koch 3rd	16 Gem 07'	16 Gem 06'	1'
Koch 11th	01 Aqu 56'	01 Aqu 55'	1'
Koch 12th	04 Pis 40'	04 Pis 38'	2'

[*] Delphi does not calculate whether the true moon node is retrograde.