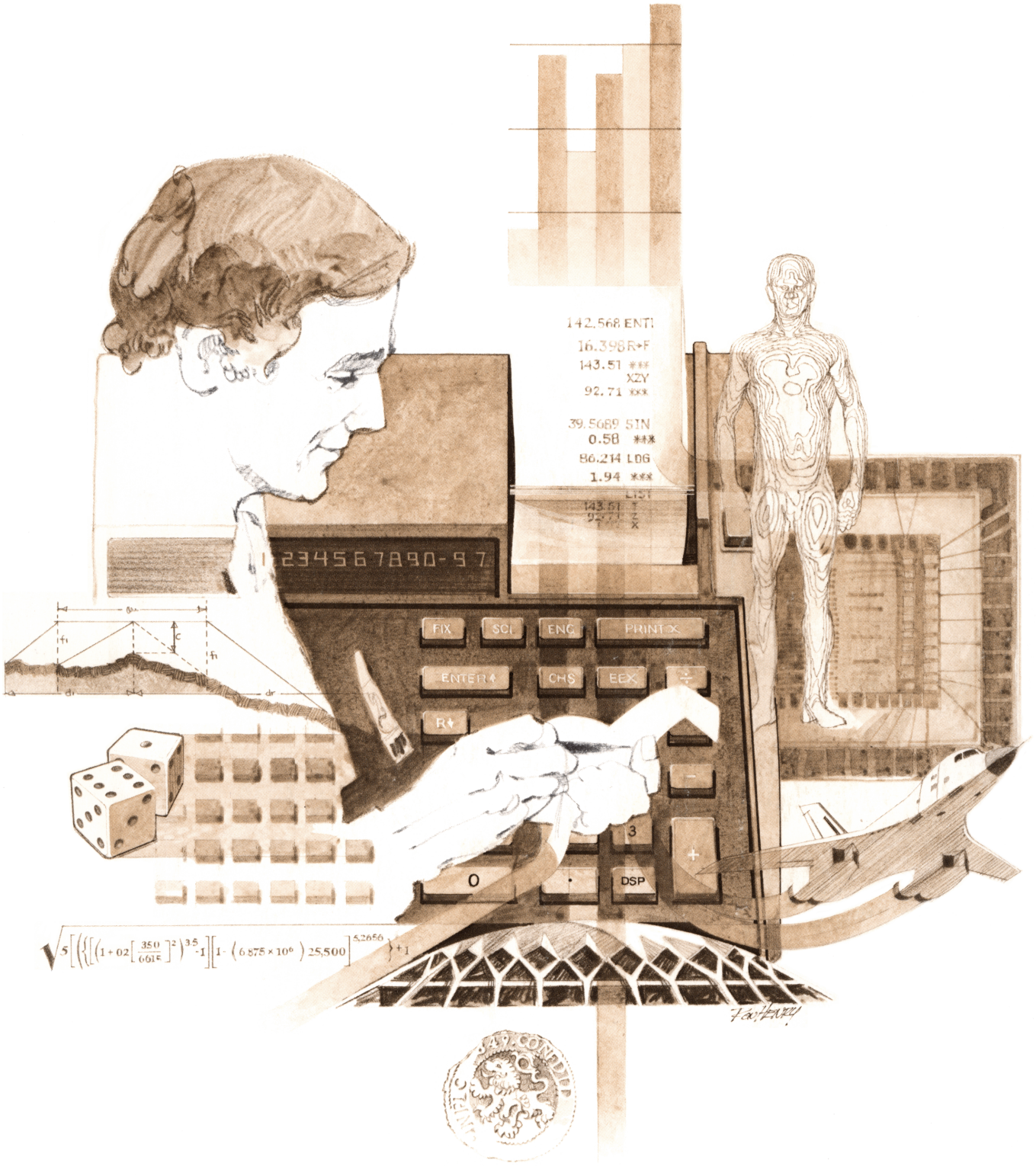
HEWLETT-PACKARD

HP-67/HP-97

Users' Library Solutions

Astrology



INTRODUCTION

In an effort to provide continued value to it's customers, Hewlett-Packard is introducing a unique service for the HP fully programmable calculator user. This service is designed to save you time and programming effort. As users are aware, Programmable Calculators are capable of delivering tremendous problem solving potential in terms of power and flexibility, but the real genie in the bottle is program solutions. HP's introduction of the first handheld programmable calculator in 1974 immediately led to a request for program **solutions** — hence the beginning of the HP-65 Users' Library. In order to save HP calculator customers time, users wrote their own programs and sent them to the Library for the benefit of other program users. In a short period of time over 5,000 programs were accepted and made available. This overwhelming response indicated the value of the program library and a Users' Library was then established for the HP-67/97 users.

To extend the value of the Users' Library, Hewlett-Packard is introducing a unique service—a service designed to save you time and money. The Users' Library has collected the best programs in the most popular categories from the HP-67/97 and HP-65 Libraries. These programs have been packaged into a series of low-cost books, resulting in substantial savings for our valued HP-67/97 users.

We feel this new software service will extend the capabilities of our programmable calculators and provide a great benefit to our HP-67/97 users.

A WORD ABOUT PROGRAM USAGE

Each program contained herein is reproduced on the standard forms used by the Users' Library. Magnetic cards are not included. The Program Description I page gives a basic description of the program. The Program Description II page provides a sample problem and the keystrokes used to solve it. The User Instructions page contains a description of the keystrokes used to solve problems in general and the options which are available to the user. The Program Listing I and Program Listing II pages list the program steps necessary to operate the calculator. The comments, listed next to the steps, describe the reason for a step or group of steps. Other pertinent information about data register contents, uses of labels and flags and the initial calculator status mode is also found on these pages. Following the directions in your HP-67 or HP-97 **Owners' Handbook and Programming Guide,** "Loading a Program" (page 134, HP-67; page 119, HP-97), key in the program from the Program Listing I and Program Listing II pages. A number at the top of the Program Listing indicates on which calculator the program was written (HP-67 or HP-97). If the calculator indicated differs from the calculator you will be using, consult Appendix E of your **Owner's Handbook** for the corresponding keycodes and keystrokes converting HP-67 to HP-97 keycodes and vice versa. No program conversion is necessary. The HP-67 and HP-97 are totally compatible, but some differences do occur in the keycodes used to represent some of the functions.

A program loaded into the HP-67 or HP-97 is not permanent—once the calculator is turned off, the program will not be retained. You can, however, permanently save any program by recording it on a blank magnetic card, several of which were provided in the Standard Pac that was shipped with your calculator. Consult your **Owner's Handbook** for full instructions. A few points to remember:

> The Set Status section indicates the status of flags, angular mode, and display setting. After keying in your program, review the status section and set the conditions as indicated before using or permanently recording the program.
>
> REMEMBER! To save the program permanently, **clip** the corners of the magnetic card once you have recorded the program. This simple step will protect the magnetic card and keep the program from being inadvertently erased.

As a part of HP's continuing effort to provide value to our customers, we hope you will enjoy our newest concept.

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Program Description I

Program Title ASTRO. I – MEAN OBLIQUITY OF THE ECLIPTIC AND GREENWICH SIDEREAL TIME

Contributor's Name JAMES NEELY

Address P.O. BOX 1902 (SECY CMA)

City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables

1. COMPUTE THE NUMBER OF DAYS FROM JAN 0, 1900 FOR ANY DATE SINCE JAN 1, 4713 B.C. (DATES PRIOR TO OCT. 15, 1582 ARE ASSUMED TO BE JULIAN CALENDER). THE CALENDER ROUTINE IS AUTHORED BY RICHARD C. SINGLETON: $IM = 12(Y+4800)+M-3$,

THEN $JD(J) = \left[\frac{IM}{48}\right] + \left[\frac{365\,IM + 2\,MOD(IM,12) + 7}{12}\right] + D - 32083.$

IF $JD(J) \geq 2299171$ (Oct 15, 1952), THE GREGORIAN CALENDER IS USED:

$$JD(G) = JD(J) + \left[\frac{IM}{4800}\right] - \left[\frac{IM}{1200}\right] + 38$$

WHERE Y = YEAR, M = MONTH, D = DAY, AND [ARG] IS THE INTEGER PART OF ARG.

THEN $JD_{1900} = J - 2415020.$

2. COMPUTE T, THE NUMBER OF JULIAN CENTURIES FROM GREENWICH MEAN NOON, JAN 0, 1900: $T = (t_G/24 + JD_{1900} - 0.5)/36525$, WHERE t_G IS THE GREENWICH MEAN TIME (GMT) OF THE OBSERVATION.

3. COMPUTE THE MEAN OBLIQUITY OF THE ECLIPTIC: $\epsilon_0 = 23.^{\circ}452294 - 0.^{\circ}013013T.$

4. COMPUTE THE GREENWICH MEAN SIDEREAL TIME: $R_G = t_G + 6.^{h}646066 + 2400.^{h}051262T + 26\times10^{-6}T^2 \pmod{24}$.

NOTE: THE RIGHT ASCENSION OF THE GREENWICH MERIDIAN, $\alpha_G = 15R_G$ DEGREES, IS COMPUTED AND STORED FOR FUTURE USE.

Operating Limits and Warnings B.C. DATES MUST BE ENTERED AS NEGATIVE QUANTITIES: 1 A.D. = 1, 1 B.C. = 0, 2 B.C. = −1, 3 B.C. = −2, ETC.

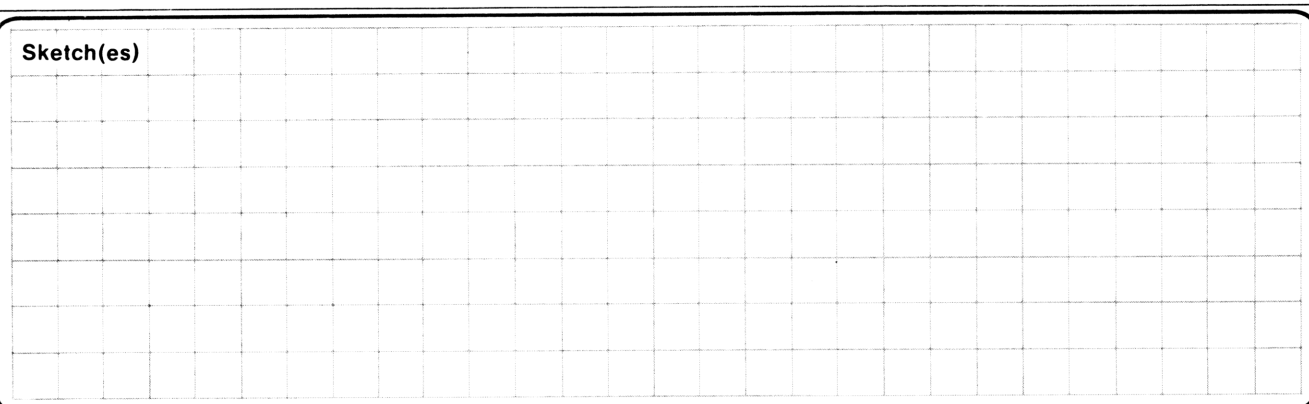
FOR EXAMPLE, JAN. 1, 6 B.C. IS ENTERED AS −1.010005

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)



Sample Problem(s)

FOR 0148 HOURS GMT ON APRIL 20, 1976, CALCULATE:

1. JD_{1900}
2. ϵ_0
3. R_G
4. T

Solution(s)

4. 20 1976 [A] 27869.0000 = JD_{1900}

1.48 [B] 23.2633 = $\epsilon_0 = 23^\circ 26' 33''$

[R/S] 15.4107 = $R_G = 15^h 41^m 07^s$

[R/S] 0.7630 = T

Reference(s)

"EXPLANATORY SUPPLEMENT TO THE ASTRONOMICAL EPHEMERIS AND THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC", HER MAJESTY'S STATIONERY OFFICE, LONDON, 1961

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	ENTER PROGRAM CARD			
2	ENTER DATE IN THE FORM MM.DDYYYY WHERE MM IS THE MONTH, DD IS THE DAY, AND YYYY IS THE YEAR (4 DIGITS). MM AND DD MUST BE SEPARATED BY A DECIMAL POINT. SEE THE WARNING ON PAGE 1 FOR B.C. DATES	MM.DDYYYY	A	JD1900
3A	ENTER GREENWICH MEAN TIME	HH.MMSS	B	E0(DD.MMSS)
B	DISPLAY GREENWICH MEAN SIDEREAL TIME		R/S	HH.MMSS
C	DISPLAY T		R/S	X.XXXX
	NOTE: FOR USE WITH ASTRO. II AND/OR THE PLANETARY COORDINATE PROGRAM, STEPS 2 AND 3A MUST BE EXECUTED, AND IN THE STATED ORDER. THE DISPLAY OF STEP 3B AND 3C ARE OPTIONAL.			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	F LBL A	31 25 11	UNPACK DATE
	↑	41	
	F INT	31 83	
	STO 3	33 03	
	−	51	
	EEX	43	
	2	02	
	X	71	
	↑	41	
010	F INT	31 83	
	STO 4	33 04	
	−	51	
	EEX	43	
	4	04	
	X	71	
	4	04	
	8	08	
	0	00	
	0	00	
020	STO 7	33 07	
	+	61	
	1	01	
	2	02	
	STO 5	33 05	
	X	71	
	RCL 3	34 03	
	+	61	
	3	03	
	−	51	
030	↑	41	
	STO 6	33 06	JULIAN DAY NUMBER COMPUTATION
	RCL 5	34 05	
	÷	81	
	F INT	31 83	
	RCL 5	34 05	
	X	71	
	−	51	
	↑	41	
	+	61	
040	7	07	
	+	61	
	3	03	
	6	06	
	5	05	
	RCL 6	34 06	
	X	71	
	+	61	
	RCL 5	34 05	
	÷	81	
050	F INT	31 83	
	RCL 4	34 04	
	+	61	
	RCL 6	34 06	
	4	04	
	8	08	
	÷	81	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	F INT	31 83	
	+	61	
	3	03	
060	2	02	
	0	00	
	8	08	
	3	03	
	−	51	
	2	02	
	2	02	
	9	09	
	9	09	
	1	01	
070	7	07	TEST FOR JULIAN OR GREGORIAN CALENDAR
	1	01	
	H X≥Y	35 52	
	G X≤Y	32 71	
	GTO 9	22 09	
	RCL 6	34 06	
	RCL 7	34 07	
	÷	81	
	F INT	31 83	
	+	61	
080	RCL 6	34 06	
	4	04	
	X	71	
	RCL 7	34 07	
	÷	81	
	F INT	31 83	
	−	51	
	3	03	
	8	08	
	+	61	
090	F LBL 9	31 25 09	
	2	02	
	4	04	
	1	01	
	5	05	
	0	00	
	2	02	
	0	00	
	−	51	
	STO 2	33 02	STORE JD_{1900}
100	R/S	84	
	F LBL B	31 25 12	ENTER GMT
	F H←	31 74	
	STO C	33 13	
	2	02	
	4	04	
	÷	81	
	RCL 2	34 02	COMPUTE T
	+	61	
	.	83	
110	5	05	
	−	51	
	3	03	

REGISTERS

0	1	2	3	4	5	6	7	8	9
	J	JD_{1900}	M	D	12	IM	4800		
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I
T	ϵ_0	t_G	α_G		

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	6	06	
	5	05	
	2	02	
	5	05	
	÷	81	
	STO A	33 11	STORE T
	•	83	
120	0	00	
	1	01	
	3	03	
	0	00	
	1	01	
	3	03	
	CHS	42	
	RCL A	34 11	COMPUTE AND
	X	71	STORE G_0
	2	02	
130	3	03	
	•	83	
	4	04	
	5	05	
	2	02	
	2	02	
	9	09	
	4	04	
	+	61	
	STO B	33 12	
140	2	02	
	6	06	
	EEX	43	
	6	06	
	CHS	42	
	RCL A	34 11	
	X	71	
	2	02	COMPUTE
	4	04	AND
	0	00	STORE
150	0	00	R_G
	•	83	
	0	00	
	5	05	
	1	01	
	2	02	
	6	06	
	2	02	
	+	61	
	RCL A	34 11	
160	X	71	
	6	06	
	•	83	
	6	06	
	4	04	
	6	06	
	0	00	
	6	06	
	6	06	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	+	61	
170	RCL C	34 13	
	+	61	
	2	02	
	4	04	
	÷	81	
	G FRAC	32 83	
	2	02	
	4	04	
	X	71	
	STO 4	33 04	
180	0	00	
	G X≤Y	32 71	
	GTO 1	22 01	
	2	02	
	4	04	
	STO + 4	33 61 04	
	F LBL 1	31 25 01	COMPUTE
	RCL 4	34 04	AND
	1	01	STORE
	5	05	α_G
190	X	71	
	STO D	33 14	
	F LBL 2	31 25 02	
	RCL B	34 12	
	G→HMS	32 74	
	R/S	84	DISPLAY ϵ_0
	RCL 4	34 04	
	G→HMS	32 74	
	R/S	84	DISPLAY R_G
	RCL A	34 11	
200	R/S	84	DISPLAY T
	GTO 2	22 02	
	R/S	84	
		84	
210			
220			

LABELS

A ✓	B ✓	C	D	E
a	b	c	d	e
0	1 ✓	2 ✓	3	4
5	6	7	8	9 ✓

FLAGS

0
1
2
3

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☑	DEG ☒	FIX ☒
1	☐	☑	GRAD ☐	SCI ☐
2	☐	☑	RAD ☐	ENG ☐
3	☐	☑		n 4

Program Description I

Program Title MOON'S ASCENDING NODE, NUTATION OF OBLIQUITY, AND SYNETIC VERNAL POINT

Contributor's Name JAMES NEELY

Address P. O. BOX 1902 (SEC'Y CMA)

City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE MEAN LONGITUDE OF THE MOON'S ASCENDING NODE $\mathcal{N} = 259^\circ 10' 59.''79 - 5^r 134^\circ 08' 31.''23\,T + 7.''48\,T^2$, WHERE T IS THE NUMBER OF JULIAN CENTURIES FROM 1900 JAN. 0.5 E.T. LET $2L = 559^\circ 23' 36'' + 200^r 1^\circ 32' 16''\,T$, THEN THE DIFFERENTIAL NUTATION OF THE OBLIQUITY IS $\delta\epsilon = 9.''21 \cos\mathcal{N} + 0.''55 \cos 2L$, SO THAT THE CORRECTED OBLIQUITY IS $\epsilon = \epsilon_0 + \delta\epsilon$.

THE SYNETIC VERNAL POINT (SVP) IS GIVEN BY $SVP = -23^\circ 20' 38.''27 - \Delta\lambda$ WHERE $\Delta\lambda = (5025.''64 + 1.''11\,T)T - 17.''23 \sin\mathcal{N} - 1.''27 \sin 2L$ THE PRECESSION PLUS NUTATION OF THE ECLIPTIC LONGITUDE. [THE QUANTITY $30^\circ + SVP$ IS DISPLAYED FOR COMPARISON WITH A SVP EPHEMERIS].

ϵ AND THE SVP ARE STORED FOR SUBSEQUENT USE BY OTHER PROGRAMS IN THIS SERIES

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

Sample Problem(s)

FOR 0148 HOURS GMT ON APRIL 20, 1976, CALCULATE:

1. $\delta\odot$ THE ASCENDING NODE
2. THE ZODIAC SIGN OF $\delta\odot$ (1 = ARIES, 2 = TAURUS, ETC.)
3. THE DEGREE-IN-SIGN OF $\delta\odot$
4. $30^\circ + SVP$

FINALLY, CORRECT THE MEAN OBLIQUITY ϵ_0 (OBTAINED FROM ASTRO. 1) FOR NUTATION.

Solution(s) FIRST, EXECUTE ASTRO. 1, THEN, USING ASTRO.2:

[A] 223.2603 = $\delta\odot$ = 223°26'03"

[R/S] 8.0000 = 8TH SIGN (SCORPIO - ♏)

[R/S] 13.2603 = DEG-IN-SIGN. THUS $\delta\odot$ IS AT 13 ♏ 26'03"

[R/S] 5.3516 = $30^\circ + SVP = 5^\circ 35' 16"$

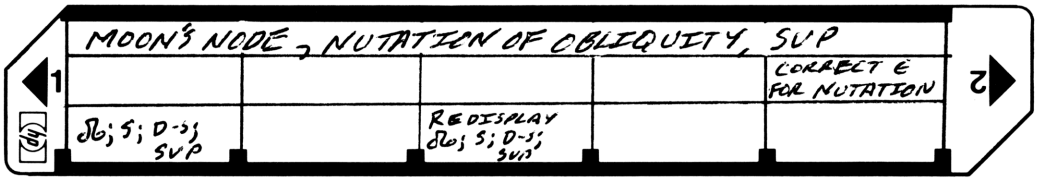
TO CORRECT THE OBLIQUITY:

[f] [E] 23.2626 = $\epsilon_0 + \delta\epsilon = \epsilon$ = 23°26'26"

Reference(s) 1. "EXPLANATORY SUPPLEMENT TO THE ASTRONOMICAL EPHEMERIS AND THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC", HER MAJESTY'S STATIONERY OFFICE, LONDON 1961.

2. STAHL-ALLEN "SYNETIC VERNAL POINT EPHEMERIS", SELUNAR RESEARCH PUBLICATIONS, BAY CITY, MICHIGAN, 1969

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1 (PROGRAM 00210D)			
2	ENTER ASTRO 2 – BOTH SIDES			
3	START COMPUTATIONS	NONE	A	
A	DISPLAY Ω			DDD.MMSS
B	DISPLAY ZODIAC SIGN		R/S	S.0000
C	DISPLAY DEGREE-IN-SIGN		R/S	DD.MMSS
D	DISPLAY 30°+SVP		R/S	DD.MMSS
	REPEAT FROM STEP 3A		R/S	Ω
4	CORRECT OBLIQUITY FOR NUTATION		F E	$\epsilon = \epsilon_0 + \delta\epsilon$
				DD.MMSS
5	IF DESIRED, REVIEW: 3A		C	Ω
	3B		R/S	SIGN
	3C		R/S	DEG-IN-SIGN
	3D		R/S	30°+SVP

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	F LBL A	31 25 11	
	7	07	START δθ
	•	83	COMPUTATION
	4	04	
	8	08	
	RCL A	34 11	
	X	71	
	6	06	
	9	09	
010	6	06	
	2	02	
	9	09	
	1	01	
	1	01	
	•	83	
	2	02	
	3	03	
	−	51	
	RCL A	34 11	
020	X	71	
	9	09	
	3	03	
	3	03	
	0	00	
	5	05	
	9	09	
	•	83	
	7	07	
	9	09	
030	+	61	
	3	03	
	6	06	
	0	00	
	0	00	
	STO 3	33 03	
	÷	81	
	3	03	
	6	06	
	0	00	
040	STO 4	33 04	
	÷	81	
	G FRAC	32 83	
	RCL 4	34 04	
	X	71	
	0	00	
	G X≤Y	32 71	
	GTO 1	22 01	ADD 360° IF
	RCL 4	34 04	δθ NEGATIVE
	+	61	
050	F LBL 1	31 25 01	
	+	61	
	STO 1	33 01	STORE δθ
	2	02	
	5	05	COMPUTE 2L
	9	09	
	2	02	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	0	00	
	5	05	
	5	05	
060	3	03	
	6	06	
	RCL A	34 11	
	X	71	
	2	02	
	0	00	
	1	01	
	3	03	
	8	08	
	1	01	
070	6	06	
	+	61	
	RCL 3	34 03	
	÷	81	
	STO 2	33 02	STORE 2L
	F COS	31 63	COMPUTE δε
	•	83	
	5	05	
	5	05	
	X	71	
080	RCL 1	34 01	
	F COS	31 63	
	9	09	
	•	83	
	2	02	
	1	01	
	X	71	
	+	61	
	RCL 3	34 03	
	÷	81	
090	STO 5	33 05	STORE δε
	1	01	COMPUTE Δλ
	7	07	
	•	83	
	2	02	
	3	03	
	RCL 1	34 01	
	F SIN	31 62	
	X	71	
	1	01	
100	•	83	
	2	02	
	7	07	
	RCL 2	34 02	
	F SIN	31 62	
	X	71	
	+	61	
	1	01	
	•	83	
	1	01	
110	1	01	
	RCL A	34 11	
	X	71	

REGISTERS

0	1	2	3	4	5	6	7	8	9
	δθ	2L	3600	360	δε				
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I
T	ε	(t_G)	(χ_G)	SVP	

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	5	05	
	0	00	
	2	02	
	5	05	
	•	83	
	6	06	
	4	04	
120	+	61	
	RCL A	34 11	COMPUTE
	X	71	SVP
	−	51	
	8	08	
	4	04	
	0	00	
	3	03	
	8	08	
	•	83	
130	2	02	
	7	07	
	−	51	
	RCL 3	34 03	
	÷	81	
	STO E	33 15	STORE SVP
	F LBL C	31 25 13	START DISPLAY
	RCL 1	34 01	
	G →HMS	32 74	
	R/S	84	DISPLAY ∂
140	↑	41	
	↑	41	
	3	03	
	0	00	
	÷	81	
	F INT	31 83	
	1	01	
	+	61	
	R/S	84	DISPLAY SIGN
	1	01	
150	−	51	
	3	03	
	0	00	
	X	71	
	−	51	
	R/S	84	DISPLAY DEG-IN-SIGN
	RCL E	34 15	
	3	03	
	0	00	
	+	61	
160	G →HMS	32 74	
	R/S	84	DISPLAY 30°+SVP
	GTO C	22 13	RE-DISPLAY
	F LBL 3	31 25 03	ERROR
	0	00	ROUTINE
	÷	81	
	GTO 3	22 03	
	G LBL E	32 25 15	CORRECT ∈₀
	H F? 2	35 71 02	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	GTO 4	22 04	PROTECT FROM
170	GTO 3	22 03	EXTRANEOUS CORRECTION
	F LBL 4	31 25 04	
	RCL B	34 12	
	RCL 5	34 05	
	+	61	
	STO B	33 12	
	→ HMS	32 74	DISPLAY ∈-CORR∂∈
	R/S	84	
		84	
180			
190			
200			
210			
220			

LABELS

A ✓	B	C ✓	D	E	0
a	b	c	d	e ✓	1
0	1 ✓	2	3 ✓	4 ✓	2 ✓
5	6	7	8	9	3

FLAGS

SET STATUS

FLAGS		TRIG		DISP	
	ON OFF				
0	☐ ☑	DEG	☑	FIX	☑
1	☐ ☑	GRAD	☐	SCI	☐
2	☑ ☐	RAD	☐	ENG	☐
3	☐ ☑			n	4

Program Description I

Program Title ASTRO 3: LOCAL SIDEREAL TIME, GEOCENTRIC LATITUDE, MIDHEAVEN, AND ASCENDANT

Contributor's Name JAMES NEELY

Address P.O. BOX 1902 (SEC'Y CMA)

City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables

1. LOCAL SIDEREAL TIME:

a. RIGHT ASCENSION OF THE ZENITH MERIDIAN (MIDHEAVEN):
$\alpha_{MC} = \alpha_G + \ell_N \pmod{360}$ DEGREES, WHERE ℓ_N IS THE GEOGRAPHIC LONGITUDE (+ FOR EAST, − FOR WEST)

b. LOCAL SIDEREAL TIME $= \alpha_{MC}/15$ HOURS

2. GEOCENTRIC LATITUDE: $\phi_C = \tan^{-1}(0.993305 \tan\phi_G)$, WHERE ϕ_G IS THE GEOGRAPHIC LATITUDE (+ FOR NORTH, − FOR SOUTH). ϕ_G MUST BE AN INPUT; THE COMPUTATION OF ϕ_C IS OPTIONAL. HENCEFORTH, EITHER LATITUDE WILL BE DENOTED BY ϕ.

3. MIDHEAVEN (GEOCENTRIC ECLIPTIC LONGITUDE OF THE ZENITH MERIDIAN, λ_{MC}): $\lambda_{MC} = \tan^{-1}\left(\dfrac{\sin\alpha_{MC}}{\cos\alpha_{MC}\cos\varepsilon}\right)$

4. ASCENDANT (GEOCENTRIC ECLIPTIC LONGITUDE OF THE EASTERN HORIZON, λ_{ASC}): $\lambda_{ASC} = \tan^{-1}\left(\dfrac{\cos\alpha_{MC}}{-\sin\alpha_{MC}\cos\varepsilon - \tan\phi\sin\varepsilon}\right)$

5. SIDEREAL LONGITUDES, λ_S, ARE COMPUTED FROM TROPICAL LONGITUDES, λ_T BY: $\lambda_S = \lambda_T + SVP$

Operating Limits and Warnings

α_G AND ε_0 ARE COMPUTED FROM ASTRO 1. (00210D)
ε AND SVP ARE COMPUTED FROM ASTRO 2.

OPINION AND COMPUTATION VARIES ON λ_{MC} & λ_{ASC} IN THE POLAR LATITUDES. IN THESE REGIONS, λ_{ASC} AND/OR λ_{MC} MAY NEED A 180° (6 SIGN) CORRECTION.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

SIGN	GLYPH	DEGREE	SIGN	GLYPH	DEGREE
1	♈	0°	7	♎	180°
2	♉	30°	8	♏	210°
3	♊	60°	9	♐	240°
4	♋	90°	10	♑	270°
5	♌	120°	11	♒	300°
6	♍	150°	12	♓	330°

Sample Problem(s)

FOR 0148 HOURS GMT ON APRIL 20, 1976, GEOGRAPHIC LATITUDE 37N20 AND LONGITUDE 121W55, CALCULATE:

1. LOCAL SIDEREAL TIME
2. GEOCENTRIC LATITUDE
3. TROPICAL MIDHEAVEN, λMC
4. TROPICAL ASCENDANT, λASC
5. SIDEREAL MIDHEAVEN, λMC
6. SIDEREAL ASCENDANT, λASC

NOTE: USE THE TRUE OBLIQUITY AS COMPUTED BY ASTRO 2. ($\epsilon = 23°26'26''$)

Solution(s) FIRST, EXECUTE ASTRO. 1, THEN EXECUTE ASTRO 2. THEN, WITH ASTRO 3:

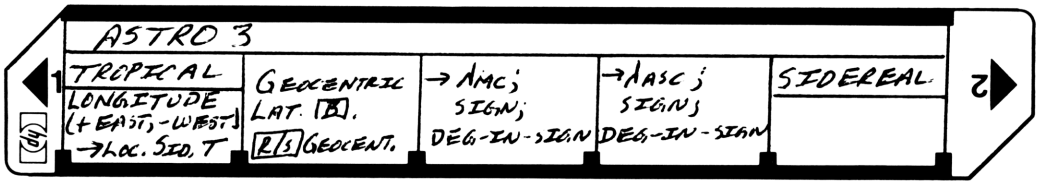
1. −121.55 [A] 7.3327 = $7^h33^m27^s$ LOCAL SIDEREAL TIME
2. 37.20 [B] 37.2000 = GEOGRAPHIC LAT; [R/S] 37.0852 = 37N08'52" GEOCENTRIC LAT.
3. λMC TROPICAL: [C] 111.3704 = 111°37'04" [R/S] 4.0000 = 4TH SIGN [R/S] 21.3704 or 21♋37'04"
4. λASC TROPICAL: [D] 199.0722 = 199°07'22" [R/S] 7.0000 = 7TH SIGN [R/S] 19.0722 or 19♎07'22"

CHANGE FROM TROPICAL MODE (DEFAULT) TO SIDEREAL [F][E]

5. λMC SIDEREAL: [C] 87.1220 = 87°12'20" [R/S] 3.0000 = 3RD SIGN [R/S] 27.1220 or 27♊12'20"
6. λASC SIDEREAL: [D] 174.4237 = 174°42'37" [R/S] 6.0000 = 6TH SIGN [R/S] 24.4237 or 24♍42'37"

Reference(s)

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1A	EXECUTE ASTRO 1 (00210D)			
B	EXECUTE ASTRO 2 IF CORRECTED			
	OBLIQUITY AND/OR SIDEREAL ZODIAC			
	IS DESIRED (00245D)			
2	ENTER PROGRAM			
3	ENTER GEOGRAPHIC LONGITUDE IN D.M.S	DDD.MMSS	A	LOCAL SIDEREAL TIME IN HH.MMSS
	+ FOR EAST, - FOR WEST			
4A	ENTER GEOGRAPHIC LATITUDE IN D.MS	DD.MMSS	B	GEOGRAPHIC LAT IN DEG.
	+ FOR NORTH, - FOR SOUTH			
B	IF REQUIRED, COMPUTE GEOCENTRIC LAT.	NONE	R/S	DD.MMSS
5A	SET MODE TO SIDEREAL OR		f E	
B	SET MODE TO TROPICAL (DEFAULT)		f A	
6A	COMPUTE MIDHEAVEN, MC		C	DDD.MMSS
	OPTIONAL - SIGN OF MC		R/S	SS.0000
	OPTIONAL - DEG-IN-SIGN OF MC		R/S	DD.MMSS
7A	COMPUTE ASCENDANT, ASC		D	DDD.MMSS
B	OPTIONAL - SIGN OF ASC		R/S	SS.0000
C	OPTIONAL - DEG-IN-SIGN OF ASC		R/S	DD.MMSS
	NOTE: COMPUTATIONS 5, 6, & 7			
	MAY BE REPEATED IN ANOTHER			
	MODE IF DESIRED.			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	F LBL 1	312501	STORE t_G & α_G IN A NEW LOCATION. KEY LOC. 0 WITH π
	RCL C	34 13	
	STO 8	33 08	
	RCL D	34 14	
	STO 9	33 09	
	H π	35 73	
	STO 0	33 00	
	H R↑	35 54	
	H RTN	35 22	
010	F LBL 3	312503	CONVERT NEGATIVE ANGLES TO POSITIVE
	0	00	
	G X≥Y	32 71	
	GTO 4	22 04	
	3	03	
	6	06	
	0	00	
	+	61	
	F LBL 4	312504	
	+	61	
020	H RTN	35 22	
	F LBL A	312511	ENTER LONGITUDE & COMPUTE LOCAL SIDEREAL TIME
	H F? 2	35 7102	
	F GSB 1	31 2201	
	F H←	31 74	
	RCL 9	34 09	
	+	61	
	F GSB 3	31 2203	
	STO D	33 14	
	1	01	
030	5	05	
	÷	81	
	G →HMS	32 74	
	R/S	84	
	GTO 0	22 00	ERROR
	F LBL B	312512	ENTER GEOGRAPHIC LATITUDE
	H F? 2	35 7102	
	F GSB 1	31 2201	
	F H←	31 74	
	STO C	33 13	
040	H LST X	35 62	
	R/S	84	
	RCL C	34 13	CONVERT GEOGRAPHIC LATITUDE TO GEOCENTRIC LATITUDE
	F TAN	31 64	
	•	83	
	9	09	
	9	09	
	3	03	
	3	03	
	0	00	
050	5	05	
	X	71	
	G TAN^{-1}	32 64	
	STO C	33 13	
	G →HMS	32 74	
	R/S	84	
	GTO 0	2200	ERROR

STEP	KEY ENTRY	KEY CODE	COMMENTS
	F LBL C	312513	COMPUTE ΔMC
	RCL D	34 14	
	1	01	
060	F R←	31 72	
	RCL B	34 12	
	F COS	31 63	
	X	71	
	GTO 5	2205	
	F LBL D	312514	COMPUTE ΔASC
	RCL D	34 14	
	1	01	
	F R←	31 72	
	RCL B	34 12	
070	1	01	
	F R←	31 72	
	H R↑	35 54	
	X	71	
	H X≷Y	35 52	
	RCL C	34 13	
	F TAN	31 64	
	X	71	
	+	61	
	CHS	42	
080	F LBL 5	312505	ROUTINE COMMON TO ΔMC & ΔASC
	G →P	32 72	
	H X≷Y	35 52	
	RCL E	34 15	TROPICAL OR SIDEREAL?
	H F?0	35 7100	
	CL X	44	
	+	61	
	F GSB 3	31 2203	
	G →HMS	32 74	
	R/S	84	DISPLAY DEGREE
090	↑	41	
	↑	41	
	3	03	
	0	00	
	÷	81	
	F INT	31 83	
	1	01	
	+	61	DISPLAY SIGN
	R/S	84	
	1	01	
100	−	51	
	3	03	
	0	00	
	X	71	
	−	51	DISPLAY DEG-IN-SIGN
	R/S	84	
	GTO 0	2200	ERROR
	G LBL A	322511	SET TROPICAL
	H SF 0	355100	
	R/S	84	
110	GTO 0	2200	
	G LBL E	322515	SET SIDEREAL
	H CF 0	356100	

REGISTERS

0	1	2	3	4	5	6	7	8	9
π								t_G	α_G
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I
T	ϵ	t_G / ϕ	α_G / ΔMC	SVP	

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	R/S	84	
120			
130			
140			
150			
160			

STEP	KEY ENTRY	KEY CODE	COMMENTS
170			
180			
190			
200			
210			
220			

LABELS

A LONG	B LAT	C MC	D ASC	E	
a TROPICAL	b	c	d	e SIDEREAL	
0 ERROR	1 ✓	2	3 ✓	4 ✓	
5 ✓	6	7	8	9	

FLAGS

0	✓
1	
2	✓
3	

SET STATUS

FLAGS			TRIG	DISP	
	ON	OFF			
0	☑	☐	DEG ☑	FIX ☐	
1	☐	☑	GRAD ☐	SCI ☐	
2	☑	☐	RAD ☐	ENG ☐	
3	☐	☑		n 4	

Program Description I

Program Title MUNDOSCOPE, REGIOMONTANUS

Contributor's Name JAMES NEELY
Address P.O. BOX 1902 (SEC'Y CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE PLANETARY POSITIONS ARE CONVERTED TO THE REGIOMONTANUS MUNDO POSITIONS AS FOLLOWS:

COUNTERCLOCKWISE SYSTEM:

$$\lambda^{\circ}_{RM} = \tan^{-1}\left[\frac{\sin M}{\cos M + \tan\delta \tan\phi}\right]$$

THEN $\lambda_{RM} = \lambda^{\circ}_{RM} + Z_{MC}$ WHERE $M = -$ HOUR ANGLE $= \alpha - \alpha_{MC}$, α = RIGHT ASCENSION OF BODY, δ = DECLINATION OF BODY, ϕ = LATITUDE (GEOGRAPHIC), α_{MC} = RIGHT ASCENSION MC (LOCAL SIDEREAL TIME), & Z_{MC} = ZENITH (MC) ORIGIN ANGLE.

CLOCKWISE SYSTEM: $\lambda_{RM} = 360^{\circ} - \lambda^{\circ}_{RM} + Z_{MC}$

IF THE BODY'S ECLIPTIC LONGITUDE λ & LATITUDE β ARE INPUT, THEN α & δ ARE COMPUTED FROM

$$\begin{pmatrix} \cos\delta\cos\alpha \\ \cos\delta\sin\alpha \\ \sin\delta \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\epsilon & -\sin\epsilon \\ 0 & \sin\epsilon & \cos\epsilon \end{pmatrix} \begin{pmatrix} \cos\beta\cos\lambda \\ \cos\beta\sin\lambda \\ \sin\beta \end{pmatrix}$$

WHERE ϵ = THE OBLIQUITY OF THE ECLIPTIC

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

Sign	Glyph	Sign	Glyph
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

Sample Problem(s) For 0148 Hours GMT on April 20, 1976, Geographic Latitude 37N20 and Longitude 121W55, Calculate the Regiomontanus In-Mundo Coordinates of the Bodies Listed Below when $\gamma_{MC} = 15\,♎\,00 = 105°00'00"$. (Note: Astro 1, Astro 2, & Astro 3 were Executed prior to the Regiomontanus Mundoscope. To approximate these results use $\epsilon = 23°26'26"$ [H.MS→] [STO B], $\phi = 37N20$, $\alpha_{MC} = 7^h33^m27^s$)

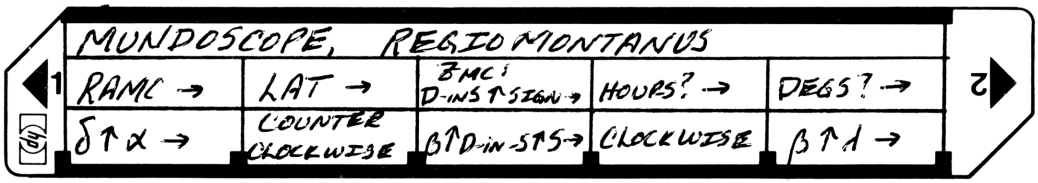
Body	α	δ	λ	Deg-in-Sign & Sign	β
Sun	$1^h52^m04^s$	11°30'42"	30°06'41"	0°♉06'41"	0°00'00"
Moon	$19^h04^m06^s$	-17°53'38"	285°16'59"	15♑16'59"	4°42'02"
Mercury	$2^h59^m35^s$	19°10'23"	47°58'08"	17♉58'08"	2°04'12"

Solution(s)

Body	λ_{RM}	λ_{RM}
Sun	28°20'55"	181°39'05"
	28♈20'55"	1♎39'05"
Moon	279°06'41'	29°53'19"
	9♑06'41"	20♑53'19"
Mercury	49°12'16"	160°47'44"
	19♉12'16"	10♍47'44"

Reference(s) 1. Arthur Blackwell, "Mid-points in Mundo", The Constellations", R.O.S.A., Placentia, CA (Vol 1 No. 1 pp 26-32)
2. Bud Overbeck – Private Communication

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1 (00X10D) AND ASTRO 3 (00X19D)			
	NOTE: TO CORRECT OBLIQUITY FOR NUTATION,			
	ASTRO 2 (00X15D) MAY BE EXECUTED.			
2	READ PROGRAM CARD (BOTH SIDES)			
3	SET INPUT MODE: HOURS (DEFAULT)	NONE	F D	
	OR DEGREES	NONE	F E	
4	INPUT α_{MC} IN HH.MMSS OR DDD.MMSS *	α_{MC}	F A	DDD.DDDD
5	INPUT GEOGRAPHIC LATITUDE ϕ *	DD.MMSS	F B	DD.DDDD
6	INPUT ZENITH ORIGIN ANGLE ZMC: {	DEG-IN-SIGN	↑	
		SIGN	F C	DDD.DDDD
7	SET OUTPUT MODE: "CLOCKWISE" FOR δRM	NONE	D	
	OR "COUNTERCLOCKWISE" (DEFAULT) FOR δRM	NONE	B	
8	INPUT DATA BY STEP A, B, OR C:			
A	DECLINATION	δ	↑	
	α IN HH.MMSS OR DDD.MMSS	α	A	
	GO TO STEP 9			
B	LATITUDE	β	↑	
	d DEG-IN-SIGN	DD.MMSS	↑	
	SIGN	S	C	
	GO TO STEP 9			
C	LATITUDE	β	↑	
	d (360° CIRCLE)	DDD.MMSS	E	
	GO TO STEP 9			
9	OUTPUT DISPLAY: δRM OR δRM			DDD.MMSS
	OPTIONAL: { SIGN		R/S	SS.cccc
	DEG-IN-SIGN		R/S	DD.MMSS
10	REPEAT FROM STEP 8A, 8B, OR 8C FOR			
	THE NEXT BODY			
	* NOT NEEDED IF ASTRO 3 EXECUTED.			
	(IF α_{MC} & ϕ ARE KNOWN AND IF			
	THE DATA INPUT IS VIA STEP 8A,			
	THIS PROGRAM CAN OPERATE AS			
	A "STAND-ALONE")			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL d	21 16 14	INPUT HOURS
002	SF1	16 21 01	
003	RTN	24	
004	*LBL e	21 16 15	INPUT DEGREES
005	CF1	16 22 01	
006	RTN	24	
007	*LBL a	21 16 11	INPUT α_{MC}
008	HMS→	16 36	
009	1	01	
010	5	05	
011	X≷Y	-41	
012	F1?	16 23 01	CONVERT TO DEGREES
013	×	-35	
014	STOD	35 14	
015	RTN	24	
016	*LBL b	21 16 12	INPUT LATITUDE ϕ
017	HMS→	16 36	
018	STOC	35 13	
019	RTN	24	
020	*LBL c	21 16 13	INPUT Z_{MC}
021	1	01	
022	-	-45	
023	3	03	
024	0	00	
025	×	-35	
026	+	-55	
027	HMS→	16 36	
028	STO1	35 01	
029	RTN	24	
030	*LBL C	21 13	LATITUDE β, DEG-IN-SIGN, SIGN INPUT (d)
031	1	01	
032	-	-45	
033	3	03	
034	0	00	
035	×	-35	
036	+	-55	
037	HMS→	16 36	
038	GTO9	22 09	
039	*LBL E	21 15	LATITUDE β & LONGITUDE λ.
040	HMS→	16 36	
041	*LBL 9	21 09	
042	X≷Y	-41	
043	HMS→	16 36	
044	1	01	CONVERT λ & β TO α & δ
045	→R	44	
046	R↓	-31	
047	X≷Y	-41	
048	R↑	16-31	
049	→R	44	
050	STO2	35 02	
051	R↓	-31	
052	→P	34	
053	X≷Y	-41	
054	RCLB	36 12	
055	+	-55	
056	X≷Y	-41	
057	→R	44	
058	RCL2	36 02	
059	→P	34	
060	R↓	-31	
061	STO3	35 03	
062	R↓	-31	
063	SIN⁻¹	16 41	
064	STO4	35 04	
065	GTO8	22 08	
066	*LBL A	21 11	INPUT α & δ
067	X≷Y	-41	
068	HMS→	16 36	
069	STO4	35 04	
070	R↓	-31	
071	HMS→	16 36	
072	1	01	
073	5	05	
074	X≷Y	-41	
075	F1?	16 23 01	CONVERT HOURS TO DEGREES
076	×	-35	
077	STO3	35 03	
078	*LBL 8	21 08	
079	RCL3	36 03	COMMON ROUTINE TO COMPUTE λ°_{RM}
080	RCLD	36 14	
081	-	-45	
082	1	01	
083	→R	44	
084	RCLC	36 13	
085	TAN	43	
086	RCL4	36 04	
087	TAN	43	
088	×	-35	
089	+	-55	
090	→P	34	
091	X≷Y	-41	
092	F0?	16 23 00	
093	GTO7	22 07	
094	CHS	-22	λ°_{RM}
095	3	03	
096	6	06	
097	0	00	
098	+	-55	
099	*LBL 7	21 07	ADD Z_{MC}
100	RCL1	36 01	
101	+	-55	
102	3	03	
103	6	06	
104	0	00	
105	÷	-24	
106	LSTX	16-63	λ_{RM} OR $\underline{\lambda_{RM}}$ MOD 360°
107	X≷Y	-41	
108	FRC	16 44	
109	1	01	
110	+	-55	
111	FRC	16 44	
112	×	-35	

REGISTERS

0	1 Z_{MC}	2 TEMP	3 α	4 δ	5	6	7	8	9
S0 TT	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B ϵ	C ϕ	D α_{MC}	E SVP	I				

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	→HMS	16 35	DISPLAY ΔRM OR ΔRM
114	R/S	51	
115	ENT↑	-21	
116	ENT↑	-21	
117	3	03	
118	0	00	
119	÷	-24	
120	INT	16 34	
121	1	01	
122	+	-55	
123	R/S	51	DISPLAY SIGN
124	1	01	
125	-	-45	
126	3	03	
127	0	00	
128	x	-35	
129	-	-45	DISPLAY
130	R/S	51	DEG-IN-SIGN
131	GTO0	22 00	ERROR
132	*LBL0	21 14	SET ΔMC
133	CF0	16 22 00	FLAG
134	R/S	51	
135	*LBLB	21 12	SET ΔMC
136	SF0	16 21 00	FLAG
137	R/S	51	
140			
150			
160			
170			
180			
190			
200			
210			
220			

COMMENTS RM

LABELS

A	B	C	D	E	
a	b	c	d	e	
0 Error	1	2	3	4	
5	6	7	8	9	

FLAGS

0, 1, 2, 3

SET STATUS

FLAGS			TRIG	DISP	
	ON	OFF			
0	☑	☐	DEG ☑	FIX ☑	
1	☑	☐	GRAD ☐	SCI ☐	
2	☐	☑	RAD ☐	ENG ☐	
3	☐	☐		n 4	

Program Description I

Program Title MUNDOSCOPE, CAMPANUS

Contributor's Name JAMES NEELY
Address P. O. BOX 1902 (SEC'Y CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE PLANETARY POSITIONS ARE CONVERTED TO THE CAMPANUS MUNDO POSITIONS AS FOLLOWS:

COUNTERCLOCKWISE SYSTEM:

$$\lambda^{\circ}_{CM} = \tan^{-1}\left[\frac{\sin M}{\cos M \cos\phi + \tan\delta \sin\phi}\right]$$

THEN $\lambda_{CM} = \lambda^{\circ}_{CM} + Z_{MC}$ WHERE M = −HOUR ANGLE = $\alpha - \alpha_{MC}$, α = RIGHT ASCENSION OF BODY, δ = DECLINATION OF BODY, ϕ = LATITUDE (GEOGRAPHIC), α_{MC} = RIGHT ASCENSION MC (LOCAL SIDEREAL TIME), & Z_{MC} = ZENITH (MC) ORIGIN ANGLE.

CLOCKWISE SYSTEM: $\lambda_{CM} = 360^{\circ} - \lambda^{\circ}_{CM} + Z_{MC}$

IF THE BODY'S ECLIPTIC LONGITUDE λ & LATITUDE β ARE INPUT, THEN α & δ ARE COMPUTED FROM

$$\begin{pmatrix} \cos\delta\cos\alpha \\ \cos\delta\sin\alpha \\ \sin\delta \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\epsilon & -\sin\epsilon \\ 0 & \sin\epsilon & \cos\epsilon \end{pmatrix} \begin{pmatrix} \cos\beta\cos\lambda \\ \cos\beta\sin\lambda \\ \sin\beta \end{pmatrix}$$

WHERE ϵ = THE OBLIQUITY OF THE ECLIPTIC.

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

Sign	Glyph	Sign	Glyph
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

Sample Problem(s) FOR 0148 HOURS GMT ON APRIL 20, 1976, GEOGRAPHIC LATITUDE 37N20 AND LONGITUDE 121W55, CALCULATE THE CAMPANUS MUNDO COORDINATES OF THE FOLLOWING BODIES (NOTE: ASTRO 1, ASTRO 2, & ASTRO 3 WERE EXECUTED PRIOR TO THE CAMPANUS MUNDOSCOPE & $\epsilon = 23°26'26"$, $\phi = 37N20$, $\alpha_{MC} = 7^h33^m27^s$ WILL APPROXIMATE THESE RESULTS. TO ENTER $\epsilon = 23°26'26"$ [H.MS→] [STO B])

Body	α	δ	λ	β
SUN	$1^h52^m04^s$	11°30'42"	30°06'41"	0°00'00"
MOON	$19^h04^m06^s$	−17°53'38"	285°16'59"	4°42'02"
MERCURY	$2^h59^m35^s$	19°10'23"	47°58'08"	2°04'12"

NOTE: USE $Z_{MC} = 15♋00 = 105°00'00"$

Solution(s)

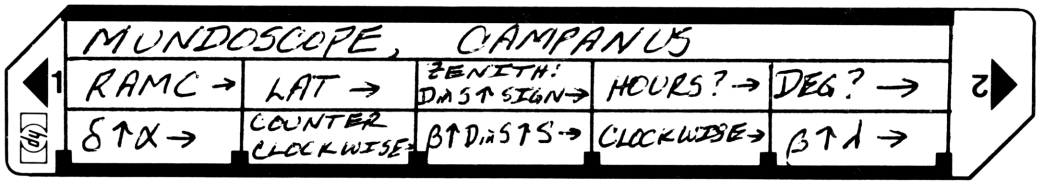
Body	Λ_{CM}	Λ_{CM}
SUN	25°41'04"	184°18'56"
	25♉41'04"	4♎18'56"
MOON	277°36'33"	292°23'27"
	7♑36'33"	22♑23'27"
MERCURY	43°23'21"	166°36'39"
	13♉23'21"	16♍36'39"

Reference(s) 1. CYRIL FAGAN, "AMERICAN ASTROLOGY", CLANCY PUBL., FEB. 1958, PP. 44–46.

2. ARTHUR BLACKWELL, MID-POINTS IN MUNDO, "THE CONSTELLATIONS", R.O.S.A., PLACENTIA, CA (VOL. 1 NO. 1 PP 26–32)

3. BUZ OVERBECK – PRIVATE COMMUNICATION

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1 (00210D) AND ASTRO 3 (00245D)			
	NOTE: TO CORRECT OBLIQUITY FOR NUTATION,			
	ASTRO 2 (00245D) MAY BE EXECUTED			
2	READ PROGRAM CARD (BOTH SIDES)			
3	SET INPUT MODE: HOURS (DEFAULT)	NONE	F D	
	OR DEGREES	NONE	F E	
4	INPUT α_{MC} IN HH.MMSS OR DDD.MMSS *	α_{MC}	F A	DDD.DDDD
5	INPUT GEOGRAPHIC LATITUDE ϕ * (NOT NEEDED	DD.MMSS	F B	DD.DDDD
	IF ASTRO 3 EXECUTED)			
6	INPUT ZENITH ORIGIN ANGLE Z_{MC}: {	DEG-IN-SIGN	↑	
		SIGN	F C	DDD.DDDD
7	SET OUTPUT MODE: "CLOCKWISE" FOR λ_{CM}	NONE	D	
	OR "COUNTERCLOCKWISE" (DEFAULT) FOR λ_{CM}	NONE	B	
8	INPUT DATA BY STEP A, B, OR C:			
A	DECLINATION	δ	↑	
	α IN HH.MMSS OR DDD.MMSS	α	A	
	GO TO STEP 9			
B	LATITUDE	β	↑	
	λ DEG-IN-SIGN	DD.MMSS	↑	
	SIGN	S	C	
	GO TO STEP 9			
C	LATITUDE	β	↑	
	λ (360° CIRCLE)	DDD.MMSS	E	
	GO TO STEP 9			
9	OUTPUT DISPLAY: λ_{CM} OR λ_{CM}			DDD.MMSS
	OPTIONAL: { SIGN		R/S	SS.CCCC
	{ DEG-IN-SIGN		R/S	DD.MMSS
10	REPEAT FROM STEP 8A, 8B, OR 8C FOR			
	THE NEXT BODY.			
	* NOT NEEDED IF ASTRO 3			
	EXECUTED (IF α_{MC} & ϕ ARE KNOWN			
	AND IF THE DATA INPUT IS VIA			
	STEP 8A, THIS PROGRAM CAN			
	OPERATE IN A "STAND-ALONE" MODE)			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL d	21 16 14	INPUT HOURS
002	SF1	16 21 01	
003	RTN	24	
004	*LBL e	21 16 15	INPUT DEGREES
005	CF1	16 22 01	
006	RTN	24	
007	*LBL a	21 16 11	INPUT α_{MC}
008	HMS→	16 36	
009	1	01	
010	5	05	
011	X≷Y	-41	
012	F1?	16 23 01	
013	×	-35	CONVERT TO DEGREES
014	STO D	35 14	
015	RTN	24	
016	*LBL b	21 16 12	INPUT LATITUDE
017	HMS→	16 36	ϕ
018	STO C	35 13	
019	RTN	24	
020	*LBL c	21 16 13	INPUT Z_{MC}
021	1	01	
022	-	-45	
023	3	03	
024	0	00	
025	×	-35	
026	+	-55	
027	HMS→	16 36	
028	STO 1	35 01	
029	RTN	24	
030	*LBL C	21 13	LATITUDE,
031	1	01	DEG-IN-SIGN,
032	-	-45	SIGN INPUT
033	3	03	
034	0	00	
035	×	-35	
036	+	-55	
037	HMS→	16 36	
038	GTO 9	22 09	
039	*LBL E	21 15	LATITUDE,
040	HMS→	16 36	DEGREE INPUT
041	*LBL 9	21 09	
042	X≷Y	-41	
043	HMS→	16 36	CONVERT
044	1	01	λ & β
045	→R	44	TO
046	R↓	-31	α & δ
047	X≷Y	-41	
048	R↑	16-31	
049	→R	44	
050	STO 2	35 02	
051	R↓	-31	
052	→P	34	
053	X≷Y	-41	
054	RCL B	36 12	
055	+	-55	
056	X≷Y	-41	
057	→R	44	
058	RCL 2	36 02	
059	→P	34	
060	R↓	-31	
061	STO 3	35 03	
062	R↓	-31	
063	SIN⁻¹	16 41	
064	STO 4	35 04	
065	GTO 8	22 08	
066	*LBL A	21 11	INPUT α & δ
067	X≷Y	-41	
068	HMS→	16 36	
069	STO 4	35 04	
070	R↓	-31	
071	HMS→	16 36	
072	1	01	
073	5	05	
074	X≷Y	-41	
075	F1?	16 23 01	CONVERT HOURS
076	×	-35	TO DEGREES
077	STO 3	35 03	
078	*LBL 8	21 08	
079	RCL 3	36 03	COMMON
080	RCL D	36 14	ROUTINE
081	-	-45	TO
082	1	01	COMPUTE
083	→R	44	λ^{0}_{CM}
084	RCL C	36 13	
085	COS	42	
086	×	-35	
087	RCL C	36 13	
088	SIN	41	
089	RCL 4	36 04	
090	TAN	43	
091	×	-35	
092	+	-55	
093	→P	34	
094	X≷Y	-41	
095	F0?	16 23 00	
096	GTO 7	22 07	
097	CHS	-22	λ^{0}_{CM}
098	3	03	
099	6	06	
100	0	00	
101	+	-55	
102	*LBL 7	21 07	ADD Z_{MC}
103	RCL 1	36 01	
104	+	-55	
105	3	03	
106	6	06	
107	0	00	
108	÷	-24	
109	LSTX	16-63	λ_{CM} OR λ_{CM}
110	X≷Y	-41	MOD 360°
111	FRC	16 44	
112	1	01	

REGISTERS

0	1 Z_{MC}	2 TEMP	3 x	4 δ	5	6	7	8	9
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_6	S9 α_6
A T	B ϵ	C ϕ	D α_{MC}	E SVP	I				

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	+	-55	
114	FRC	16 44	
115	×	-35	
116	→HMS	16 35	DISPLAY dcm OR dcm
117	R/S	51	
118	ENT↑	-21	
119	ENT↑	-21	
120	3	03	
121	0	00	
122	÷	-24	
123	INT	16 34	
124	1	01	
125	+	-55	
126	R/S	51	DISPLAY SIGN
127	1	01	
128	-	-45	
129	3	03	
130	0	00	
131	×	-35	
132	-	-45	
133	R/S	51	DISPLAY DEG-IN-SIGN
134	GTO 00	22 00	ERROR
135	*LBL D	21 14	SET dcm FLAG
136	CF 0	16 22 00	
137	R/S	51	
138	*LBL B	21 12	SET dcm FLAG
139	SF 0	16 21 00	
140	R/S	51	

STEP	KEY ENTRY	KEY CODE	COMMENTS
150			
160			
170			
180			
190			
200			
210			
220			

LABELS

A ✓	B ✓	C ✓	D ✓	E ✓	0 ✓
a ✓	b ✓	c ✓	d ✓	e ✓	1 ✓
0 ERROR	1	2	3	4	2
5	6	7 ✓	8 ✓	9 ✓	3

FLAGS

	ON	OFF
0	☑	☐
1	☑	☐
2	☐	☑
3	☐	☑

SET STATUS

TRIG	DISP
DEG ☑	FIX ☑
GRAD ☐	SCI ☐
RAD ☐	ENG ☐
	n 4

Program Description I

Program Title HOUSE CUSPS - PLACIDUS METHOD (EXACT)

Contributor's Name JAMES NEELY
Address P.O. BOX 1902 (SEC'Y CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables

THE HOUSE CUSPS ARE COMPUTED BY THE EXACT METHOD OF PLACIDUS. LET λ_N DENOTE THE (TROPICAL) DEGREE (ECLIPTIC LONGITUDE) OF THE N^{TH} CUSP. COMPUTE

$$f_N = (N-10)/3,$$

SOLVE $\cos\xi_N = -\sin(\alpha_{MC} + f_N\xi_N)\tan\phi\tan\varepsilon$
FOR ξ_N USING THE NEWTON-RAPHSON METHOD
THEN,

$$\lambda_N = \tan^{-1}\left[\frac{\sin(\alpha_{MC}+f_N\xi_N)}{\cos(\alpha_{MC}+f_N\xi_N)\cos\varepsilon}\right] \quad \text{FOR } N=7,8,\ldots,12$$

ALSO, $\lambda_N = \lambda_{N+6} + 180^\circ$ FOR $N=1,2,\ldots,6$

SIDEREAL LONGITUDES, λ_S, ARE COMPUTED FROM THE TROPICAL LONGITUDES ABOVE BY ADDING SVP TO λ_N

NOTE: THIS PROGRAM MUST BE USED WITH ASTRO 1, 2, & 3. ε, ϕ, α_{MC}, & SVP ARE DESCRIBED THEREIN.

Operating Limits and Warnings

AN ERROR WILL FLASH IF A POLAR LATITUDE IS INPUT. PLACIDIAN CUSPS DO NOT EXIST IN THE POLAR REGIONS.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

SIGN	GLYPH	SIGN	GLYPH
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

Sample Problem(s) FOR 0148 HOURS GMT ON APRIL 20, 1976, GEOGRAPHIC LATITUDE 37N20 & LONGITUDE 121W55 (NOTE - EXECUTE THE SAMPLE PROBLEM IN ASTRO-3), COMPUTE TROPICAL & SIDEREAL CUSPS IN THE (STANDARD) PLACIDUS SYSTEM.

IN THE PLACIDUS SYSTEM

$d_{10} = d_{MC}$ AND $d_1 = d_{ASC}$

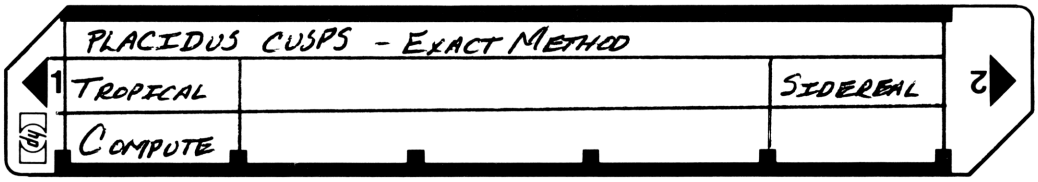
Solution(s) PARTIAL SOLUTION:

CUSP	TROPICAL ZODIAC			SIDEREAL ZODIAC		
NO.	DEGREE	SIGN	DEG-IN-SIGN	DEGREE	SIGN	DEG-IN-SIGN
10	111°37'04"	4	21 ♋ 37'04"	87°12'20"	3	27 ♊ 12'20"
11	144°30'59"	5	24 ♌ 30'59"	120°06'14"	5	0 ♌ 06'14"
12	174°03'57"	6	24 ♍ 03'57"	149°39'13"	5	29 ♌ 39'13"
1	199°07'22"	7	19 ♎ 07'22"	174°42'37"	6	24 ♍ 42'37"
2	226°57'18"	8	16 ♏ 57'18"	202°32'33"	7	22 ♎ 32'33"
3	258°09'57"	9	18 ♐ 09 57	233°45'13"	8	23 ♏ 45'13"

Reference(s)

M.E. HONE, "THE MODERN TEXTBOOK OF ASTROLOGY." L.N. FOWLER & CO. LTD, LONDON. 1968

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 3 (00249D)			
2	ENTER PROGRAM CARD (BOTH SIDES)			
3	SET ZODIAC SYSTEM. EITHER:			
A	TROPICAL (DEFAULT). OR		F A	
B	SIDEREAL		F E	
4	START (DISPLAY FIRST CUSP NO.)		A	N = 10.
	GO TO STEP 6			
5	DISPLAY NEW CUSP NUMBER		R/S	N.
6	DISPLAY λ IN D.M.S.		R/S	DDD.MMSS
7	DISPLAY SIGN		R/S	SS.0000
8	DISPLAY DEG-IN-SIGN		R/S	DD.MMSS
9	REPEAT STEPS 5 THRU 8 FOR THE NEXT CUSP			
	NOTE: IF REQUIRED, REPEAT FROM STEP 3 TO CHANGE ZODIACS.			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	LBL 1	31 25 01	
	RCL C	34 13	
	ABS	35 64	ERROR EXIT
	9	09	
	0	00	FOR
	RCL B	34 12	
	-	51	POLAR
	X≤Y?	32 71	
	GTO 0	22 00	LATITUDES
010	RCL 0	34 00	
	π	35 73	
	X=Y?	32 51	
	P⇄S	31 42	
	STO 6	33 06	
	RCL B	34 12	
	1	01	
	R↓	31 72	
	STO 5	33 05	
	÷	81	
020	RCL C	34 13	
	TAN	31 64	
	X	71	
	STO 9	33 09	
	0	00	
	STO 7	33 07	
	RCL D	34 14	
	G→R	32 73	
	STO 8	33 08	
	RTN	35 22	
030	LBL A	31 25 11	START COMPUTATION
	F? 2	35 71 02	
	GSB 1	31 22 01	
	7	07	INITIALIZE
	STO I	35 33	
	1	01	
	0	00	
	STO 1	33 01	
	0	00	
	STO 2	33 02	
040	LBL 2	31 25 02	
	TI	35 73	INITIAL GUESS
	2	02	
	÷	81	
	STO 3	33 03	
	RAD	35 42	
	LBL 3	31 25 03	
	RCL 2	34 02	BEGIN
	RCL 3	34 03	
	X	71	NEWTON-
050	RCL 6	34 06	
	+	61	RAPHSON
	STO 4	33 04	
	RCL 9	34 09	ITERATION
	R↓	31 72	
	RCL 2	34 02	
	CHS	42	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	X	71	
	RCL 3	34 03	
	SIN	31 62	
060	+	61	
	X⇄Y	35 52	
	RCL 3	34 03	
	COS	31 63	
	+	61	
	X⇄Y	35 52	
	÷	81	
	RCL 3	34 03	
	+	61	
	STO 3	33 03	
070	LST X	35 82	
	-	51	
	ABS	35 64	
	EEX	43	
	8	08	CONVERGED?
	CHS	42	
	X≤Y?	32 71	
	GTO 3	22 03	NO - LOOP BACK
	RCL 3	34 03	
	RCL 2	34 02	
080	X	71	
	RCL 8	34 08	
	+	61	
	RCL (i)	34 24	
	+	61	
	1	01	
	R↓	31 72	
	RCL 5	34 05	
	X	71	
	DEG	35 41	
090	→P	32 72	
	X⇄Y	35 52	
	RCL E	34 15	
	F? 0	35 71 00	
	CL X	44	
	+	61	
	3	03	
	6	06	
	0	00	
	+	61	
100	LST X	35 82	
	÷	81	
	LST X	35 82	
	X⇄Y	35 52	
	FRAC	32 83	
	X	71	
	RCL 1	34 01	
	DSP 0	23 00	
	R/S	84	DISPLAY CUSP NO.
	R↓	35 53	
110	→HMS	32 74	
	DSP 4	23 04	DISPLAY
	R/S	84	DEGREE

REGISTERS

0	1 N	2 f_N	3 g_N	4 $\alpha + fg$	5 cos ε	6 π	7 0	8 $\alpha_{RADIANS}$	9 time/date
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B ε	C φ	D α_{MC}	E SVP	I USED				

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	↑	41	
	↑	41	
	3	03	
	0	00	
	÷	81	
	INT	31 83	
	1	01	
120	+	61	DISPLAY SIGN
	R/S	84	
	1	01	
	−	51	
	3	03	
	0	00	
	X	71	
	−	51	DISPLAY
	R/S	84	DEG-IN-SIGN
	1	01	
130	2	02	
	RCL 1	34 01	
	1	01	NEW CUSP NO.
	+	61	
	X>Y?	32 81	
	1	01	
	STO 1	33 01	
	7	07	
	X>Y	32 81	
	6	06	
140	ST I	35 33	
	RCL 2	34 02	
	3	03	
	1/x	35 62	
	+	61	
	STO 2	33 02	
	RND	31 24	
	1	01	
	X≠Y?	32 61	
	GTO 2	22 02	
150	1	01	
	CHS	42	
	STO 2	33 02	
	GTO 2	22 02	
	LBL a	32 25 11	TROPICAL ZODIAC
	SF 0	35 51 00	
	R/S	84	
	LBL e	32 25 15	SIDEREAL ZODIAC
	CF 0	35 61 00	
	R/S	84	
160			

STEP	KEY ENTRY	KEY CODE	COMMENTS
170			
180			
190			
200			
210			
220			

LABELS

A ✓	B	C	D	E
a ✓	b	c	d	e ✓
0 ERROR	1 ✓	2 ✓	3 ✓	4
5	6	7	8	9

FLAGS

0 ✓
1
2 ✓
3

SET STATUS

FLAGS		TRIG	DISP
	ON OFF		
0	☑ ☐	DEG ☑	FIX ☑
1	☐ ☐	GRAD ☐	SCI ☐
2	☑ ☐	RAD ☐	ENG ☐
3	☐ ☐		n 0

Program Description I

Program Title HOUSE CUSPS - REGIOMONTANUS METHODS

Contributor's Name JAMES NEELY
Address P.O. Box 1902 (SEC'Y CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE HOUSE CUSPS ARE COMPUTED IN ONE OF SEVERAL REGIOMONTANUS SYSTEMS. LET d_N DENOTE THE (TROPICAL) DEGREE (ECLIPTIC LONGITUDE) OF THE N^{th} CUSP. COMPUTE:

A. STANDARD SYSTEM $\Delta_N = 60^\circ + 30N$ FOR $N = 1, 2, \ldots, 12$
B. 8-FOLD SYSTEM $\Delta_N = 157\frac{1}{2} - 45N$ FOR $N = 1, 1\frac{1}{2}, \ldots, 8\frac{1}{2}$
C. 12-FOLD SYSTEM $\Delta_N = 45^\circ + 30N$ FOR $N = 1, 1\frac{1}{2}, \ldots, 12\frac{1}{2}$

THEN, $$\lambda_N = \tan^{-1}\left[\frac{\sin(\alpha_{MC}+\Delta_N)}{\cos(\alpha_{MC}+\Delta_N)\cos\epsilon - \sin\Delta_N \tan\phi \sin\epsilon}\right]$$

SIDEREAL LONGITUDES, λ_S, ARE COMPUTED FROM THE ABOVE TROPICAL LONGITUDES BY ADDING SVP TO Δ_N.

NOTE: THIS PROGRAM MUST BE USED WITH ASTRO 1, 2, AND 3. ϵ, ϕ, α_{MC} AND SVP ARE DESCRIBED THEREIN.

Operating Limits and Warnings

THIS PROGRAM IS VALID FOR ALL NON-POLAR LATITUDES, THAT IS, $|\phi| < 90^\circ - \epsilon$. NO VALIDITY CHECKING IS PERFORMED.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

Sign	Glyph	Sign	Glyph
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

Sample Problem(s) For 0148 Hours GMT on April 20, 1976, Geographic Latitude 37N20 and Longitude 121W55 (Note - Execute the Sample Problem in Astro 3), Calculate Tropical & Sidereal Cusp & Medians in the Standard, 8-Fold & 12-Fold Systems. The partial solutions are:

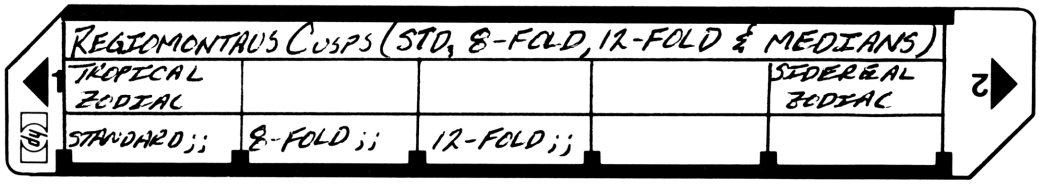
	Cusp Number			Tropical			Sidereal		
	Standard	8-Fold	12-Fold	Degree	Sign	Deg-in-Sign	Degree	Sign	Deg-in-Sign
MC →	10	3½	10½	111°37'04"	4	21♋37'04"	87°12'20"	3	27♊12'20"
			11	129°32'41"	5	9♌32'41"	105°07'57"	4	15♋07'57"
		3		136°00'44"	5	18♌00'44"	113°35'60"	4	23♋35'60"
	11		11½	146°03'51"	5	26♌03'51"	121°39'06"	5	1♌39'06"
		2½	12	160°55'01"	6	10♍55'01"	136°30'17"	5	16♌30'17"
	12		12½	174°22'05"	6	24♍22'05"	149°57'20"	5	29♌57'20"
		2		180°43'13"	7	0♎43'13"	156°18'26"	6	6♍18'26"
			1	186°54'58"	7	6♎54'58"	162°30'13"	6	12♍30'13"
ASC →	1	1½	1½	199°07'22"	7	19♎07'22"	174°42'37"	6	24♍42'37"
			2	211°33'24"	8	1♏33'24"	187°08'40"	7	7♎08'40"
		1		218°02'10"	8	8♏02'10"	193°37'26"	7	13♎37'26"
	2		2½	224°46'59"	8	14♏46'59"	200°22'14"	7	20♎22'14"
		8½	3	239°19'20"	8	29♏19'20"	214°54'36"	8	4♏54'36"
	3		3½	255°30'25"	9	15♐30'25"	231°05'41"	8	21♏05'41"
		8		264°12'05"	9	24♐12'05"	239°47'21"	8	29♏47'21"
			4	273°12'20"	10	3♑12'20"	246°47'36"	9	8♐47'36"

Reference(s)

1. Alan Leo, "Casting the Horoscope," L.N. Fowler & Co., LTD. London, 1970

2. Carl W. Stahl, "Stahl's Octoscope Tables & Houses, Campanus Demonstification," Selunar Research Publications, Bay City, Mich. 1974. for the 8-Fold & 12-Fold Methods & Principles.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1, 2 & 3			
2	ENTER PROGRAM CARD (BOTH SIDES)			
3	SET ZODIAC SYSTEM. EITHER			
A	TROPICAL (DEFAULT), OR		F A	
B	SIDEREAL		F E	
4	INITIALIZE CUSP SYSTEM. EITHER			
A	STANDARD CUSPS, OR		A	10.
B	8-FOLD CUSPS & MEDIANS, OR		B	3.5
C	12-FOLD CUSPS & MEDIANS,		C	10.5
	THEN GO TO STEP 6			
5	DISPLAY NEW CUSP NUMBER		R/S	NN.N
6	DISPLAY λ IN D.M.S		R/S	DDD.MMSS
7	DISPLAY SIGN		R/S	SS.0000
8	DISPLAY DEG-IN-SIGN		R/S	DD.MMSS
9	REPEAT STEPS 5 THRU 8 FOR THE NEXT CUSP			
	NOTE: AT ANY TIME, THE COMPUTATIONS MAY BE REPEATED FRRM STEP 3 OR FROM STEP 4			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	LBL 1	31 25 01	INITIALIZATION SUBROUTINE
	RCL 0	34 00	
	π	35 73	
	x=y?	32 51	
	P≠S	31 42	
	RCL C	34 13	
	1	01	
	R↓	31 72	
	STO 4	33 04	cos φ
010	÷	81	TAN φ
	RCL B	34 12	
	1	01	
	R↓	31 72	
	STO 5	33 05	COS ε
	R↓	35 53	SIN ε
	X	71	
	STO 6	33 06	TAN φ SIN ε
	3	03	
	0	00	
020	STO 7	33 07	30
	4	04	
	5	05	
	STO 8	33 08	45
	1	01	
	5	05	
	7	07	
	•	83	
	5	05	
	STO 9	33 09	157 1/2
030	0	00	
	STO 3	33 03	0
	RTN	35 22	
	G LBL a	32 25 11	TROPICAL ZODIAC
	SF 0	35 51 00	
	R/S	84	
	G LBL e	32 25 15	SIDEREAL ZODIAC
	CF 0	35 61 00	
	R/S	84	
	LBL 9	31 25 09	STANDARD CUSP ROUTINE: A_N COMPUTATION
040	DSP 0	23 00	
	1	01	
	2	02	
	RCL 1	34 01	
	1	01	
	+	61	
	x≥y?	32 81	
	1	01	
	STO 1	33 01	
	RCL 7	34 07	
050	X	71	
	6	06	
	0	00	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL 7	31 25 07	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	DSP 1	23 01	12-FOLD CUSP ROUTINE: A_N COMPUTATION
	1	01	
	2	02	
060	•	83	
	5	05	
	RCL 1	34 01	
	•	83	
	5	05	
	+	61	
	x>y?	32 81	
	1	01	
	STO 1	33 01	
	RCL 7	34 07	
070	X	71	
	RCL 8	34 08	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL 8	31 25 08	8-FOLD CUSP ROUTINE: A_N COMPUTATION
	DSP 1	23 01	
	•	83	
	5	05	
	RCL 1	34 01	
080	•	83	
	5	05	
	—	51	
	x≠y?	32 61	
	GTO 6	22 06	
	8	08	
	•	83	
	5	05	
	LBL 6	31 25 06	
	STO 1	33 01	
090	RCL 8	34 08	
	CHS	42	
	X	71	
	RCL 9	34 09	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL A	31 25 11	STANDARD CUSP INITIALIZATION
	GSB 1	31 22 01	
	DSP 0	23 00	
100	1	01	
	0	00	
	STO 1	33 01	
	9	09	
	STO I	35 33	
	GTO 2	22 02	
	LBL B	31 25 12	8-FOLD CUSP INITIALIZATION
	GSB 1	31 22 01	
	DSP 1	23 01	
	3	03	
110	•	83	
	5	05	
	STO 1	33 01	

REGISTERS

0	1 N	2	3 A_N	4 cos φ	5 COS ε	6 TAN φ SIN ε	7 30	8 45	9 157.5
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B ε	C φ	D α_{MC}	E SVP	I 7 - 12 FOLD 8 - 8 FOLD 3 - 3 STANDARD				

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	8	08	
	STO I	35 33	
	GTO 2	22 02	
	LBL C	31 25 13	
	GSB 1	31 22 01	12-FOLD CUSP
	DSP 1	23 01	INITIALIZATION
	1	01	
120	0	00	
	.	83	
	5	05	
	STO 1	33 01	
	7	07	
	STO I	35 33	
	LBL 2	31 25 02	
	RCL 3	34 03	A_N
	RCL D	34 14	
	+	61	$\alpha_{MC} + A_N$
130	1	01	
	R↓	31 72	
	RCL 5	34 05	
	X	71	$\cos(\alpha_{MC}+A_N)\cos\epsilon$
	RCL 3	34 03	
	SIN	31 62	
	RCL 6	34 06	
	X	71	$\sin A_N \tan\phi \cos\epsilon$
	−	51	
	→ P	32 72	
140	R↓	35 53	λ_N
	RCL E	34 15	SVP
	F? 0	35 71 00	
	CL X	44	0
	+	61	
	3	03	
	6	06	λ_N OR λ_S
	0	00	
	+	61	MOD 360°
	LST X	35 82	
150	÷	81	
	LST X	35 82	
	X⇌Y	35 52	
	FRAC	32 83	
	X	71	
	RCL 1	34 01	
	R/S	84	DISPLAY CUSP #
	R↓	35 53	
	→HMS	32 74	
	DSP 4	23 04	
160	R/S	84	DISPLAY DEGREE
	↑	41	
	↑	41	
	RCL 7	34 07	
	÷	81	
	INT	31 83	
	1	01	
	+	61	
	R/S	84	DISPLAY SIGN

STEP	KEY ENTRY	KEY CODE	COMMENTS
	1	01	
170	−	51	
	RCL 7	34 07	
	X	71	
	−	51	DISPLAY DEGREE-IN-SIGN
	R/S	84	
	GTO (i)	22 24	CONTINUE
	R/S	84	
180			
190			
200			
210			
220			

LABELS

A ✓	B ✓	C ✓	D	E
a ✓	b	c	d	e
0	1 ✓	2 ✓	3	4
5	6 ✓	7 ✓	8 ✓	9 ✓

FLAGS

0 ✓
1
2
3

SET STATUS

FLAGS		TRIG		DISP	
	ON	OFF				
0	☑	☐	DEG	☑	FIX	☑
1	☐	☑	GRAD	☐	SCI	☐
2	☐	☑	RAD	☐	ENG	☐
3	☐	☑			n	0

Program Description I

Program Title HOUSE CUSPS - CAMPANUS METHODS

Contributor's Name JAMES NEELY
Address P.O. BOX 1902 (SECY CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE HOUSE CUSPS ARE COMPUTED IN ONE OF SEVERAL CAMPANUS SYSTEMS. LET λ_N DENOTE THE (TROPICAL) DEGREE (ECLIPTIC LONGITUDE) OF THE N^{TH} CUSP, COMPUTE:

A. STANDARD SYSTEM $\xi_N = 60^\circ + 30N$ FOR $N = 1, 2, \ldots, 12$.

B. 8-FOLD SYSTEM $\xi_N = 157\frac{1}{2}^\circ - 45N$ FOR $N = 1, 1\frac{1}{2}, \ldots, 8\frac{1}{2}$.

C. 12-FOLD SYSTEM $\xi_N = 45^\circ + 30N$ FOR $N = 1, 1\frac{1}{2}, \ldots, 12\frac{1}{2}$.

THEN, $$A_N = \tan^{-1}(\tan \xi_N \cos\phi)$$

AND, $$\lambda_N = \tan^{-1}\left[\frac{\sin(\alpha_{MC} + A_N)}{\cos(\alpha_{MC} + A_N)\cos\epsilon - \sin A_N \tan\phi \sin\epsilon}\right]$$

SIDEREAL LONGITUDES, λ_S, COMPUTED FROM THE ABOVE TROPICAL LONGITUDES BY ADDING SVP TO λ_N.

NOTE: THIS PROGRAM MUST BE USED WITH ASTRO 1, 2, and 3. $\epsilon, \phi, \alpha_{MC}$ AND SVP ARE DESCRIBED THEREIN.

Operating Limits and Warnings

THIS PROGRAM IS VALID FOR ALL NON-POLAR LATITUDES, THAT IS, $|\phi| < 90^\circ - \epsilon$. NO VALIDITY CHECKING IS PERFORMED.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

SIGN	GLYPH	SIGN	GLYPH
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

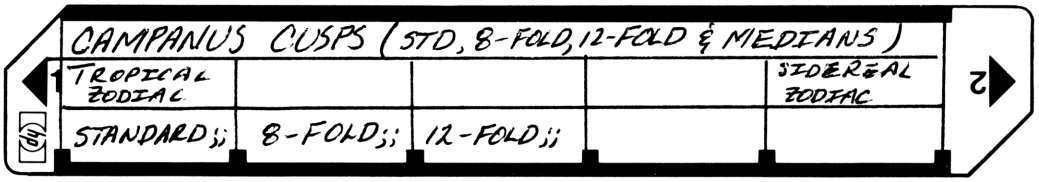
Sample Problem(s) FOR 0148 HOURS GMT ON APRIL 20, 1976; GEOGRAPHIC LATITUDE 37N20 & LONGITUDE 121W55 (NOTE-EXECUTE THE SAMPLE PROBLEM IN ASTRO 3), CALCULATE TROPICAL & SIDEREAL CUSPS IN THE STANDARD, 8-FOLD, & 12-FOLD SYSTEMS. THE PARTIAL SOLUTIONS ARE:

	CUSP NUMBER			TROPICAL			SIDEREAL		
	Standard	8-FOLD	12-FOLD	DEGREE	SIGN	DEG-IN-SIGN	DEGREE	SIGN	DEG-IN-SIGN
MC →	10	3½	10½	111°37'04"	4	21♋37'04"	87°12'20"	3	27♊12'20"
			11	126°07'01"	5	6♌07'01"	101°42'17"	4	11♋42'17"
		3		133°17'12"	5	13♌17'12"	108°52'28"	4	18♋52'28"
	11		11½	140°25'51"	5	20♌25'51"	116°01'07"	4	26♋01'07"
		2½	12	154°43'60"	6	4♍43'60"	130°14'16"	5	10♌14'16"
	12		12½	169°12'00"	6	19♍12'00"	144°47'16"	5	24♌47'16"
		2		176°32'30"	6	26♍32'30"	152°07'46"	6	2♍07'46"
			1	183°58'22"	7	3♎58'22"	159°33'38"	6	9♍33'38"
ASC →	1	1½	1½	199°07'22"	7	19♎07'22"	174°42'37"	6	24♍42'37"
			2	214°37'16"	8	4♏37'16"	190°12'32"	7	10♎12'32"
		1		222°27'48"	8	12♏27'48"	198°03'04"	7	18♎03'04"
	2		2½	230°20'11"	8	20♏20'11"	205°55'26"	7	25♎55'26"
		8½	3	246°03'55"	9	6♐03'55"	221°39'11"	8	11♏39'11"
	3		3½	261°36'03"	9	21♐36'03"	237°11'19"	8	27♏11'19"
		8		269°14'50"	9	29♐14'50"	244°50'06"	9	4♐50'06"
			4	276°47'56"	10	6♑47'56"	252°23'12"	9	12♐23'12"

Reference(s) 1. ALAN LEO, "CASTING THE HOROSCOPE", L.N. FOWLER & CO LTD LONDON, 1970

2. CARL W. STAHL, "STAHL'S OCTOSCOPE TABLES OF HOUSES, CAMPANUS DOMNIFICATION", SELUNAR RESEARCH PUBL. BAY CITY, MICH. 1974

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	EXECUTE ASTRO 3 (00249D)				
2	ENTER PROGRAM CARD (BOTH SIDES)				
3	SET ZODIAC SYSTEM. EITHER				
A	TROPICAL (DEFAULT), OR		F	A	
B	SIDEREAL		F	E	
4	INITIALIZE CUSP SYSTEM. EITHER				
A	STANDARD CUSPS, OR		A		N=10.
B	8-FOLD CUSPS & MEDIANS, OR		B		N=3.5
C	12-FOLD CUSPS & MEDIANS, THEN		C		N=10.5
	GO TO STEP 6				
5	DISPLAY NEW CUSP NUMBER		R/S		NN.N
6	DISPLAY λ_N IN D.M.S.		R/S		DDD.MMSS
7	DISPLAY SIGN		R/S		SS.0000
8	DISPLAY DEG.-IN-SIGN		R/S		DD.MMSS
9	REPEAT STEPS 5 THRU 8 FOR THE				
	NEXT CUSP				
	NOTE: AT ANY TIME, STEP 4 MAY				
	BE REPEATED TO INITIALIZE A				
	NEW CUSP SYSTEM. ALSO, STEP 3				
	MAY BE REPEATED TO CHANGE				
	ZODIACS.				

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	LBL 1	31 25 01	INITIALIZATION SUBROUTINE
	RCL 0	34 00	
	π	35 73	
	X=Y?	32 51	
	P≠S	31 42	
	RCL C	34 13	
	1	01	
	R↓	31 72	
	STO 4	33 04	COS φ
010	÷	81	TAN φ
	RCL B	34 12	
	1	01	
	R↓	31 72	
	STO 5	33 05	COS ε
	R↓	35 53	SINE
	X	71	
	STO 6	33 06	TAN φ SING
	3	03	
	0	00	
020	STO 7	33 07	30
	4	04	
	5	05	
	STO 8	33 08	45
	1	01	
	5	05	
	7	07	
	.	83	
	5	05	
	STO 9	33 09	157 1/2
030	0	00	
	STO 3	33 03	0
	RTN	35 22	
	G LBL a	32 25 11	TROPICAL ZODIAC
	SF 0	35 51 00	
	R/S	84	
	G LBL e	32 25 15	SIDEREAL ZODIAC
	CF 0	35 61 00	
	R/S	84	
	LBL 9	31 25 09	STANDARD COSP ROUTINE. S_N COMPUTATION
040	DSP 0	23 00	
	1	01	
	2	02	
	RCL 1	34 01	
	1	01	
	+	61	
	X>Y?	32 81	
	1	01	
	STO 1	33 01	
	RCL 7	34 07	
050	X	71	
	6	06	
	0	00	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL 7	31 25 07	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	DSP 1	23 01	12-FOLD COSP ROUTINE. S_N COMPUTATION
	1	01	
	2	02	
060	.	83	
	5	05	
	RCL 1	34 01	
	.	83	
	5	05	
	+	61	
	X>Y?	32 81	
	1	01	
	STO 1	33 01	
	RCL 7	34 07	
070	X	71	
	RCL 8	34 08	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL 8	31 25 08	8-FOLD COSP ROUTINE: S_N COMPUTATION
	DSP 1	23 01	
	.	83	
	5	05	
	RCL 1	34 01	
080	.	83	
	5	05	
	−	51	
	X≠Y?	32 61	
	GTO 6	22 06	
	8	08	
	.	83	
	5	05	
	LBL 6	31 25 06	
	STO 1	33 01	
090	RCL 8	34 08	
	CHS	42	
	X	71	
	RCL 9	34 09	
	+	61	
	STO 3	33 03	
	GTO 2	22 02	
	LBL A	31 25 11	STANDARD COSP INITIALIZATION
	GSB 1	31 22 01	
	DSP 0	23 00	
100	1	01	
	0	00	
	STO 1	33 01	
	9	09	
	STO I	35 33	
	GTO 2	22 02	
	LBL B	31 25 12	8-FOLD COSP INITIALIZATION
	GSB 1	31 22 01	
	DSP 1	23 01	
	3	03	
110	.	83	
	5	05	
	STO 1	33 01	

REGISTERS

0	1 N	2	3 $S_N/\Delta N$	4 cos φ	5 cos ε	6 tan φ sine	7 30	8 45	9 157.5
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B ε	C φ	D α_{MC}	E SVP	I 7-12 FOLD 8-8 FOLD STANDARD				

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	8	08	
	STO I	35 33	
	GTO 2	22 02	
	LBL C	31 25 13	12-FOLD CUSP
	GSB 1	31 22 01	
	DSP 1	23 01	INITIALIZATION
	1	01	
120	0	00	
	.	83	
	5	05	
	STO 1	33 01	
	7	07	
	ST I	35 33	
	LBL 2	31 25 02	
	RCL 3	34 03	S_N
	1	01	
	R↓	31 72	
130	RCL 4	34 04	
	÷	81	
	→P	32 72	
	X⇄Y	35 52	
	STO 3	33 03	Δ_N
	RCL D	34 14	
	+	61	$\alpha_{MC} + \Delta_N$
	1	01	
	R↓	31 72	
	RCL 5	34 05	
140	X	71	$\cos(\alpha_{MC}+\Delta_N)\cos\phi$
	RCL 3	34 03	
	SIN	31 62	$\sin\Delta_N$
	RCL 6	34 06	
	X	71	$\sin\Delta_N \tan\phi \cos\phi$
	−	51	
	→P	32 72	
	R↓	35 53	λ_N
	RCL E	34 15	SVP
	F? 0	35 71 00	
150	CL X	44	0
	+	61	
	3	03	
	6	06	λ_N or λ_S
	0	00	
	+	61	MOD 360°
	LST X	35 82	
	÷	81	
	LST X	35 82	
	X⇄Y	35 52	
160	FRAC	32 83	
	X	71	
	RCL 1	34 01	
	R/S	64	DISPLAY CUSP #
	R↓	35 53	
	→HMS	32 74	
	DSP 4	23 04	
	R/S	84	DISPLAY DEGREE
	↑	41	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	↑	41	
170	RCL 7	34 07	
	÷	81	
	INT	31 83	
	1	01	
	+	61	
	R/S	84	DISPLAY SIGN
	1	01	
	−	51	
	RCL 7	34 07	
	X	71	
180	−	51	
	R/S	84	DISPLAY DEG-IN SIGN
	GTO (i)	22 24	CONTINUE
	R/S	84	
190			
200			
210			
220			

LABELS

A ✓	B ✓	C ✓	D	E
a ✓	b	c	d	e ✓
0	1 ✓	2 ✓	3	4
5	6 ✓	7 12 FOLD	8 8 FOLD	9 STANDARD

FLAGS

0 ✓
1
2
3

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☑	☐	DEG ☑	FIX ☑
1	☐	☑	GRAD ☐	SCI ☐
2	☐	☑	RAD ☐	ENG ☐
3	☐	☑		n 0

Program Description I

Program Title HOUSE CUSPS - TOPOCENTRIC METHODS

Contributor's Name JAMES NEELY
Address P.O. BOX 1502 (SEC'Y CMA)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE HOUSE CUSPS ARE COMPUTED IN ONE OF SEVERAL TOPOCENTRIC SYSTEMS. LET λ_N DENOTE THE (TROPICAL) DEGREE (ECLIPTIC LONGITUDE) OF THE N^{TH} CUSP. COMPUTE:

A. STANDARD SYSTEM: $\Delta_N = 60^\circ + 30N$ FOR $N = 1, 2, \ldots, 12$.

B. 8-FOLD SYSTEM: $\Delta_N = 15^\circ\tfrac{1}{2} - 45N$ FOR $N = 1, 1\tfrac{1}{2}, \ldots, 8\tfrac{1}{2}$.

C. 12-FOLD SYSTEM: $\Delta_N = 45^\circ + 30N$ FOR $N = 1, 1\tfrac{1}{2}, 2, \ldots, 12\tfrac{1}{2}$.

THEN $$F_N = \left| \left| \frac{\Delta_N}{90} - 1 \right| \bmod 4 - 2 \right| - 1 ,$$

AND, $$\lambda_N = \tan^{-1}\left[\frac{\sin(\alpha_{MC} + \Delta_N)}{\cos(\alpha_{MC} + \Delta_N)\cos\epsilon - F_N \tan\phi \sin\epsilon} \right]$$

SIDEREAL LONGITUDES, λ_S, ARE COMPUTED FROM THE ABOVE TROPICAL LONGITUDES BY ADDING SVP TO λ_N.

NOTE: THIS PROGRAM MUST BE USED WITH ASTRO 1, 2, & 3 (00249D)
ϵ, ϕ, α_{MC} AND SVP ARE DESCRIBED THEREIN.

Operating Limits and Warnings

THIS PROGRAM IS VALID FOR ALL NON-POLAR LATITUDES, THAT IS, $|\phi| < 90^\circ - \epsilon$. NO VALIDITY CHECKING IS PERFORMED.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Description II

Sketch(es)

Sign	Glyph	Sign	Glyph
1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

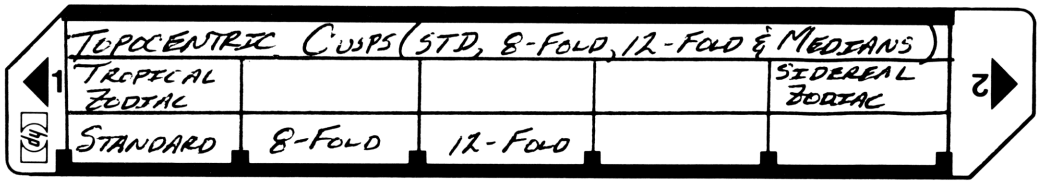
Sample Problem(s) For 0148 hours GMT on April 20, 1976; Geographic Latitude 37N20 & Longitude 121W55 (Note – Execute the Sample Program in Astro 3), Calculate Tropical & Sidereal Cusps & Medians in the Standard, 8-Fold, & 12-Fold Systems. The Partial Solutions are:

	Cusp Number			Tropical			Sidereal		
	Stand-ard	8-Fold	12-Fold	Degree	Sign	Deg-in-Sign	Degree	Sign	Deg-in-Sign
MC →	10	3½	10½	111°37'04"	4	21♋37'04"	87°12'20"	3	27♊12'20"
			11	126°19'01"	5	8♌19'01"	103°54'16"	4	13♋54'16"
		3		136°29'49"	5	16♌29'49"	112°05'05"	4	22♋05'05"
	11		11½	144°30'02"	5	24♌30'02"	120°05'17"	5	0♌05'17"
		4½	12	159°49'24"	6	9♍49'24"	135°24'40"	5	15♌24'40"
	12		12½	174°03'57"	6	24♍03'57"	149°39'13"	5	29♌39'13"
		5		166°45'11"	7	0♎45'11"	158°20'27"	6	6♍20'27"
			1	187°09'07"	7	7♎09'07"	162°44'23"	6	12♍44'23"
ASC →	1	1½	1½	199°07'22"	7	19♎07'22"	174°42'37"	6	24♍42'37"
			2	212°35'49"	8	2♏35'49"	188°11'04"	7	8♎11'04"
		1		219°40'57"	8	9♏40'57"	195°16'13"	7	15♎16'13"
	2		2½	226°59'36"	8	16♏59'36"	202°34'52"	7	22♎34'52"
		6½	3	242°15'07"	9	2♐15'07"	217°50'23"	8	7♏50'23"
	3		3½	258°15'16"	9	18♐15'16"	233°50'31"	8	23♏50'31"
		8		266°26'38"	9	26♐26'36"	242°03'54"	9	2♐03'54"
			4	274°46'22"	10	4♑46'22"	250°23'37"	9	10♐23'37"

Reference(s) 1. W. Polich & A.P. Nelson Page, "Brief Outline of the Topocentric System of Houses", The Astrological Journal, Vol. V, No. 4, 1963, Sparta Press Ltd.

2. Carl W. Stahl, "Stahl's Octoscope Tables of Houses, Campanus Domnification", Solunar Research Publ., Bay City, Mich 1974

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1, 2, & 3			
2	ENTER PROGRAM CARD (BOTH SIDES)			
3	SET ZODIAC SYSTEM. EITHER			
A	TROPICAL (DEFAULT), OR		F A	
B	SIDEREAL		F E	
4	INITIALIZE CUSP SYSTEM. EITHER			
A	STANDARD CUSPS, OR		A	10.
B	8-FOLD CUSPS & MEDIANS, OR		B	3.5
C	12-FOLD CUSPS & MEDIANS		C	10.5
	THEN GO TO STEP 6			
5	DISPLAY NEW CUSP OR MEDIAN NUMBER		R/S	NN.N
6	DISPLAY λ IN D.M.S.		R/S	DDDMMSS
7	DISPLAY SIGN		R/S	SS.0000
8	DISPLAY DEG-IN-SIGN		R/S	DD.MMSS
9	REPEAT STEPS 5 THRU 8 FOR THE NEXT CUSP OR MEDIAN			
	NOTE: AT ANY TIME, THE COMPUTATIONS MAY BE REPEATED FROM STEP 3 OR STEP 4.			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL1	21 01	INITIALIZATION SUBROUTINE
002	RCL0	36 00	
003	Pi	16-24	
004	X=Y?	16-33	
005	P≠S	16-51	
006	RCLC	36 13	
007	1	01	
008	→R	44	
009	STO4	35 04	COSΦ
010	÷	-24	TANΦ
011	RCLB	36 12	
012	1	01	
013	→R	44	
014	STO5	35 05	COSE
015	R↓	-31	SINE
016	×	-35	
017	STO6	35 06	TANΦSINE
018	3	03	
019	0	00	
020	STO7	35 07	30
021	4	04	
022	5	05	
023	STO8	35 08	45
024	1	01	
025	5	05	
026	7	07	
027	.	-62	
028	5	05	
029	STO9	35 09	157½
030	0	00	
031	STO3	35 03	0
032	RTN	24	
033	*LBLa	21 16 11	TROPICAL ZODIAC
034	SF0	16 21 00	
035	R/S	51	
036	*LBLe	21 16 15	SIDEREAL ZODIAC
037	CF0	16 22 00	
038	R/S	51	
039	*LBL9	21 09	STANDARD CUSP ROUTINE: ΔN COMPUTATION
040	DSP0	-63 00	
041	1	01	
042	2	02	
043	RCL1	36 01	
044	1	01	
045	+	-55	
046	X>Y?	16-34	
047	1	01	
048	STO1	35 01	N
049	RCL7	36 07	
050	×	-35	
051	6	06	
052	0	00	
053	+	-55	
054	STO3	35 03	ΔN
055	GTO2	22 02	
056	*LBL7	21 07	

STEP	KEY ENTRY	KEY CODE	COMMENTS
057	DSP1	-63 01	12-FOLD CUSP ROUTINE: ΔN COMPUTATION
058	1	01	
059	2	02	
060	.	-62	
061	5	05	
062	RCL1	36 01	
063	.	-62	
064	5	05	
065	+	-55	
066	X>Y?	16-34	
067	1	01	
068	STO1	35 01	N
069	RCL7	36 07	
070	×	-35	
071	RCL8	36 08	
072	+	-55	
073	STO3	35 03	ΔN
074	GTO2	22 02	
075	*LBL8	21 08	8-FOLD CUSP ROUTINE: ΔN COMPUTATION
076	DSP1	-63 01	
077	.	-62	
078	5	05	
079	RCL1	36 01	
080	.	-62	
081	5	05	
082	-	-45	
083	X≠Y?	16-32	
084	GTO6	22 06	
085	8	08	
086	.	-62	
087	5	05	
088	*LBL6	21 06	
089	STO1	35 01	N
090	RCL8	36 08	
091	CHS	-22	
092	×	-35	
093	RCL9	36 09	
094	+	-55	
095	STO3	35 03	ΔN
096	GTO2	22 02	
097	*LBLA	21 11	STANDARD CUSP INITIALIZATION
098	GSB1	23 01	
099	DSP0	-63 00	
100	1	01	
101	0	00	
102	STO1	35 01	
103	9	09	
104	STOI	35 46	
105	GTO2	22 02	
106	*LBLB	21 12	8-FOLD CUSP INITIALIZATION
107	GSB1	23 01	
108	DSP1	-63 01	
109	3	03	
110	.	-62	
111	5	05	
112	STO1	35 01	

REGISTERS

0	1 N'	2	3 ΔN	4 COSΦ	5 COSE	6 TANΦSINE	7 30	8 45	9 157½
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B E	C Φ	D α_{MC}	E SVP	I 7- 12-FOLD 8 8-FOLD 9 STD				

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	8	08	
114	STOI	35 46	
115	GTO2	22 02	
116	*LBLC	21 13	12-FOLD CUSP
117	GSB1	23 01	INITIALIZATION
118	DSP1	-63 01	
119	1	01	
120	0	00	
121	.	-62	
122	5	05	
123	STO1	35 01	
124	7	07	
125	STOI	35 46	
126	*LBL2	21 02	COMMON ROUTINE
127	RCL3	36 03	
128	RCLD	36 14	$\alpha_{MC} + \Delta_N$
129	+	-55	
130	1	01	
131	→R	44	
132	RCL5	36 05	
133	×	-35	$\cos(\alpha_{MC} + \Delta_N)\cos\epsilon$
134	RCL3	36 03	
135	9	09	
136	0	00	
137	÷	-24	
138	1	01	
139	-	-45	
140	ABS	16 31	
141	4	04	
142	÷	-24	COMPUTE
143	FRC	16 44	
144	4	04	F_N
145	×	-35	
146	2	02	
147	-	-45	
148	ABS	16 31	
149	1	01	
150	-	-45	
151	RCL6	36 06	
152	×	-35	
153	-	-45	
154	→P	34	
155	R↓	-31	λ_N
156	RCLE	36 15	SVP
157	F0?	16 23 00	
158	CLX	-51	
159	+	-55	
160	3	03	$\lambda \bmod 360^\circ$
161	6	06	
162	0	00	
163	+	-55	
164	LSTX	16-63	
165	÷	-24	
166	LSTX	16-63	
167	X≠Y	-41	
168	FRC	16 44	

STEP	KEY ENTRY	KEY CODE	COMMENTS
169	×	-35	TOPO
170	RCL1	36 01	
171	R/S	51	DISPLAY CUSP #
172	R↓	-31	
173	→HMS	16 35	
174	DSP4	-63 04	
175	R/S	51	DISPLAY DEGREE
176	ENT↑	-21	
177	ENT↑	-21	
178	RCL7	36 07	
179	÷	-24	
180	INT	16 34	
181	1	01	
182	+	-55	
183	R/S	51	DISPLAY SIGN
184	1	01	
185	-	-45	
186	RCL7	36 07	
187	×	-35	
188	-	-45	
189	R/S	51	DISPLAY
190	GTOi	22 45	DEG-IN-SIGN
191	R/S	51	CONTINUE
200			
210			
220			

LABELS

A STD	B 8-FOLD	C 12-FOLD	D	E	0
a TROPICAL	b	c	d	e SIDEREAL	1
0	1 ✓	2 ✓	3	4	2
5	6 ✓	7 ✓	8 ✓	9 ✓	3

FLAGS

SET STATUS

FLAGS	ON	OFF
0	☑	☐
1	☐	☑
2	☐	☑
3	☐	☑

TRIG	
DEG	☑
GRAD	☐
RAD	☐

DISP	
FIX	☑
SCI	☐
ENG	☐
n	0

Program Description I

Program Title HOUSE CUSPS — KOCH (GOH) METHODS

Contributor's Name JAMES NEELY
Address P.O. BOX 1902 (SEC'Y CMH)
City CARMEL **State** CA **Zip Code** 93921

Program Description, Equations, Variables THE HOUSE CUSPS ARE COMPUTED IN ONE OF SEVERAL KOCH SYSTEMS. LET λ_N DENOTE THE (TROPICAL) DEGREE (ECLIPTIC LONGITUDE) OF THE N^{TH} CUSP. COMPUTE:

A. STANDARD SYSTEM: $\beta_N = (60° + 30N) \bmod 360°$ FOR $N = 1, 2, 3, \ldots, 12$

B. 8-FOLD SYSTEM: $\beta_N = (517\tfrac{1}{2} - 45N) \bmod 360°$ FOR $N = 1, 1\tfrac{1}{2}, 2, \ldots, 8\tfrac{1}{2}$

C. 12-FOLD SYSTEM: $\beta_N = (30N + 45) \bmod 360°$ FOR $N = 1, 1\tfrac{1}{2}, 2, \ldots, 12\tfrac{1}{2}$.

THEN, $\xi = \sin^{-1}[\sin\alpha_{MC} \tan\phi \tan\varepsilon]$,

$\Gamma_N = \alpha_{MC} + \beta_N + \gamma_N \xi$,

$\gamma_N = \beta_N/90 - 1$ FOR $0° \le \beta_N < 180°$ & $\gamma_N = \beta_N/90 - 3$ FOR $180° \le \beta_N < 360°$

AND, $$\lambda_N = \tan^{-1}\left[\frac{\sin\Gamma_N}{\cos\Gamma_N \cos\varepsilon - K_N \tan\phi \sin\varepsilon}\right],$$

WHERE $K_N = +1$ FOR $0° \le \beta_N < 180°$ & $K_N = -1$ FOR $180° \le \beta_N < 360°$.

SIDEREAL LONGITUDES ARE COMPUTED BY ADDING THE SVP TO THE ABOVE TROPICAL LONGITUDES.

NOTE: THIS PROGRAM MUST BE USED WITH ASTRO 1, 2, & 3 (00249D). ε, ϕ, α_{MC} AND SVP ARE DESCRIBED THEREIN.

Operating Limits and Warnings

THIS PROGRAM IS VALID FOR ALL NON-POLAR LATITUDES, THAT IS, $|\phi| < 90° - \varepsilon$. NO VALIDITY CHECKING IS PERFORMED.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

Program Description II

Sketch(es)

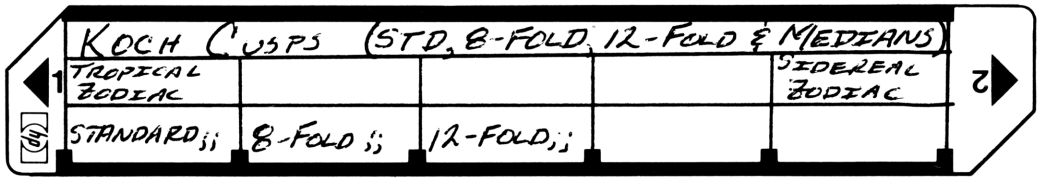
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1	♈	7	♎
2	♉	8	♏
3	♊	9	♐
4	♋	10	♑
5	♌	11	♒
6	♍	12	♓

Sample Problem(s) For 0148 Hours GMT on April 20, 1976, Geographic Latitude 37N20 and Longitude 121W55 (Note - Execute the Sample Problem in Astro-3), Calculate Tropical & Sidereal Cusps & Medians in the Standard, 8-Fold, & 12-Fold Systems. The Partial Solution) are:

	Cusp Number			Tropical			Sidereal		
	Stand-Ard	8-Fold	12-Fold	Degree	Sign	Deg-in-Sign	Degree	Sign	Degree-in-Sign
MC →	10	3 1/2	10 1/2	111°37'04"	4	21♋37'04"	87°12'20"	3	27♊12'20"
			11	126°13'41"	5	6♌13'41"	101°48'57"	4	11♋46'57"
		3		133°26'36"	5	13♌26'36"	109°01'52"	4	19♋01'52"
	11		11 1/2	140°39'09"	5	20♌39'09"	116°14'25"	4	26♋14'25"
		2 1/2	12	155°08'22"	6	5♍08'22"	130°43'38"	5	10♌43'38"
	12		12 1/2	169°45'37"	6	19♍45'37"	145°20'53"	5	25♌20'53"
		2		177°06'25"	6	27♍06'25"	152°41'40"	6	2♍41'40"
			1	184°27'34"	7	4♎27'34"	160°02'50"	6	10♍02'50"
ASC →	1	1 1/2	1 1/2	199°07'22"	7	19♎07'22"	174°42'37"	6	24♍42'37"
			2	213°39'44"	8	3♏39'44"	189°14'54"	7	9♎14'54"
		1		220°53'03"	8	10♏53'03"	196°28'19"	7	16♎28'19"
	2		2 1/2	228°05'32"	8	16♏05'32"	203°40'48"	7	23♎40'48"
		8 1/2	3	242°35'13"	9	2♐35'13"	218°10'26"	8	8♏10'28"
	3		3 1/2	257°31'20"	9	17♐31'20"	233°06'36"	8	23♏06'36"
		8		265°20'34"	9	25♐20'34"	240°55'49"	9	0♐55'49"
			4	273°32'17"	10	3♑32'17"	249°07'33"	9	9♐07'33"

Reference(s) 1. W. Koch & E. Schaeck, "Geburtsortes Hausetabellen", Schaeck Verlag, Saarbrücken, Germany
2. Carl W. Stahl, "Stahl's Cotoscope Tables of Houses, Campanus Domnification," Solunar Research Publ., Bay City, Mich 1974

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	EXECUTE ASTRO 1, 2, & 3			
2	ENTER PROGRAM CARD (BOTH SIDES)			
3	SET ZODIAC SYSTEM. EITHER			
A	TROPICAL (DEFAULT), OR		F A	
B	SIDEREAL		F E	
4	INITIALIZE CUSP SYSTEM. EITHER			
A	STANDARD CUSPS, OR		A	10.
B	8-FOLD CUSPS & MEDIANS, OR		B	3.5
C	12-FOLD CUSPS & MEDIANS		C	10.5
	THEN GO TO STEP 6			
5	DISPLAY NEW CUSP OR MEDIAN NUMBER		R/S	NN.N
6	DISPLAY λ IN D.M.S.		R/S	DDD.MMSS
7	DISPLAY SIGN		R/S	SS.0000
8	DISPLAY DEG-IN-SIGN		R/S	DD.MMSS
9	REPEAT STEPS 5 THRU 8 FOR THE NEXT CUSP OR MEDIAN			
	NOTE: AT ANY TIME, THE COMPUTATIONS MAY BE REPEATED FROM STEP 3 OR FROM STEP 4			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL1	21 01	INITIALIZATION SUBROUTINE
002	RCL0	36 00	
003	Pi	16-24	
004	X=Y?	16-33	
005	F?S	16-51	
006	RCL0	36 10	
007	1	01	
008	→R	44	
009	STO4	35 04	COS ϕ
010	÷	-24	TAN ϕ
011	RCL8	36 12	
012	1	01	
013	→R	44	
014	STO5	35 05	COS ϵ
015	R↓	-31	SIN ϵ
016	×	-35	
017	STO6	35 06	TAN ϕ SING
018	R↑	16-31	
019	÷	-24	TAN ϕ TANE
020	RCL0	36 14	
021	SIN	41	
022	×	-35	
023	SIN⁻¹	16 41	
024	STO2	35 02	β
025	3	03	
026	0	00	
027	STO7	35 07	30
028	4	04	
029	5	05	
030	STO8	35 08	45
031	5	05	
032	1	01	
033	7	07	
034	.	-62	
035	5	05	
036	STO9	35 09	517½
037	0	00	
038	STO3	35 03	0
039	3	03	
040	6	06	
041	0	00	
042	STO0	35 00	360
043	RTN	24	
044	*LBLa	21 16 11	TROPICAL ZODIAC
045	SF0	16 21 00	
046	R/S	51	
047	*LBLe	21 16 15	SIDEREAL ZODIAC
048	CF0	16 22 00	
049	R/S	51	
050	*LBL9	21 09	STANDARD CUSP ROUTINE: β_N COMPUTATION
051	DSP0	-63 00	
052	1	01	
053	2	02	
054	RCL1	36 01	
055	1	01	
056	+	-55	
057	X>Y?	16-34	
058	1	01	
059	STO1	35 01	N
060	RCL7	36 07	
061	×	-35	
062	6	06	
063	0	00	
064	+	-55	
065	STO3	35 03	β_N
066	GTO2	22 02	
067	*LBL7	21 07	12-FOLD CUSP ROUTINE: β_N COMPUTATION
068	DSP1	-63 01	
069	1	01	
070	2	02	
071	.	-62	
072	5	05	
073	RCL1	36 01	
074	.	-62	
075	5	05	
076	+	-55	
077	X>Y?	16-34	
078	1	01	
079	STO1	35 01	N
080	RCL7	36 07	
081	×	-35	
082	RCL8	36 08	
083	+	-55	
084	STO3	35 03	β_N
085	GTO2	22 02	
086	*LBL8	21 08	8-FOLD CUSP ROUTINE: β_N COMPUTATION
087	DSP1	-63 01	
088	.	-62	
089	5	05	
090	RCL1	36 01	
091	.	-62	
092	5	05	
093	-	-45	
094	X≠Y?	16-32	
095	GTO6	22 06	
096	8	08	
097	.	-62	
098	5	05	
099	*LBL6	21 06	
100	STO1	35 01	N
101	RCL8	36 08	
102	CHS	-22	
103	×	-35	
104	RCL9	36 09	
105	+	-55	
106	STO3	35 03	β_N
107	GTO2	22 02	
108	*LBLA	21 11	STANDARD CUSP INITIALIZATION
109	GSB1	23 01	
110	DSP0	-63 00	
111	1	01	
112	0	00	

REGISTERS

0 360	1 N	2 β	3 β_N	4 COS ϕ	5 COS ϵ	6 TAN ϕ SINE	7 30	8 45	9 7½
S0 π	S1	S2	S3	S4	S5	S6	S7	S8 t_G	S9 α_G
A T	B ϵ	C ϕ	D α_{MC}	E SVP	I 7: 12-FOLD 8: 8-FOLD 9: STD				

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	STO1	35 01	
114	9	09	
115	STOI	35 46	
116	GTO2	22 02	
117	*LBLB	21 12	8-FOLD COSP
118	GSB1	23 01	INITIALIZATION
119	DSP1	-63 01	
120	3	03	
121	.	-62	
122	5	05	
123	STO1	35 01	
124	8	08	
125	STOI	35 46	
126	GTO2	22 02	
127	*LBLC	21 13	12-FOLD COSP
128	GSB1	23 01	INITIALIZATION
129	DSP1	-63 01	
130	1	01	
131	0	00	
132	.	-62	
133	5	05	
134	STO1	35 01	
135	7	07	
136	STOI	35 46	
137	*LBL2	21 02	
138	RCLD	36 14	α_{MC}
139	RCL3	36 03	
140	RCL0	36 00	
141	÷	-24	
142	FRC	16 44	
143	RCL0	36 00	
144	x	-35	
145	+	-55	β_N
146	LSTX	16-63	
147	CF1	16 22 01	
148	1	01	
149	8	08	
150	0	00	
151	X≤Y?	16-35	
152	SF1	16 21 01	
153	÷	-24	
154	LSTX	16-63	
155	X≠Y	-41	
156	FRC	16 44	
157	x	-35	
158	9	09	
159	0	00	
160	÷	-24	
161	1	01	
162	-	-45	γ_N
163	RCL2	36 02	
164	x	-35	
165	+	-55	Γ_N
166	1	01	
167	→R	44	
168	RCL5	36 05	
169	x	-35	COS Γ_N COS ϵ
170	RCL6	36 06	
171	F1?	16 23 01	$K_N = \pm 1$?
172	CHS	-22	
173	-	-45	
174	→P	34	λ_N
175	R↓	-31	
176	RCLE	36 14	SVP
177	F0?	16 23 00	
178	CLX	-51	
179	+	-55	
180	RCL0	36 00	
181	+	-55	
182	LSTX	16-63	λ MOD 360
183	÷	-24	
184	LSTX	16-63	
185	X≠Y	-41	
186	FRC	16 44	
187	x	-35	
188	RCL1	36 01	
189	R/S	51	DISPLAY COSP #
190	R↓	-31	
191	→HMS	16 35	
192	DSP4	-63 04	
193	R/S	51	DISPLAY DEGREE
194	ENT↑	-21	
195	ENT↑	-21	
196	RCL7	36 07	
197	÷	-24	
198	INT	16 34	
199	1	01	
200	+	-55	
201	R/S	51	DISPLAY SIGN
202	1	01	
203	-	-45	
204	RCL7	36 07	
205	x	-35	
206	-	-45	DISPLAY DEG-IN-SIGN
207	R/S	51	
208	GTO1	22 45	CONTINUE
209	R/S	51	
210			
220			

LABELS

A STD	B 8-FOLD	C 12-FOLD	D	E	0 ✓
a TROPICAL	b	c	d	e SIDEREAL	1 ✓
0	1 ✓	2 ✓	3	4	2
5	6 ✓	7 ✓	8 ✓	9 ✓	3

FLAGS

	ON	OFF
0	☑	☐
1	☐	☑
2	☐	☑
3	☐	☑

SET STATUS

TRIG		DISP	
DEG	☑	FIX	☑
GRAD	☐	SCI	☐
RAD	☐	ENG	☐
		n	4

Program Description I

Program Title Astrological Horoscope Construction

Contributor's Name Michael Erlewine
Address 1041 N. Main St.
City Ann Arbor, Michigan **State** **Zip Code** 48104

Program Description, Equations, Variables Program constructs complete NATAL HOROSCOPE using a series of conventional formulae..in particular SPHERICAL TRIGONOMETRY. PROGRAM OUTPUTS the sensitive points: Ascendant, Mid-heaven, Right Ascension of the Mid-heaven and Vertex (all non-linear). The program also will use either conventional NOON or MIDNIGHT ephemerides of PLANETARY POSITIONS to determine precise GEOCENTRIC positions. I will sketch the flow of the formulae (please ask for more detailed instructions if needed).

A. Uses adaption JULIAN DAY NUMBER (encode) routine as given in the HP-67 STANDARD PAC (04-01) to work with dates.

B. Figures SIDEREAL TIME (in degrees) for NOON of EVENT DATE using this equation: S.T. NOON Greenwich = 18h38m45.836s + 8640184.542sT
where T = # days elapsed since NOON Jan. 0, 1900/ 36525

C. Figures Local RIGHT ASCENSION OF MIDHEAVEN by:

$$R.A.M.C. = ST + GMT(1+C) - \lambda$$

where: λ = longitude of observer(+ if West,"-" if East)
ST = Mean Sidereal Time Greenwich Noon
GMT = Interval NOON GREENWICH to time Event.
C = Correction to convert GMT interval into sidereal units.

D. Computes Ecliptic Intercept or Mid -heaven by:
M.C. = tan R.A.M.C./ cos Obliquity of the Ecliptic (1950 used)

E. Computes non-linear Acendant by:

$$\tan \text{Ascendant} = \frac{\cos\phi \cdot \sin RAMC \cdot \cos\varepsilon + \sin\phi \cdot \sin\varepsilon}{\cos\phi \cdot \cos RAMC} + 90$$

(contREVERSE SIDE)

Operating Limits and Warnings LABEL(STEP) A must precede Label B...and Label D must precede Label E.

PROGRAM WORKS for dates March 1, 1900 thru Feb. 28, 2100 (this can be adjusted for other dates)

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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DESCRIPTION(continued)

E. Where ϕ = Latitude of place(positive if North, negative if South)
RAMC= Right Ascension of the Mid-heaven
ε = Obliquity of the Ecliptic for year (1950 used)
(more or less a constant)

F. Formula for VERTEX by:

$$\tan\text{Vertex} = \frac{\cos \text{RAMC}}{(\sin\varepsilon \div \tan\phi) - (\sin\text{RAMC} \cdot \cos\varepsilon)}$$

Legend as above.

G. Coefficient for finding planets places by:

x = GREENWICH MEAN TIME/ 24

H. Planets longitudes by: (used with Ephemerides Planets Positions)

Longitude = Daily motionTIMEScoefficientPLUS earlier planet listing

Program Description II

Sketch(es) NO SKETCH but LIST HERE OUTPUT FROM EXAMPLE GIVEN BELOW :

```
#1 Sidereal Time or Right Ascension Midheaven = 175.7252269
#2 Midheaven Zodiac Degree                    = 175.3421498
#3 Ascendant Zodiac Degree                    = 248.0128522
Vertex                                        = 112.1149333
Coefficient in STORAGE 0                      = 0.377083333
```

PLEASE NOTE: All Zodiac Longitudes given in their ABSOLUTE LONGITUDE equivalents from the Equinox (0° Aries) point thru all 360 degrees.

Sample Problem(s) Erect a Horoscope given the following standard birth information (the authors): Born July 18, 1941 at 4:03 P.M. Eastern Standard Time at Lancaster, Pa.(geographic coordinates 76°West18' longitude and 40°North 02' latitude). The information should be ordered for ENTRY into calculator as follows:

```
        (A)BIRTHDATE & Year   (T stack)  7.181941
ADD B+C (B)TIME ZONE          (Z stack)  5.000000
        (C)Time from NOON     (Z stack)  4.030000 HH.MMSS
        (D) Longitude         (Y stack) 76.180000 DD.MMSS (D = degrees)
        (E) Latitude          (X stack) 40.020000 DD.MMSS
```

NOTE: If a MORNING birth you will used DATE PRIOR to BIRTHDAY (In this example..if the BIRTHTIME were A.M. the date used would be 7.171941)AND you will ADD 12 hours. (If BIRTH was at 4:03 A.M. you would use date 7.171941...AND ADD 4.03 + 12.00 PLUS 5.00 (TIME ZONE FACTOR). This program always works from a NOON position. There are additional notes on the USER INSTRUCTION PAGE.

Solution(s) ENTER DATA as explained above:
(T) 7.181941 date in MM.DDYYYY
(Z) 9.030000 time + zone HH.MMSS
(Y)76.180000 longitude DD.MMSS
(X)40.020000 latitude DD.MMSS

NOTE: ANSWERS GIVEN TOP OF PAGE.

PUSH LABEL A will give: (1)Sidereal Time (in degrees or RAMC)
pause (2) MidHeaven Zodiac Degree (0°to 360°)
pause (3) Nonlinear Ascendant (0°to 360°)

[NOTE: LABEL B may be pushed ONLY after LABEL A to find the VERTEX (0° to 360°)]

NEXT: LABEL D will set up ROUTINE for PLANET's PLACES for a NOON EPHEMERIS (If you are using a MIDNIGHT EPHEMERIS push LABEL E only after LABEL D has been PUSHED). A FLASHING PAUSE after either LABEL D or E indicates that you are to use SUBSEQUENT ephemeris listings(SEE USER INSTRUCTIONS for more complete EXPLANATION)(SEE PAGE 2 of this sheet)

Reference(s) ERLEWINE, Michael PUSH BUTTON ASTROLOGY, Heart Center/Circle Books Publication, 1977 (section on Natal Construction)

PROGRAM DESCRIPTION II (page 2)

It is advisable to ADD this page to make clear (1) possible cases and their ENTRY and (2) Adjustments to personal requirements of the User.

The ASTROLOGER will note that this program generates its own SIDEREAL TIME without recourse to an Ephemeris.(accurate to within 1/10th of a second of time). In order to make clear just HOW this program may be used to fit the various possible cases of North/South latitude and East/West longitude we include here ENTRY PROCEDURE. NOTE: A minus sign "-" indicates that the value ENTERED is NEGATIVE (use the CHS KEY). Letters = stack location.

North latitude East longitude	South latitude East longitude	North Latitude West Longitude	South Latitude West Longitude
(T) Birthdate & Year	(T) Birthdate/Year	(T) Birthdate/Year	(T) Birhtdate/Y.
(Z) Event time	(Z) Event time	(Z) Event Time	(Z) Event Time
(Z) - Time Zone	(Z) - Time Zone	(Z) Time Zone	(Z) Time Zone
(Y) - Longitude	(Y) - Longitude	(Y) Longitude	(Y) Longitude
(X) Latitude	(X) - Latitude	(X) Latitude	(X) -Latitude

Please Note: In ALL cases above the TWO Z VALUES are to be ADDED together algebraically.

SUGGESTIONS FOR ADJUSTMENT TO PERSONAL REQUIREMENTS

As you will note, all 224 steps have been used. However, if you do not feel you need VERTEX OUTPUT...you may remove steps 207 thru 224 and replace them with others. Examples of desirable ADDITIONS might be: Output in DEGREES/MINUTES/SECONDS...rather than DEGREES/DECIMAL FRACTIONS.

Others may want to ADD the slight adjustment to convert Universal to Ephemeris Time (the ΔT correction). This would be inserted after STEP-70 of the program...by a R/S instruction, at which time you would manually enter the ΔT correction and see that it is converted to DECIMALS and ADDED to the Y register.

Another desirable feature would be the use of LABEL B for the entry of the value of the OBLIQUITY OF THE ECLIPTIC (ε) for the year of the Event in question. A small program would take the value for ε and store the $\sin\varepsilon$ in STO 1 and the $\cos\varepsilon$ in STO 2. As the program stands the value for ε used is that for the EPOCH 1950.0 and as this value changes only very slowly...for most purposes will be accurate enough.

DATA CARD VALUES

We will list here the VALUES used in the DATA CARD for this program:

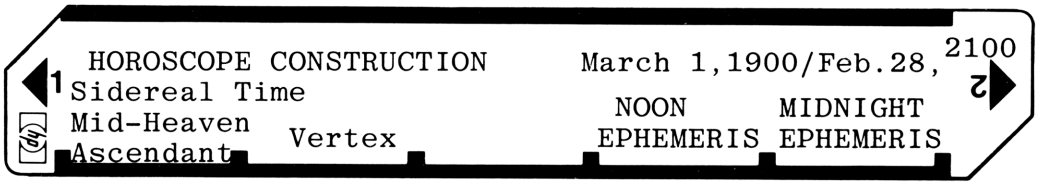
STO A = 2415020 (JDN Jan. 0, 1900)	STO I = 360
STO B = .065709822 (increment S.T.)	STO 5 = 365.25 (# Julian Days in Year)
STO C = 18.64606555 (S.T. NOON 1900.0)	STO 6 = 30.6001 (JDN Routine)
STO D = 1.002737812 (9.58"/hr corr.)	STO 1 =0.397881203 $\sin\varepsilon$1950.0
STO E = 1720982 (Julian Day Master #)	STO 2 =0.917436945 $\cos\varepsilon$1950.0

A NOTE ON "FLASHING PAUSE" IN PLANET'S PLACES (LABELS D & E)

As most of you well know, the various additions/subtractions of time can send us either forward or backward to a later or earlier DATE from which to determine PLANET's PLACES. All you need know to use this program is that if AFTER LABEL D or E is pushed...you encounter a FLASHING PAUSE: If the flashing value is POSITIVE, THEN proceed to the next or subsequent DATE for planets places. If the PLASHING PAUSE is NEGATIVE (that is:there is a "-" sign in DISPLAY), THEN proceed to previous date or DAY-BEFORE the DATE ENTERED in STEP 3 of USER INSTRUCTIONS)...for the calculation of the PLANET's PLACES.

User Instructions

* SEE ADDITIONAL PAGE PROGRAM DESCRIPTION FOR MORE DETAILS



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	LOAD SIDE 1 and SIDE 2			
2	LOAD DATA CARD			
3	Enter Birth or Event MONTH/DAY/YEAR		ENTER	
	for DATE: MM.DDYYYY			
	(always enter DATE for NOON before Event)			
4	ENTER Event TIME in HOURS/MINUTES/SEC.		ENTER	
	format = HH.MMSS			
	(If A.M. birth...ADD 12 hours to the BIRTHTIME and use DAY-OF-THE-MONTH before birthdate in STEP-3)			
5	ADD MANUALLY to TIME in STEP-4 the TIME-ZONE factor in HOURS for section of the country where birth takes place. (In USA this will be 5,6,7 or 8 hours depending on EST=5h,CST=6h,MST=7h,PST=8h)		+	
6	ENTER Geographic Longitude of place in DEGREES/MINUTES/SECONDS DD.MMSS		ENTER	
7	ENTER Geographic Latitude of place in DEGREES/MINUTES/SECONDS DD.MMSS			
8	PUSH LABEL A will give:		A	
	(1) Right Ascension of Midheaven (or Sidereal Time) in WHOLE DEGREES and DECIMAL FRACTIONS from 0°(0°Aries) to 360°. (program pauses to display RAMC)			RAMC
	(2) Zodiac Degree of MIDHEAVEN in WHOLE DEGREES/DECIMALS (0° to 360°) (program again pauses)			M.C.
	(3) non-linear ASCENDANT in WHOLE DEGREES/DECIMALS (0° to 360°) PROGRAM STOPS.			ASCENDANT
	(Label B will give VERTEX in WHOLE DEGREES/DECIMALS...after label A is pushed...if desired)			
9	PUSH LABEL D:set-up a routine to find the PLANET'S PLACES using a NOON ephemeris.			
	(note: FLASHING PAUSE after D indicates you have crossed a NOON-DATE line and should use EPHEMERIS LISTINGS for day SUBSEQUENT to that entered in STEP 3) SEE PAGE 3 for more DETAILS			
	Ephemeris Routine as follows:			
	(1) ENTER EARLY DATE PLANET LISTING		ENTER	
	(2) ENTER LATER DATE PLANET LISTING PUSH R/S			PLANET
10	REPEAT parts 1&2 of STEP 9 for all planets			
	(NOTE: If using MIDNIGHT EPHEMERIS: PUSH label E only AFTER label D and proceed with parts 1&2 of STEP 9. FLASHING PAUSE AGAIN INDICATES DATE CHANGE)			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL A	31 25 11	Decimal Conversion and storage of initial values
002	CF 1	35 61 01	
003	CF 0	35 61 00	
004	HMS→	31 74	
005	STO3	33 03	
006	R↓	35 53	
007	HMS→	31 74	
008	STO4	33 04	
009	R↓	35 53	
010	HMS→	31 74	
011	STO 0	33 00	
012	R↓	35 53	----------
013	ENT	41	Julian Day Number Encode
014	INT	31 83	
015	STO7	33 07	
016	-	51	
017	EEX	43	This is an adaptation of a portion of the routine in CALENDAR FUNCTIONS section of the Standard Pac issued with the HP-67
018	2	02	
019	X	71	
020	ENT	41	
021	INT	31 83	
022	STO8	33 08	
023	-	51	
024	EEX	43	
025	4	04	
026	X	71	
027	STO9	33 09	
028	RCL7	34 07	
029	1	01	
030	+	61	
031	ENT	41	
032	1/x	35 62	
033	.	83	
034	7	07	
035	+	61	
036	CHS	42	
037	INT	31 83	
038	STO+9	33 61 09	
039	1	01	
040	2	02	
041	X	71	
042	-	51	
043	RCL6	34 06	
044	X	71	
045	INT	31 83	
046	RCL9	34 09	
047	RCL5	34 05	
048	X	71	
049	INT	31 83	
050	+	61	
051	RCL8	34 08	
052	+	61	
053	RCL E	34 15	
054	+	61	
055	RCLA	34 11	----------
056	-	51	determines # days
057	RCLB	34 12	between 1900.0 & Event and from this the Sidereal Time at NOON Greenwich calculation is formed.
058	X	71	
059	2	02	
060	4	04	
061	STO8	33 08	
062	÷	81	
063	FRC	32 83	
064	RCL8	34 08	
065	X	71	
066	RCLC	34 13	
067	+	61	----------
068	RCL 0	34 00	ADDS to Greenwich Sidereal Angle the adjustment to the locality.
069	ENT	41	
070	ENT	41	
071	RCL 8	34 08	
072	÷	81	
073	STO 0	33 00	stores constant
074	R↓	35 53	
075	RCLD	34 14	9.56"/hr. correct.
076	X	71	
077	+	61	
078	1	01	
079	5	05	
080	X	71	conversion degrees Right Ascension & Subtracts Long.
081	RCL4	34 04	
082	-	51	
083	GSB9	31 22 09	
084	R↓	35 53	
085	STO9	33 09	----------
086	PRTX	31 84	display R.A.M.C.
087	TAN	31 64	
088	RCL 9	34 09	determines M.C. Zodiac degree from the R.A.M.C.
089	2	02	
090	7	07	
091	0	00	
092	X≤Y?	32 71	
093	SF2	35 51 02	
094	3	03	
095	÷	81	
096	X<Y?	32 71	
097	F3?	35 71 03	
098	R↓	35 53	
099	R↓	35 53	
100	RCL2	34 02	
101	F2?	35 71 02	
102	GTO8	22 08	
103	F3?	35 71 03	
104	GTOa	22 31 11	
105	GTO1	22 01	----------
106	*LBL7	31 25 07	used in Ascendant Routine.
107	F0?	35 71 00	
108	RTN	35 22	
109	9	09	
110	0	00	
111	+	61	
112	GSB9	31 22 09	

REGISTERS

0	1	2	3	4	5	6	7	8	9
coeff.	sin ε	cos ε	latitude	longit.	constant	const.	used	used	used
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I
JDN 1900.0	increment S.T.	S.T. 1900.0	9.56"/hr. cst.	master JDN	360

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	R ↓	35 53	
114	R/S	84	
115	*LBLC	31 25 13	----------
116	F1?	35 71 01	determines the
117	GTO7	22 07	Ascendant.
118	SF1	35 51 01	
119	RCL9	34 09	
120	COS	31 63	
121	RCL3	34 03	
122	COS	31 63	
123	X	71	
124	STO4	33 04	
125	RCL3	34 03	
126	COS	31 63	
127	RCL9	34 09	
128	SIN	31 62	
129	RCL2	34 02	
130	X	71	
131	STO7	33 07	
132	X	71	
133	RCL3	34 03	
134	SIN	31 62	
135	RCL1	34 01	
136	X	71	
137	+	61	
138	RCL4	34 04	
139	X<0?	31 71	
140	GTO1	22 01	
141	X↔Y	35 52	
142	X<0?	31 71	
143	GTO2	22 02	
144	X↔Y	35 52	----------
145	*LBLa	32 25 11	used variously
146	GSB4	31 22 04	
147	GSB3	31 22 03	----------
148	*LBL1	31 25 01	
149	GSB4	31 22 04	quadrant sort
150	1	01	routines...
151	8	08	Labels a,1,2,8 & 3
152	0	00	
153	+	61	
154	GTO3	22 03	
155	*LBL2	31 25 02	
156	X↔Y	35 52	
157	*LBL8	31 25 08	
158	GSB4	31 22 04	
159	RCL I	35 34	
160	+	61	
161	GTO3	22 03	
162	*LBL4	31 25 04	
163	÷	81	
164	TAN⁻¹	32 64	
165	RTN	35 22	
166	*LBL3	31 25 03	
167	F1?	35 71 01	
168	GTO7	22 07	
169	PRTX	31 84	
170	GTOC	22 13	----------
171	*LBLD	31 25 14	checks if motion
172	RCL0	34 00	coefficient has
173	1	01	moved ahead or
174	X<Y?	32 71	behind one full
175	GTO 0	22 00	day.
176	X↔Y	35 52	
177	X>0?	31 81	
178	GTO6	22 06	
179	X↔Y	35 52	
180	CHS	42	
181	*LBL0	31 25 00	
182	PRTX	31 84	FLASHES PAUSE
183	STO-0	33 51 00	----------
184	*LBL6	31 25 06	
185	R/S	84	routine for plan-
186	HMS→	31 74	ets positions.
187	X↔Y	35 52	converts two pos-
188	HMS→	31 74	itions to decimals
189	-	51	...finds daily
190	LSTX	35 82	motion and adds
191	X↔Y	35 52	the correct port-
192	RCL0	34 00	ion of that motion
193	X	71	to the Earlier
194	+	61	Planet's Listing.
195	GTO6	22 06	----------
196	*LBLE	31 25 15	routine for Mid-
197	.	83	night Ephemeris.
198	5	05	..adds .5 day to
199	STO+0	33 61 00	coefficient and
200	GTOD	22 14	checks by FLASHING.
201	*LBL9	31 25 09	----------
202	RCL I	35 34	used in quadrant
203	X>Y?	32 81	sorting for trig
204	RTN	35 22	problems.
205	-	51	
206	GTO9	22 09	
207	*LBLB	31 25 12	----------
208	SF0	35 51 00	determines the
209	RCL9	34 09	Vertex and sorts
210	COS	31 63	for quadrant. This
211	RCL1	34 01	section is the
212	RCL3	34 03	one most dispens-
213	TAN	31 64	able..and can be
214	÷	81	replaced by prog-
215	RCL7	34 07	ram modifications
216	-	51	specified by the
217	X<0?	31 71	User's taste.
218	GTO5	22 05	
219	GTO1	22 01	
220	*LBL5	31 25 05	
221	X↔Y	35 52	
222	X<0?	31 71	
223	GTO4	22 04	
224	GTO8	22 08	

LABELS

A START	B Vertex	C Ascend.	D Planets	E Midnight
a used	b	c	d	e
0 Warning	1 quadrant	2 used	3 used	4 trig
5 quadrant	6 planets	7 quadrant	8 quadrant	9 quadrant

FLAGS

0	used
1	used
2	used
3	used

SET STATUS

FLAGS

	ON	OFF
0	☐	☐
1	☐	☐
2	☐	☐
3	☐	☐

TRIG

DEG ☒
GRAD ☐
RAD ☐

DISP

FIX ☒
SCI ☐
ENG ☐
n____

NOTES

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In terms of power and flexibility, the problem-solving potential of the Hewlett-Packard line of fully programmable calculators is nearly limitless. And in order to see the practical side of this potential, we have several different types of software to help save you time and programming effort. Every one of our software solutions has been carefully selected to effectively increase your problem-solving potential. Chances are, we already have the solutions you're looking for.

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To increase the versatility of your fully programmable Hewlett-Packard calculator, HP has an extensive library of "Application Pacs". These programs transform your HP-67 and HP-97 into specialized calculators in seconds. Each program in a pac is fully documented with commented program listing, allowing the adoption of programming techniques useful to each application area. The pacs contain 20 or more programs in the form of prerecorded cards, a detailed manual, and a program card holder. Every Application Pac has been designed to extend the capabilities of our fully programmable models to increase your problem-solving potential.

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Business Decisions
Clinical Lab and Nuclear Medicine
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Users' Library

The main objective of our Users' Library is dedicated to making selected program solutions contributed by our HP-67 and HP-97 users available to you. By subscribing to our Users' Library, you'll have at your fingertips, literally hundreds of different programs. No longer will you have to: research the application; program the solution; debug the program; or complete the documentation. Simply key your program to obtain your solution. In addition, programs from the library may be used as a source of programming techniques in your application area.

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Portfolio Management/Bonds & Notes
Real Estate Investment
Taxes
Home Construction Estimating
Marketing/Sales
Home Management
Small Business
Antennas
Butterworth and Chebyshev Filters
Thermal and Transport Sciences
EE (Lab)
Industrial Engineering
Aeronautical Engineering
Control Systems
Beams and Columns
High-Level Math
Test Statistics
Geometry
Reliability/QA
Medical Practitioner
Anesthesia
Cardiac
Pulmonary
Chemistry
Optics
Physics
Earth Sciences
Energy Conservation
Space Science
Biology
Games
Games of Chance
Aircraft Operation
Avigation
Calendars
Photo Dark Room
COGO-Surveying
Astrology
Forestry

ASTROLOGY

These programs should provide the user with the ability to compute basic astrological values and also five methods for calculating house cusp positions. These programs should certainly save time and effort for the astrologer, whether amateur or expert.

ASTRO 1 — MEAN OBLIQUITY OF THE ECLIPTIC AND GREENWICH SIDEREAL TIME

ASTRO 2 — MOON'S ASCENDING NODE, NUTATION, AND SVP

ASTRO 3 — LOCAL SIDEREAL TIME, GEOCENTRIC LATITUDE, MC AND ASCENDANT

MUNDOSCOPE, REGIONMONTANUS

MUNDOSCOPE, CAMPANUS

HOUSE CUSPS — PLACIDUS METHOD (Exact)

HOUSE CUSPS — REGIONMONTANUS METHOD

HOUSE CUSPS — CAMPANUS METHOD

HOUSE CUSPS — TOPOCENTRIC METHOD

HOUSE CUSPS — KOCH (GOH) METHOD

ASTROLOGICAL HOROSCOPE CONSTRUCTION

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Reorder No. 00097-14014 Printed in U.S.A. 00097-90189
Revision B 1-78