MCRP 3-16.7A
FM 6-300

Army Ephemeris 1993-1997

U.S. Marine Corps

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PREFACE

This manual is a compilation of tables and charts which are used in field computations of astronomical observations by the field artillery. These tables and charts are compiled and provided by the Astronomical Applications Department, US Naval Observatory; H. M. Nautical Almanac Office, Royal Greenwich Observatory; and National Oceanic Atmospheric Administration.

This manual reflects the update of data to encompass the years 1993 through 1997. It is designed to be used in conjunction with FM 6-2, *Field Artillery Survey*.

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FM 6-300
MCRP 3-16.7A

ARMY EPHEMERIS 1993-1997

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Note. Table numbers are references to current FM 6-2. Several tables were omitted due to the new Artillery Astronomic Observation method, which replaces the hour-angle method.

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*This publication supersedes FM 6-300, 15 May 1987.

CHAPTER 1

INTRODUCTION

1-1. PURPOSE AND SCOPE

a. This manual is a compilation of tables and charts for use in computing astronomical azimuths for the field artillery. These tables and charts are used for computing azimuth of the Sun or selected stars by either the altitude or Artillery Astronomic Observation method. Special tables (Tables 12 through 12e), which are tabular methods of computing Polaris, are included for a rapid computation of a Polaris azimuth. Tables and charts are also included to correct astronomic azimuth to grid azimuth and to extend azimuth by simultaneous observation.

b. Data contained in Tables 2a, 2b, 2c, 2d, 2e, 10a(1), 10a(2), 10a(3), 10a(4), 10a(5), 10b(1), 10b(2), 10b(3), 10b(4), 10b(5), 11a, 11b, 11c, 11d, 11e, 12a, 12b, 12c, 12d, and 12e are current only for the years in which the manual is effective.

1-2. DESCRIPTION OF TABLES AND CHARTS

This manual is intended to be used as a companion publication to FM 6-2, *Field Artillery Survey.* Details on the computation of astronomical azimuth and the use of these tables and charts are contained in FM 6-2.

CHAPTER 2

ASTRONOMICAL TABLES AND CHARTS

Table 1a. Astronomic refraction corrected for temperature (degrees)

TO BE SUBTRACTED FROM OBSERVED ALTITUDE OF SUN OR STAR

(Use values of observed altitude and temperature nearest the values tabulated as arguments.)

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
00 00	40-43	38-45	36-53	35-02	37-15	36-27	35-44	35-01	34-20	33-40	33-01	32-26	31-51	31-26	30-43	30-14	29-46
20	36-57	35-08	34-20	33-35	32-53	32-11	31-33	30-55	30-18	29-44	29-08	28-38	28-07	27-37	27-07	26-42	26-17
40	32-09	31-15	30-34	29-54	29-16	28-39	28-05	27-31	26-59	28-28	25-57	25-30	25-02	24-35	24-08	23-46	23-23
01 00	28-42	28-07	27-25	26-49	26-15	25-42	25-12	24-41	24-12	23-44	23-17	22-52	22-27	22-03	21-40	21-19	20-58
20	25-55	25-19	24-46	24-13	23-43	23-13	22-45	22-16	21-51	21-28	21-02	20-39	20-17	19-55	19-44	19-15	18-57
40	23-34	23-09	22-31	22-01	21-33	21-06	20-41	20-16	19-52	19-29	19-07	18-46	18-26	18-06	17-47	17-30	17-13
02 00	21-32	21-02	20-35	20-07	19-42	19-17	18-54	18-31	18-10	17-49	17-28	17-10	16 51	16-33	16-15	15-00	15-45
20	19-48	19-20	18-54	18-29	18-06	17-43	17-22	17-01	16-41	16-22	16-03	15-46	15-29	15-12	14-58	14-42	14-28
40	18-17	17-51	17-28	17-05	16-43	16-22	16-03	15-43	15-25	15-07	14-50	14-34	14-18	14-02	13-48	13-36	13-22
03 00	16-57	16-33	16-12	15-50	15-30	15-11	14-53	14-35	14-18	14-01	13-45	13-30	13-16	13-01	12-48	12-36	12-24
20	15-47	15-26	15-05	14-46	14-27	14-08	13-51	13-35	13-19	13-04	12-48	12-35	12-21	12-08	11-56	11-44	11-32
40	14-45	14-25	14-06	13-47	13-30	13-13	12-57	12-42	12-27	12-12	11-58	11-46	11-33	11-20	11-08	10-58	10-47
04 00	13-50	13-31	13-13	12-56	12-40	12-24	12-09	11-54	11-40	11-27	11-14	11-02	10-50	10-38	10-27	10-17	10-07
20	13-01	12-43	12-26	12-10	11-55	11-40	11-26	11-12	10-59	10-46	10-34	10-23	10-11	10-00	09-50	09-40	09-31
40	12-17	12-00	11-44	11-29	11-14	11-00	10-47	10-34	10-22	10-10	09-58	09-47	09-37	09-26	09-16	09-06	08-58
05 00	11-38	11-21	11-07	10-52	10-38	10-25	10-13	10-00	09-48	09-37	09-26	09-16	09-06	08-56	08-47	08-38	08-30
20	11-02	10-48	10-32	10-18	10-06	09-53	09-41	09-29	09-18	09-07	08-57	08-47	08-38	08-28	08-19	08-12	08-04
40	10-29	10-14	10-01	09-48	09-35	09-23	09-12	09-01	08-50	08-40	08-30	08-21	08-12	08-03	07-55	07-47	07-40
06 00	09-58	09-45	09-32	09-20	09-08	08-56	08-46	08-36	08-25	08-16	08-06	07-57	07-49	07-40	07-32	07-25	07-18
20	09-32	09-18	09-06	08-54	08-43	08-32	08-22	08-12	08-02	07-53	07-44	07-35	07-27	07-19	07-11	07-06	06-58
40	09-07	08-54	08-42	08-31	08-20	08-09	08-00	07-50	07-41	07-32	07-23	07-16	07-08	07-00	06-53	06-46	06-40
07 00	08-43	08-31	08-20	08-09	07-59	07-49	07-39	07-30	07-21	07-13	07-05	06-57	06-50	06-42	06-35	06-29	06-23
20	08-22	08-10	08-00	07-49	07-39	07-30	07-21	07-12	07-03	06-55	06-47	06-40	06-33	06-26	06-19	06-13	06-07
40	08-02	07-51	07-41	07-31	07-21	07-12	07-03	06-55	06-47	06-39	06-31	06-24	06-17	06-10	06-04	05-58	05-53
08 00	07-44	07-33	07-23	07-13	07-04	06-55	06-47	06-39	06-31	06-24	06-16	06-10	06-03	05-56	05-50	05-45	05-39
20	07-27	07-18	07-07	06-57	06-49	06-40	06-32	06-24	06-17	06-09	06-02	06-56	05-49	05-43	05-37	05-32	05-27
40	07-11	07-01	06-52	06-42	06-34	06-26	06-18	06-10	06-03	05-56	05-48	05-43	05-37	05-31	05-25	05 20	05-16
09 00	06-58	06-46	06-37	06-26	06-20	06-12	06-06	05-58	05-51	05-44	05-37	05-31	05-25	05-19	05-14	05-08	05-04
20	06-42	06-32	06-24	06-15	06-08	06-00	05-53	05-46	05-39	05-32	05-26	05-20	05-14	05-08	05-03	04-58	04-54
40	06-29	06-19	06-11	06-03	05-56	05-48	05-41	05-34	05-28	05-21	05-15	05-10	05-04	04-58	04-53	04-49	04-44
10 00	06 16	06-07	05-59	05-52	05-44	05-37	05-30	05-24	05-17	05-11	05-05	05-00	04-54	04-49	04-44	04-40	04-35
20	06-06	05-58	05-48	05-41	05-34	05-27	05-20	05-14	05-08	05-02	04-56	04-51	04-45	04-40	04-36	04-31	04-27
40	05-54	05-45	05-38	05-30	05-24	05-17	05-10	05-04	04-58	04-53	04-47	04-42	04-37	04-32	04-27	04-23	04-18
11 00	05-43	05-35	05-28	05-21	05-14	05-07	05-01	04-55	04-50	04-44	04-39	04-34	04-29	04-24	04-19	04-15	04-11
20	05-34	05-26	05-19	05-12	05 05	04-59	04-53	04-47	04-41	04-36	04-31	04-26	04-21	04-16	04-12	04-08	04-04
40	05-24	05-17	05-10	05-03	04-57	04-50	04-45	04-39	04-33	04-28	04-23	04-18	04-14	04-09	04-05	04-01	03-57
12 00	05-15	05-08	05-01	04-55	04-48	04-42	04-37	04-31	04-26	04-21	04-16	04-11	04-07	04-02	03-58	03-54	03-51
20	05-07	05-00	04-53	04-47	04-41	04-35	04-30	04-24	04-19	04-14	04-09	04-05	04-00	03-56	03-52	03-48	03-44
40	04-58	04-52	04-45	04-39	04-34	04-28	04-21	04-17	04-12	04-07	04-03	03-58	03-54	03-50	03-46	03-42	03-39

Table 1a. Astronomic refraction corrected for temperature (degrees) – continued

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
13 00	04·51	04·45	04·38	04·32	04·27	04·21	04·16	04·11	04·06	04·01	03·56	03·52	03·48	03·44	03·40	03·36	03·33
20	04·44	04·37	04·31	04·25	04·20	04·14	04·09	04·04	04·00	03·55	03·50	03·46	03·42	03·38	03·34	03·31	03·27
40	04·37	04·31	04·25	04·19	04·14	04·08	04·03	03·58	03·54	03·49	03·45	03·41	03·37	03·33	03·29	03·26	03·23
14 00	04·31	04·24	04·19	04·13	04·08	04·02	03·58	03·53	03·48	03·44	03·40	03·36	03·32	03·28	03·24	03·21	03·19
20	04·24	04·18	04·12	04·07	04·02	03·57	03·52	03·47	03·43	03·38	03·34	03·31	03·27	03·23	03·19	03·16	03·13
40	04·18	04·12	04·07	04·01	03·56	03·51	03·47	03·41	03·38	03·34	03·29	03·26	03·22	03·18	03·15	03·12	03·09
15 00	04·12	04·06	04·01	03·56	03·51	03·46	03·42	03·37	03·33	03·29	03·25	03·21	03·17	03·14	03·10	03·07	03·04
20	04·07	04·01	03·56	03·51	03·46	03·41	03·37	03·32	03·28	03·24	03·20	03·17	03·13	03·10	03·06	03·03	03·00
40	04·01	03·56	03·51	03·46	03·41	03·36	03·32	03·28	03·24	03·20	03·16	03·12	03·09	03·06	03·02	02·59	02·57
16 00	03·56	03·51	03·46	03·41	03·36	03·32	03·27	03·23	03·19	03·15	03·12	03·08	03·05	03·01	02·58	02·55	02·53
20	03·51	03·46	03·41	03·36	03·32	03·27	03·23	03·19	03·15	03·12	03·08	03·04	03·01	02·58	02·55	02·52	02·49
40	03·47	03·41	03·36	03·32	03·27	03·23	03·19	03·15	03·11	03·07	03·04	03·00	02·57	02·54	02·51	02·48	02·46
17 00	03·42	03·37	03·32	03·27	03·23	03·19	03·15	03·11	03·07	03·04	03·00	02·57	02·54	02·51	02·48	02·45	02·42
20	03·38	03·32	03·28	03·23	03·19	03·15	03·11	03·07	03·03	03·00	02·56	02·53	02·50	02·47	02·44	02·42	02·39
40	03·33	03·28	03·24	03·19	03·15	03·11	03·07	03·03	03·00	02·56	02·53	02·50	02·47	02·44	02·41	02·38	02·36
18 00	03·29	03·24	03·20	03·15	03·11	03·07	03·04	03·00	02·56	02·53	02·50	02·47	02·44	02·41	02·38	02·35	02·33
20	03·25	03·20	03·16	03·12	03·08	03·04	03·00	02·56	02·53	02·50	02·46	02·43	02·41	02·38	02·35	02·32	02·30
40	03·21	03·17	03·12	03·08	03·04	03·00	02·57	02·53	02·50	02·46	02·43	02·40	02·37	02·35	02·32	02·30	02·27
19 00	03·18	03·13	03·09	03·05	03·01	02·57	02·53	02·50	02·47	02·43	02·40	02·37	02·35	02·32	02·29	02·27	02·24
20	03·14	03·09	03·05	03·01	02·58	02·54	02·50	02·47	02·44	02·40	02·37	02·35	02·32	02·29	02·26	02·24	02·22
40	03·10	03·06	03·02	02·58	02·54	02·51	02·47	02·44	02·41	02·38	02·34	02·32	02·29	02·26	02·24	02·21	02·19
20 00	03·07	03·03	02·59	02·55	02·51	02·48	02·44	02·41	02·38	02·35	02·32	02·29	02·26	02·24	02·21	02·19	02·17
20	03·04	02·59	02·56	02·52	02·48	02·45	02·41	02·38	02·35	02·32	02·29	02·26	02·24	02·21	02·19	02·17	02·14
40	03·01	02·56	02·53	02·49	02·45	02·42	02·39	02·35	02·32	02·29	02·27	02·24	02·21	02·19	02·16	02·14	02·12
21 00	02·58	02·53	02·50	02·46	02·42	02·39	02·36	02·33	02·30	02·27	02·24	02·21	02·19	02·16	02·14	02·12	02·10
20	02·55	02·50	02·47	02·43	02·40	02·36	02·33	02·30	02·27	02·24	02·22	02·19	02·17	02·14	02·12	02·10	02·08
40	02·52	02·48	02·44	02·40	02·37	02·34	02·31	02·28	02·25	02·22	02·19	02·17	02·14	02·12	02·10	02·07	02·05
22 00	02·49	02·45	02·41	02·38	02·34	02·31	02·28	02·25	02·22	02·20	02·17	02·14	02·12	02·10	02·07	02·05	02·03
20	02·46	02·42	02·39	02·35	02·32	02·29	02·26	02·23	02·20	02·17	02·15	02·12	02·10	02·08	02·05	02·03	02·01
40	02·43	02·40	02·36	02·33	02·30	02·28	02·23	02·21	02·18	02·16	02·13	02·10	02·08	02·06	02·03	02·01	01·59
23 00	02·41	02·37	02·34	02·30	02·27	02·24	02·21	02·18	02·16	02·13	02·10	02·08	02·06	02·04	02·01	01·59	01·58
20	02·38	02·34	02·31	02·28	02·25	02·22	02·19	02·16	02·13	02·11	02·08	02·06	02·04	02·02	01·59	01·58	01·56
40	02·36	02·32	02·29	02·26	02·23	02·20	02·17	02·14	02·11	02·09	02·06	02·04	02·02	02·00	01·58	01·56	01·54
24 00	02·33	02·30	02·26	02·23	02·20	02·17	02·15	02·12	02·09	02·07	02·04	02·02	02·00	01·58	01·56	01·54	01·52
20	02·31	02·28	02·24	02·21	02·18	02·15	02·13	02·10	02·07	02·05	02·03	02·00	01·58	01·56	01·54	01·52	01·50
40	02·29	02·25	02·22	02·19	02·16	02·13	02·11	02·08	02·05	02·03	02·01	01·58	01·56	01·54	01·52	01·50	01·49
25 00	02·26	02·23	02·20	02·17	02·14	02·11	02·09	02·06	02·04	02·01	01·59	01·57	01·55	01·53	01·51	01·49	01·47
20	02·24	02·21	02·18	02·15	02·12	02·09	02·07	02·04	02·02	02·00	01·57	01·55	01·53	01·51	01·49	01·47	01·46
40	02·22	02·19	02·16	02·13	02·10	02·07	02·05	02·02	02·00	01·58	01·55	01·53	01·51	01·49	01·47	01·46	01·44
26 00	02·20	02·17	02·14	02·11	02·08	02·06	02·03	02·01	01·58	01·56	01·54	01·52	01·50	01·48	01·46	01·44	01·42
20	02·18	02·15	02·12	02·09	02·06	02·04	02·01	01·58	01·56	01·54	01·52	01·50	01·48	01·46	01·44	01·43	01·41
40	02·16	02·13	02·10	02·07	02·05	02·02	02·00	01·57	01·55	01·53	01·50	01·48	01·47	01·45	01·43	01·41	01·40
27 00	02·14	02·11	02·08	02·05	02·03	02·00	01·58	01·55	01·53	01·51	01·48	01·47	01·45	01·43	01·41	01·40	01·38
20	02·12	02·09	02·06	02·04	02·01	01·59	01·56	01·54	01·52	01·49	01·47	01·45	01·44	01·42	01·40	01·38	01·37
40	02·10	02·07	02·05	02·02	01·59	01·57	01·55	01·52	01·50	01·48	01·46	01·44	01·42	01·40	01·38	01·37	01·35

Table 1a. Astronomic refraction corrected for temperature (degrees) – continued

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
28 00	02-09	02-06	02-03	02-00	01-58	01-55	01-53	01-51	01-48	01-46	01-44	01-43	01-41	01-39	01-37	01-36	01-34
20	02-07	02-04	02-01	01-59	01-56	01-54	01-51	01-49	01-47	01-45	01-43	01-41	01-39	01-37	01-36	01-34	01-33
40	02-05	02-02	02-00	01-57	01-54	01-52	01-50	01-48	01-46	01-43	01-41	01-40	01-38	01-36	01-34	01-33	01-31
29 00	02-03	02-01	01-58	01-55	01-53	01-51	01-48	01-46	01-44	01-42	01-40	01-38	01-37	01-35	01-33	01-32	01-30
20	02-02	01-59	01-56	01-54	01-51	01-49	01-47	01-45	01-43	01-41	01-39	01-37	01-35	01-34	01-32	01-30	01-29
40	02-00	01-57	01-55	01-52	01-50	01-48	01-45	01-43	01-41	01-39	01-37	01-36	01-34	01-32	01-31	01-29	01-28
30 00	01-58	01-56	01-53	01-51	01-48	01-46	01-44	01-42	01-40	01-38	01-36	01-34	01-33	01-31	01-30	01-28	01-27
20	01-57	01-54	01-52	01-49	01-47	01-45	01-43	01-41	01-39	01-37	01-35	01-33	01-32	01-30	01-28	01-27	01-25
40	01-56	01-53	01-50	01-48	01-46	01-43	01-41	01-39	01-37	01-36	01-34	01-32	01-30	01-29	01-27	01-26	01-24
31 00	01-54	01-51	01-49	01-46	01-44	01-42	01-40	01-38	01-36	01-34	01-32	01-31	01-29	01-28	01-26	01-25	01-23
20	01-52	01-50	01-47	01-45	01-43	01-41	01-39	01-37	01-35	01-33	01-31	01-30	01-28	01-26	01-25	01-24	01-22
40	01-51	01-48	01-46	01-44	01-42	01-39	01-37	01-35	01-34	01-32	01-30	01-28	01-27	01-25	01-24	01-22	01-21
32 00	01-50	01-47	01-45	01-42	01-40	01-38	01-36	01-34	01-32	01-31	01-29	01-27	01-26	01-24	01-23	01-21	01-20
30	01-48	01-45	01-43	01-40	01-38	01-35	01-34	01-33	01-31	01-29	01-27	01-26	01-24	01-23	01-21	01-20	01-19
33 00	01-45	01-43	01-41	01-38	01-35	01-34	01-33	01-31	01-29	01-27	01-26	01-24	01-22	01-21	01-20	01-18	01-17
30	01-44	01-41	01-39	01-37	01-35	01-33	01-31	01-29	01-27	01-26	01-24	01-22	01-21	01-20	01-18	01-17	01-16
34 00	01-42	01-39	01-37	01-35	01-33	01-31	01-29	01-27	01-26	01-24	01-22	01-21	01-19	01-18	01-17	01-16	01-14
30	01-40	01-37	01-35	01-33	01-31	01-29	01-28	01-26	01-24	01-23	01-21	01-19	01-18	01-17	01-15	01-14	01-13
35 00	01-38	01-36	01-33	01-31	01-30	01-28	01-26	01-24	01-22	01-21	01-19	01-18	01-17	01-16	01-14	01-13	01-12
30	01-36	01-34	01-32	01-30	01-28	01-26	01-24	01-23	01-21	01-19	01-18	01-17	01-15	01-14	01-12	01-11	01-10
36 00	01-34	01-32	01-30	01-28	01-26	01-24	01-23	01-21	01-20	01-18	01-16	01-15	01-14	01-12	01-11	01-10	01-09
30	01-33	01-30	01-28	01-27	01-25	01-23	01-21	01-20	01-18	01-17	01-15	01-14	01-12	01-11	01-10	01-09	01-08
37 00	01-31	01-29	01-27	01-25	01-23	01-21	01-20	01-18	01-17	01-15	01-14	01-12	01-11	01-10	01-08	01-08	01-06
30	01-29	01-27	01-25	01-23	01-22	01-20	01-18	01-17	01-15	01-14	01-12	01-11	01-10	01-09	01-07	01-06	01-05
38 00	01-28	01-26	01-24	01-22	01-20	01-19	01-17	01-16	01-14	01-13	01-11	01-10	01-09	01-07	01-08	01-05	01-04
30	01-26	01-24	01-22	01-21	01-19	01-17	01-16	01-14	01-13	01-11	01-10	01-09	01-07	01-06	01-05	01-04	01-03
39 00	01-25	01-23	01-21	01-19	01-17	01-16	01-14	01-13	01-11	01-10	01-09	01-07	01-06	01-05	01-04	01-03	01-02
30	01-23	01-21	01-19	01-18	01-16	01-14	01-13	01-12	01-10	01-09	01-07	01-06	01-05	01-04	01-03	01-02	01-01
40 00	01-22	01-20	01-18	01-16	01-15	01-13	01-12	01-10	01-09	01-08	01-06	01-05	01-04	01-03	01-02	01-01	01-00
30	01-20	01-18	01-17	01-15	01-13	01-12	01-10	01-09	01-08	01-06	01-05	01-04	01-03	01-02	01-01	01-00	00-59
41 00	01-19	01-17	01-15	01-14	01-12	01-11	01-09	01-09	01-08	01-05	01-04	01-03	01-02	01-01	01-00	00-59	00-58
30	01-18	01-16	01-14	01-12	01-11	01-09	01-08	01-07	01-05	01-04	01-03	01-02	01-01	01-00	00-59	00-58	00-57
42 00	01-16	01-14	01-13	01-11	01-10	01-08	01-07	01-05	01-04	01-03	01-02	01-01	01-00	00-58	00-57	00-57	00-56
30	01-15	01-13	01-11	01-10	01-08	01-07	01-06	01-04	01-03	01-02	01-01	01-00	00-59	00-57	00-56	00-56	00-55
43 00	01-14	01-12	01-10	01-09	01-07	01-06	01-05	01-03	01-02	01-01	01-00	00-59	00-58	00-56	00-56	00-55	00-54
30	01-12	01-11	01-09	01-08	01-06	01-05	01-04	01-02	01-01	01-00	00-59	00-58	00-57	00-56	00-55	00-54	00-53
44 00	01-11	01-09	01-08	01-06	01-05	01-04	01-02	01-01	01-00	00-59	00-58	00-57	00-56	00-55	00-54	00-53	00-52
30	01-10	01-08	01-07	01-05	01-04	01-03	01-01	01-00	00-59	00-58	00-57	00-56	00-55	00-54	00-53	00-52	00-51
45 00	01-09	01-07	01-06	01-04	01-03	01-01	01-00	00-59	00-58	00-57	00-56	00-55	00-54	00-53	00-52	00-51	00-50
30	01-07	01-06	01-04	01-03	01-02	01-00	00-59	00-58	00-57	00-56	00-55	00-54	00-53	00-52	00-51	00-50	00-49
46 00	01-06	01-05	01-03	01-02	01-01	00-59	00-58	00-57	00-56	00-55	00-54	00-53	00-52	00-51	00-50	00-49	00-48
30	01-05	01-04	01-02	01-01	01-00	00-58	00-57	00-56	00-55	00-54	00-53	00-52	00-51	00-50	00-49	00-48	00-48

Table 1a. Astronomic refraction corrected for temperature (degrees) - continued

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
47 00	01·04	01·03	01·01	01·00	00·59	00·57	00·56	00·55	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·48	00·47
30	01·03	01·01	01·00	00·59	00·58	00·56	00·55	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·47	00·47	00·46
48 00	01·02	01·00	00·59	00·58	00·57	00·55	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·47	00·47	00·46	00·46
30	01·01	00·59	00·58	00·57	00·56	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·48	00·47	00·46	00·46	00·45
49 00	01·00	00·58	00·57	00·56	00·55	00·53	00·52	00·51	00·50	00·49	00·48	00·48	00·47	00·46	00·46	00·45	00·44
30	00·59	00·57	00·56	00·55	00·54	00·52	00·51	00·50	00·49	00·48	00·48	00·47	00·46	00·45	00·45	00·44	00·43
50 00	00·58	00·56	00·55	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·47	00·46	00·45	00·44	00·43	00·43	00·42
51 00	00·56	00·54	00·53	00·52	00·51	00·50	00·49	00·48	00·47	00·46	00·45	00·44	00·44	00·43	00·42	00·41	00·41
52 00	00·54	00·52	00·51	00·50	00·49	00·48	00·47	00·46	00·45	00·44	00·43	00·43	00·42	00·41	00·40	00·40	00·39
53 00	00·52	00·50	00·49	00·48	00·47	00·46	00·45	00·44	00·44	00·43	00·42	00·41	00·40	00·40	00·39	00·38	00·38
54 00	00·50	00·49	00·48	00·47	00·46	00·45	00·44	00·43	00·42	00·41	00·41	00·40	00·39	00·38	00·38	00·37	00·37
55 00	00·48	00·47	00·46	00·45	00·44	00·43	00·42	00·41	00·40	00·40	00·39	00·38	00·38	00·37	00·36	00·36	00·35
56 00	00·46	00·45	00·44	00·43	00·42	00·41	00·41	00·40	00·39	00·38	00·38	00·37	00·36	00·36	00·35	00·34	00·34
57 00	00·45	00·44	00·43	00·42	00·41	00·40	00·39	00·38	00·38	00·37	00·36	00·36	00·35	00·34	00·34	00·33	00·33
58 00	00·43	00·42	00·41	00·40	00·39	00·38	00·38	00·37	00·36	00·36	00·35	00·34	00·34	00·33	00·32	00·32	00·31
59 00	00·41	00·40	00·39	00·39	00·38	00·37	00·36	00·35	00·35	00·34	00·33	00·33	00·32	00·32	00·31	00·31	00·30
60 00	00·40	00·38	00·38	00·37	00·36	00·35	00·35	00·34	00·33	00·33	00·32	00·32	00·31	00·30	00·30	00·29	00·29

Table Ib. Astronomic refraction corrected for temperature (mils)

TO BE SUBTRACTED FROM OBSERVED ALTITUDE OF SUN OR STAR

(Use values of observed altitude and temperature nearest the values tabulated as arguments.)

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠
0	12.65	12.35	12.08	11.82	11.57	11.33	11.10	10.88	10.66	10.46	10.26	10.08	9.90	9.72	9.54	9.40	9.25
10	9.83	9.80	8.39	9.18	8.90	8.80	8.63	8.45	8.29	8.13	7.97	7.83	7.69	7.55	7.42	7.30	7.19
20	8.18	7.99	7.82	7.64	7.49	7.33	7.21	7.04	6.90	6.77	6.64	6.52	6.40	6.28	6.17	6.08	5.98
30	6.94	6.78	6.63	6.49	6.36	6.22	6.09	5.97	5.85	5.74	5.63	5.53	5.43	5.33	5.24	5.16	5.08
40	5.99	5.86	5.72	5.60	5.48	5.38	5.26	5.15	5.05	4.96	4.86	4.77	4.69	4.60	4.52	4.45	4.38
50	5.24	5.11	5.00	4.89	4.79	4.69	4.60	4.50	4.42	4.33	4.25	4.17	4.10	4.02	3.96	3.89	3.83
60	4.64	4.53	4.43	4.33	4.24	4.15	4.07	3.99	3.91	3.84	3.78	3.70	3.63	3.56	3.50	3.45	3.39
70	4.15	4.05	3.96	3.88	3.80	3.72	3.64	3.57	3.50	3.43	3.37	3.31	3.25	3.19	3.13	3.08	3.03
80	3.75	3.66	3.58	3.50	3.43	3.35	3.28	3.22	3.16	3.10	3.04	2.99	2.93	2.88	2.83	2.78	2.74
90	3.41	3.33	3.26	3.19	3.12	3.06	2.99	2.93	2.88	2.82	2.77	2.72	2.67	2.62	2.57	2.53	2.48
100	3.13	3.06	2.99	2.92	2.86	2.80	2.74	2.69	2.64	2.59	2.54	2.49	2.45	2.40	2.36	2.32	2.28
110	2.88	2.81	2.75	2.69	2.64	2.58	2.53	2.48	2.43	2.38	2.34	2.30	2.25	2.21	2.17	2.14	2.11
120	2.67	2.61	2.55	2.49	2.44	2.39	2.34	2.30	2.25	2.21	2.17	2.13	2.09	2.06	2.01	1.98	1.95
130	2.49	2.43	2.37	2.32	2.27	2.22	2.18	2.14	2.10	2.06	2.02	1.98	1.94	1.91	1.88	1.85	1.82
140	2.32	2.27	2.22	2.17	2.13	2.08	2.04	2.00	1.96	1.92	1.88	1.85	1.82	1.79	1.75	1.73	1.70
150	2.18	2.13	2.08	2.04	2.00	1.96	1.91	1.88	1.84	1.80	1.77	1.74	1.71	1.68	1.66	1.62	1.59
160	2.05	2.00	1.96	1.92	1.88	1.84	1.80	1.77	1.73	1.70	1.67	1.64	1.61	1.58	1.55	1.53	1.50
170	1.94	1.89	1.85	1.81	1.77	1.74	1.70	1.67	1.64	1.60	1.57	1.55	1.52	1.49	1.46	1.44	1.42
180	1.84	1.79	1.75	1.72	1.68	1.64	1.61	1.58	1.55	1.52	1.49	1.46	1.44	1.41	1.39	1.36	1.34
190	1.74	1.70	1.67	1.63	1.59	1.56	1.53	1.50	1.47	1.44	1.41	1.39	1.36	1.34	1.32	1.29	1.27
200	1.66	1.62	1.58	1.55	1.52	1.49	1.46	1.43	1.40	1.37	1.35	1.32	1.30	1.27	1.25	1.23	1.21
210	1.58	1.54	1.51	1.48	1.45	1.42	1.39	1.36	1.33	1.31	1.28	1.26	1.24	1.22	1.19	1.18	1.16
220	1.51	1.48	1.44	1.41	1.38	1.35	1.33	1.30	1.27	1.25	1.23	1.20	1.18	1.16	1.14	1.12	1.10
230	1.45	1.41	1.38	1.35	1.32	1.29	1.27	1.25	1.22	1.20	1.17	1.15	1.13	1.11	1.09	1.07	1.06
240	1.39	1.36	1.32	1.29	1.27	1.24	1.22	1.19	1.17	1.15	1.12	1.10	1.08	1.06	1.05	1.03	1.01
250	1.33	1.30	1.27	1.24	1.22	1.19	1.17	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	0.99	0.97
260	1.28	1.25	1.22	1.19	1.17	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	0.98	0.96	0.96	0.93
270	1.23	1.20	1.18	1.15	1.13	1.10	1.08	1.06	1.04	1.02	0.99	0.98	0.96	0.95	0.93	0.91	0.90
280	1.19	1.16	1.13	1.11	1.09	1.06	1.04	1.02	1.00	0.98	0.96	0.94	0.93	0.91	0.90	0.88	0.87
290	1.14	1.12	1.09	1.07	1.05	1.02	1.00	0.98	0.96	0.95	0.93	0.91	0.89	0.88	0.86	0.86	0.84
300	1.10	1.08	1.06	1.03	1.01	0.99	0.97	0.95	0.93	0.91	0.90	0.88	0.86	0.85	0.83	0.82	0.81
310	1.07	1.04	1.02	1.00	0.98	0.96	0.94	0.92	0.90	0.88	0.87	0.85	0.84	0.82	0.81	0.79	0.78
320	1.03	1.01	0.99	0.96	0.94	0.92	0.91	0.89	0.87	0.85	0.84	0.82	0.81	0.79	0.78	0.77	0.75
330	1.00	0.98	0.96	0.93	0.92	0.90	0.88	0.86	0.84	0.83	0.81	0.80	0.78	0.77	0.75	0.74	0.73
340	0.97	0.95	0.93	0.91	0.89	0.87	0.86	0.83	0.82	0.80	0.79	0.77	0.76	0.74	0.73	0.72	0.71
350	0.94	0.92	0.90	0.88	0.86	0.84	0.82	0.81	0.79	0.78	0.76	0.75	0.74	0.72	0.71	0.70	0.69
360	0.91	0.89	0.87	0.86	0.83	0.82	0.80	0.78	0.77	0.75	0.74	0.73	0.71	0.70	0.69	0.68	0.67
370	0.89	0.86	0.85	0.83	0.81	0.79	0.78	0.76	0.75	0.73	0.72	0.71	0.69	0.68	0.67	0.66	0.65
380	0.86	0.84	0.82	0.80	0.79	0.77	0.76	0.74	0.73	0.71	0.70	0.69	0.67	0.66	0.65	0.64	0.63
390	0.84	0.82	0.80	0.78	0.77	0.76	0.73	0.72	0.71	0.69	0.68	0.67	0.65	0.64	0.63	0.62	0.61
400	0.81	0.79	0.78	0.76	0.74	0.73	0.71	0.70	0.69	0.67	0.66	0.65	0.64	0.62	0.61	0.60	0.59

Table 1b. Astronomic refraction corrected for temperature (mils) - continued

Observed Altitude	Temperature °F																
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
410	0.78	0.77	0.76	0.74	0.72	0.71	0.70	0.68	0.67	0.66	0.64	0.63	0.62	0.61	0.60	0.59	0.58
420	0.77	0.76	0.74	0.72	0.71	0.69	0.68	0.66	0.65	0.64	0.63	0.61	0.60	0.59	0.58	0.57	0.56
430	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.65	0.63	0.62	0.61	0.60	0.59	0.58	0.57	0.56	0.55
440	0.73	0.71	0.70	0.68	0.67	0.66	0.64	0.63	0.62	0.61	0.59	0.58	0.57	0.56	0.55	0.54	0.54
450	0.71	0.70	0.68	0.67	0.65	0.64	0.63	0.61	0.60	0.59	0.58	0.57	0.56	0.55	0.54	0.53	0.52
460	0.70	0.68	0.66	0.65	0.64	0.62	0.61	0.60	0.59	0.58	0.56	0.56	0.54	0.53	0.53	0.52	0.51
470	0.68	0.66	0.65	0.64	0.62	0.61	0.60	0.58	0.57	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.50
480	0.66	0.65	0.63	0.62	0.61	0.59	0.58	0.57	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48
490	0.65	0.63	0.62	0.60	0.59	0.58	0.57	0.56	0.55	0.54	0.52	0.52	0.51	0.50	0.49	0.48	0.47
500	0.63	0.62	0.60	0.59	0.58	0.57	0.56	0.54	0.53	0.52	0.51	0.50	0.49	0.49	0.48	0.47	0.46
510	0.62	0.62	0.59	0.58	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.47	0.46	0.46
520	0.60	0.59	0.58	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.46	0.45	0.44
530	0.59	0.58	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.45	0.45	0.44	0.43
540	0.58	0.56	0.56	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.45	0.44	0.43	0.43	0.42
550	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.45	0.44	0.43	0.42	0.42	0.41
560	0.55	0.54	0.53	0.52	0.50	0.49	0.48	0.47	0.47	0.46	0.45	0.44	0.43	0.42	0.42	0.41	0.40
570	0.54	0.53	0.52	0.50	0.49	0.48	0.47	0.46	0.46	0.45	0.44	0.43	0.42	0.41	0.41	0.40	0.39
580	0.53	0.52	0.50	0.49	0.48	0.47	0.46	0.45	0.45	0.44	0.43	0.42	0.41	0.41	0.40	0.39	0.39
590	0.52	0.50	0.49	0.48	0.47	0.46	0.45	0.44	0.44	0.43	0.42	0.41	0.40	0.40	0.39	0.38	0.38
600	0.51	0.49	0.48	0.47	0.46	0.45	0.44	0.44	0.43	0.42	0.41	0.40	0.40	0.39	0.38	0.38	0.37
610	0.50	0.48	0.47	0.46	0.45	0.44	0.44	0.43	0.42	0.41	0.40	0.40	0.39	0.38	0.37	0.37	0.36
620	0.49	0.47	0.46	0.46	0.44	0.43	0.43	0.42	0.41	0.40	0.39	0.39	0.38	0.37	0.37	0.36	0.35
630	0.48	0.46	0.45	0.44	0.44	0.43	0.42	0.41	0.40	0.39	0.39	0.38	0.37	0.37	0.36	0.35	0.35
640	0.47	0.45	0.44	0.43	0.43	0.42	0.41	0.40	0.39	0.39	0.38	0.37	0.36	0.36	0.35	0.35	0.34
650	0.46	0.45	0.44	0.43	0.42	0.41	0.40	0.39	0.38	0.38	0.37	0.36	0.36	0.35	0.34	0.34	0.33
660	0.45	0.44	0.43	0.42	0.41	0.40	0.39	0.38	0.38	0.37	0.36	0.36	0.35	0.34	0.34	0.33	0.33
670	0.44	0.43	0.42	0.41	0.40	0.39	0.38	0.38	0.37	0.36	0.36	0.35	0.34	0.34	0.33	0.33	0.32
680	0.43	0.42	0.41	0.40	0.39	0.39	0.38	0.37	0.36	0.36	0.35	0.34	0.34	0.33	0.32	0.32	0.31
690	0.42	0.41	0.40	0.39	0.39	0.38	0.37	0.36	0.36	0.35	0.34	0.34	0.33	0.32	0.32	0.31	0.31
700	0.41	0.40	0.39	0.39	0.38	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.32	0.32	0.31	0.31	0.30
710	0.40	0.40	0.39	0.38	0.37	0.38	0.36	0.35	0.34	0.33	0.33	0.32	0.32	0.31	0.31	0.30	0.30
720	0.40	0.39	0.38	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29
730	0.39	0.38	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.32	0.31	0.31	0.30	0.30	0.29	0.28	0.28
740	0.38	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28
750	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27
760	0.37	0.36	0.35	0.34	0.34	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27
770	0.36	0.35	0.34	0.34	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26
780	0.35	0.34	0.34	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.26
790	0.36	0.34	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.26	0.26
800	0.34	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.26	0.25	0.25
810	0.33	0.32	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.26	0.25	0.25	0.24
820	0.33	0.32	0.31	0.30	0.30	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.25	0.25	0.25	0.24	0.24
830	0.32	0.31	0.31	0.30	0.29	0.29	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.25	0.24	0.24	0.23
840	0.31	0.31	0.30	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.25	0.25	0.24	0.24	0.24	0.23	0.23
850	0.31	0.30	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.25	0.25	0.24	0.24	0.24	0.23	0.23	0.22
860	0.30	0.29	0.29	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.24	0.24	0.24	0.23	0.23	0.22	0.22
870	0.30	0.29	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.24	0.24	0.24	0.23	0.23	0.22	0.22	0.22
880	0.29	0.28	0.28	0.27	0.26	0.25	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21
890	0.28	0.28	0.27	0.27	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21	0.21
900	0.28	0.27	0.27	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21	0.21	0.20

Table Ib. Astronomic refraction corrected for temperature (mils) - continued

Observed Altitude	Temperature °F															
	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils	mils
910	0.27	0.27	0.26	0.26	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21	0.21	0.20	0.20
920	0.27	0.26	0.26	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21	0.21	0.20	0.20	0.20
930	0.26	0.26	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19
940	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.18
950	0.25	0.25	0.24	0.23	0.23	0.22	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.19	0.18
960	0.25	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.20	0.19	0.19	0.18	0.18
970	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18
980	0.24	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.17
990	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17
1000	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.17
1010	0.22	0.22	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.16	0.16
1020	0.22	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16
1030	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.16
1040	0.21	0.20	0.20	0.19	0.19	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15
1050	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15
1060	0.20	0.19	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
1070	0.19	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14
1080	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14	0.14
1090	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14
1100	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13
1110	0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13
1120	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13
1130	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.12
1140	0.16	0.16	0.16	0.16	0.16	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12
1150	0.16	0.16	0.15	0.16	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12
1160	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.11
1170	0.16	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11
1180	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11
1190	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11
1200	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.10	0.10

Table 2a. Sun, 1993, for zero hours universal time (GMT)

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JAN 0 TH	-23 05 40		-410.57		-02 57.0		6 38 41.3
JAN 1 FR	-23 01 03	+ 278	-409.20	+1.37	-03 25.6	-28.5	6 42 37.8
2 SA	-22 55 58	+ 305	-407.69	+1.51	-03 53.8	-28.2	6 46 34.4
3 SU	-22 50 25	+ 332	-406.05	+1.64	-04 21.6	-27.9	6 50 30.9
4 MO	-22 44 26	+ 360	-404.27	+1.78	-04 49.1	-27.5	6 54 27.5
5 TU	-22 37 59	+ 387	-402.37	+1.91	-05 16.1	-27.0	6 58 24.0
6 WE	-22 31 06	+ 413	-400.32	+2.04	-05 42.7	-26.6	7 02 20.6
7 TH	-22 23 45	+ 440	-398.15	+2.17	-06 08.8	-26.1	7 06 17.2
8 FR	-22 15 59	+ 467	-395.85	+2.31	-06 34.5	-25.6	7 10 13.7
9 SA	-22 07 46	+ 493	-393.41	+2.43	-06 59.6	-25.1	7 14 10.3
10 SU	-21 59 08	+ 519	-390.85	+2.56	-07 24.2	-24.6	7 18 06.9
11 MO	-21 50 03	+ 544	-388.16	+2.69	-07 48.2	-24.0	7 22 03.4
12 TU	-21 40 33	+ 570	-385.35	+2.81	-08 11.6	-23.5	7 26 00.0
13 WE	-21 30 38	+ 595	-382.41	+2.94	-08 34.5	-22.9	7 29 56.5
14 TH	-21 20 17	+ 620	-379.35	+3.06	-08 56.8	-22.3	7 33 53.1
15 FR	-21 09 32	+ 645	-376.16	+3.19	-09 18.4	-21.6	7 37 49.6
16 SA	-20 58 23	+ 669	-372.85	+3.30	-09 39.4	-21.0	7 41 46.2
17 SU	-20 46 49	+ 694	-369.43	+3.43	-09 59.7	-20.3	7 45 42.7
18 MO	-20 34 52	+ 717	-365.89	+3.54	-10 19.3	-19.6	7 49 39.3
19 TU	-20 22 31	+ 741	-362.23	+3.66	-10 38.3	-18.9	7 53 35.9
20 WE	-20 09 47	+ 764	-358.46	+3.77	-10 56.5	-18.2	7 57 32.4
21 TH	-19 56 41	+ 787	-354.57	+3.89	-11 14.0	-17.5	8 01 29.0
22 FR	-19 43 12	+ 809	-350.58	+4.00	-11 30.7	-16.7	8 05 25.5
23 SA	-19 29 21	+ 831	-346.47	+4.10	-11 46.6	-16.0	8 09 22.1
24 SU	-19 15 08	+ 853	-342.26	+4.21	-12 01.8	-15.2	8 13 18.7
25 MO	-19 00 34	+ 874	-337.95	+4.32	-12 16.2	-14.4	8 17 15.2
26 TU	-18 45 40	+ 895	-333.53	+4.42	-12 29.8	-13.6	8 21 11.8
27 WE	-18 30 25	+ 915	-329.01	+4.52	-12 42.6	-12.8	8 25 08.3
28 TH	-18 14 50	+ 935	-324.39	+4.62	-12 54.5	-12.0	8 29 04.9
29 FR	-17 58 55	+ 955	-319.68	+4.72	-13 05.6	-11.1	8 33 01.4
30 SA	-17 42 41	+ 974	-314.87	+4.81	-13 15.9	-10.3	8 36 58.0
31 SU	-17 26 08	+ 993	-309.96	+4.90	-13 25.4	- 9.5	8 40 54.5
		+1011		+4.99		- 8.6	

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
FEB 1 MO	-17 09 16	+1029	-304.97	+5.08	-13 34.0	- 7.8	8 44 51.1
2 TU	-16 52 07	+1047	-299.89	+5.17	-13 41.8	- 7.0	8 48 47.6
3 WE	-16 34 40	+1064	-294.72	+5.25	-13 48.8	- 6.1	8 52 44.2
4 TH	-16 16 56	+1081	-289.46	+5.34	-13 54.9	- 5.3	8 56 40.8
5 FR	-15 58 55	+1098	-284.12	+5.42	-14 00.2	- 4.5	9 00 37.3
6 SA	-15 40 37	+1114	-278.70	+5.50	-14 04.7	- 3.7	9 04 33.9
7 SU	-15 22 04	+1129	-273.20	+5.58	-14 08.4	- 2.9	9 08 30.4
8 MO	-15 03 14	+1145	-267.63	+5.65	-14 11.2	- 2.1	9 12 27.0
9 TU	-14 44 10	+1159	-261.97	+5.72	-14 13.3	- 1.3	9 16 23.5
10 WE	-14 24 50	+1174	-256.25	+5.80	-14 14.6	- 0.5	9 20 20.1
11 TH	-14 05 16	+1188	-250.45	+5.87	-14 15.2	+ 0.2	9 24 16.6
12 FR	-13 45 28	+1202	-244.58	+5.94	-14 15.0	+ 0.9	9 28 13.2
13 SA	-13 25 27	+1215	-238.65	+6.00	-14 14.0	+ 1.7	9 32 09.7
14 SU	-13 05 11	+1228	-232.65	+6.06	-14 12.4	+ 2.4	9 36 06.3
15 MO	-12 44 43	+1240	-226.59	+6.12	-14 10.0	+ 3.1	9 40 02.9
16 TU	-12 24 03	+1252	-220.46	+6.18	-14 06.9	+ 3.8	9 43 59.4
17 WE	-12 03 11	+1264	-214.27	+6.24	-14 03.1	+ 4.5	9 47 56.0
18 TH	-11 42 07	+1275	-208.03	+6.30	-13 58.6	+ 5.2	9 51 52.5
19 FR	-11 20 52	+1286	-201.74	+6.35	-13 53.4	+ 5.8	9 55 49.1
20 SA	-10 59 26	+1296	-195.39	+6.40	-13 47.6	+ 6.5	9 59 45.6
21 SU	-10 37 50	+1306	-188.99	+6.45	-13 41.1	+ 7.1	10 03 42.2
22 MO	-10 16 04	+1315	-182.54	+6.49	-13 34.0	+ 7.8	10 07 38.7
23 TU	- 9 54 09	+1324	-176.04	+6.54	-13 26.2	+ 8.4	10 11 35.3
24 WE	- 9 32 04	+1333	-169.50	+6.58	-13 17.9	+ 9.0	10 15 31.8
25 TH	- 9 09 51	+1341	-162.92	+6.62	-13 08.9	+ 9.6	10 19 28.4
26 FR	- 8 47 30	+1349	-156.30	+6.66	-12 59.3	+10.1	10 23 24.9
27 SA	- 8 25 02	+1356	-149.64	+6.70	-12 49.2	+10.7	10 27 21.5
28 SU	- 8 02 25	+1363	-142.94	+6.73	-12 38.5	+11.3	10 31 18.0

Table 2a. Sun, 1993, for zero hours universal time (GHT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		NILS				
	° ′ ″	DAILY CHANGE (SEC)	NILS	DAILY CHANGE (NILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAR 1 MO	- 7 39 42	+1370	-136.21	+6.77	-12 27.2	+11.8	10 35 14.6
2 TU	- 7 16 53	+1376	-129.45	+6.80	-12 15.4	+12.3	10 39 11.2
3 WE	- 6 53 57	+1381	-122.65	+6.82	-12 03.1	+12.8	10 43 07.7
4 TH	- 6 30 55	+1387	-115.83	+6.85	-11 50.3	+13.3	10 47 04.3
5 FR	- 6 07 49	+1392	-108.98	+6.87	-11 37.1	+13.7	10 51 00.8
6 SA	- 5 44 37	+1396	-102.11	+6.89	-11 23.4	+14.1	10 54 57.4
7 SU	- 5 21 21	+1401	- 95.21	+6.92	-11 09.2	+14.5	10 58 53.9
8 MO	- 4 58 00	+1405	- 88.30	+6.94	-10 54.7	+14.9	11 02 50.5
9 TU	- 4 34 35	+1408	- 81.36	+6.95	-10 39.7	+15.3	11 06 47.0
10 WE	- 4 11 07	+1411	- 74.41	+6.97	-10 24.4	+15.6	11 10 43.6
11 TH	- 3 47 36	+1414	- 67.44	+6.98	-10 08.8	+15.9	11 14 40.1
12 FR	- 3 24 02	+1417	- 60.45	+7.00	-09 52.9	+16.2	11 18 36.7
13 SA	- 3 00 25	+1419	- 53.46	+7.01	-09 36.7	+16.5	11 22 33.2
14 SU	- 2 36 46	+1421	- 46.45	+7.02	-09 20.2	+16.7	11 26 29.8
15 MO	- 2 13 06	+1422	- 39.44	+7.02	-09 03.5	+16.9	11 30 26.4
16 TU	- 1 49 24	+1423	- 32.41	+7.03	-08 46.6	+17.1	11 34 22.9
17 WE	- 1 25 41	+1424	- 25.39	+7.03	-08 29.5	+17.3	11 38 19.5
18 TH	- 1 01 57	+1424	- 18.36	+7.03	-08 12.1	+17.5	11 42 16.0
19 FR	- 0 38 14	+1424	- 11.33	+7.03	-07 54.7	+17.6	11 46 12.6
20 SA	- 0 14 30	+1423	- 4.30	+7.03	-07 37.0	+17.7	11 50 09.1
21 SU	+ 0 09 13	+1422	+ 2.73	+7.02	-07 19.3	+17.9	11 54 05.7
22 MO	+ 0 32 55	+1421	+ 9.75	+7.02	-07 01.5	+17.9	11 58 02.2
23 TU	+ 0 56 36	+1419	+ 16.77	+7.01	-06 43.5	+18.0	12 01 58.8
24 WE	+ 1 20 15	+1417	+ 23.78	+7.00	-06 25.5	+18.1	12 05 55.3
25 TH	+ 1 43 52	+1415	+ 30.77	+6.99	-06 07.4	+18.1	12 09 51.9
26 FR	+ 2 07 26	+1412	+ 37.76	+6.97	-05 49.3	+18.1	12 13 48.4
27 SA	+ 2 30 58	+1409	+ 44.73	+6.96	-05 31.2	+18.1	12 17 45.0
28 SU	+ 2 54 27	+1405	+ 51.69	+6.94	-05 13.1	+18.1	12 21 41.5
29 MO	+ 3 17 52	+1401	+ 58.63	+6.92	-04 54.9	+18.1	12 25 38.1
30 TU	+ 3 41 13	+1397	+ 65.55	+6.90	-04 36.8	+18.0	12 29 34.6
31 WE	+ 4 04 30	+1392	+ 72.45	+6.87	-04 18.8	+18.0	12 33 31.2

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
APR 1 TH	+ 4 27 43	+1387	+ 79.32	+6.85	-04 00.8	+17.9	12 37 27.7
2 FR	+ 4 50 50	+1382	+ 86.17	+6.82	-03 42.9	+17.8	12 41 24.3
3 SA	+ 5 13 52	+1377	+ 93.00	+6.80	-03 25.1	+17.7	12 45 20.9
4 SU	+ 5 36 49	+1371	+ 99.80	+6.77	-03 07.5	+17.5	12 49 17.4
5 MO	+ 5 59 39	+1364	+106.56	+6.74	-02 50.0	+17.3	12 53 14.0
6 TU	+ 6 22 24	+1358	+113.30	+6.71	-02 32.6	+17.2	12 57 10.5
7 WE	+ 6 45 01	+1351	+120.01	+6.67	-02 15.5	+16.9	13 01 07.0
8 TH	+ 7 07 32	+1344	+126.68	+6.64	-01 58.5	+16.7	13 05 03.6
9 FR	+ 7 29 56	+1336	+133.31	+6.60	-01 41.8	+16.4	13 09 00.2
10 SA	+ 7 52 12	+1328	+139.91	+6.56	-01 25.4	+16.2	13 12 56.7
11 SU	+ 8 14 21	+1320	+146.47	+6.52	-01 09.2	+15.9	13 16 53.3
12 MO	+ 8 36 21	+1312	+152.99	+6.48	-00 53.4	+15.5	13 20 49.8
13 TU	+ 8 58 12	+1303	+159.47	+6.43	-00 37.9	+15.2	13 24 46.4
14 WE	+ 9 19 55	+1294	+165.90	+6.39	-00 22.7	+14.8	13 28 42.9
15 TH	+ 9 41 29	+1284	+172.29	+6.34	-00 07.8	+14.5	13 32 39.5
16 FR	+10 02 53	+1274	+178.63	+6.29	+00 06.7	+14.1	13 36 36.0
17 SA	+10 24 07	+1264	+184.92	+6.24	+00 20.8	+13.7	13 40 32.6
18 SU	+10 45 11	+1253	+191.16	+6.19	+00 34.5	+13.3	13 44 29.1
19 MO	+11 06 04	+1242	+197.35	+6.13	+00 47.8	+12.9	13 48 25.7
20 TU	+11 26 46	+1231	+203.49	+6.08	+01 00.7	+12.5	13 52 22.2
21 WE	+11 47 17	+1219	+209.57	+6.02	+01 13.1	+12.0	13 56 18.8
22 TH	+12 07 36	+1207	+215.59	+5.96	+01 25.1	+11.6	14 00 15.3
23 FR	+12 27 44	+1195	+221.55	+5.90	+01 36.7	+11.1	14 04 11.9
24 SA	+12 47 39	+1182	+227.45	+5.84	+01 47.8	+10.7	14 08 08.4
25 SU	+13 07 21	+1169	+233.29	+5.77	+01 58.5	+10.2	14 12 05.0
26 MO	+13 26 50	+1156	+239.06	+5.71	+02 08.7	+ 9.7	14 16 01.6
27 TU	+13 46 06	+1142	+244.77	+5.64	+02 18.4	+ 9.2	14 19 58.1
28 WE	+14 05 09	+1128	+250.41	+5.57	+02 27.6	+ 8.7	14 23 54.7
29 TH	+14 23 57	+1114	+255.99	+5.50	+02 36.3	+ 8.2	14 27 51.2
30 FR	+14 42 31	+1099	+261.49	+5.43	+02 44.5	+ 7.7	14 31 47.8

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
MAY 1 SA	+15 00 51	+1084	+266.92	+5.35	+02 52.3	+ 7.2	14	35	44.4
2 SU	+15 18 55	+1069	+272.27	+5.28	+02 59.5	+ 6.7	14	39	40.9
3 MO	+15 36 44	+1054	+277.55	+5.20	+03 06.1	+ 6.1	14	43	37.4
4 TU	+15 54 18	+1038	+282.75	+5.13	+03 12.3	+ 5.6	14	47	34.0
5 WE	+16 11 35	+1022	+287.86	+5.05	+03 17.9	+ 5.1	14	51	30.5
6 TH	+16 28 37	+1005	+292.92	+4.96	+03 23.0	+ 4.5	14	55	27.1
7 FR	+16 45 22	+ 989	+297.89	+4.88	+03 27.4	+ 3.9	14	59	23.7
8 SA	+17 01 51	+ 972	+302.77	+4.80	+03 31.4	+ 3.3	15	03	20.2
9 SU	+17 18 03	+ 954	+307.57	+4.71	+03 34.7	+ 2.8	15	07	16.8
10 MO	+17 33 57	+ 937	+312.28	+4.63	+03 37.5	+ 2.2	15	11	13.3
11 TU	+17 49 34	+ 919	+316.91	+4.54	+03 39.6	+ 1.6	15	15	09.9
12 WE	+18 04 53	+ 901	+321.44	+4.45	+03 41.2	+ 1.0	15	19	06.5
13 TH	+18 19 53	+ 882	+325.89	+4.36	+03 42.2	+ 0.4	15	23	03.0
14 FR	+18 34 35	+ 863	+330.25	+4.26	+03 42.6	- 0.2	15	26	59.6
15 SA	+18 48 59	+ 844	+334.51	+4.17	+03 42.4	- 0.8	15	30	56.1
16 SU	+19 03 03	+ 825	+338.68	+4.07	+03 41.7	- 1.4	15	34	52.7
17 MO	+19 16 48	+ 805	+342.76	+3.98	+03 40.3	- 1.9	15	38	49.2
18 TU	+19 30 14	+ 786	+346.73	+3.88	+03 38.4	- 2.5	15	42	45.8
19 WE	+19 43 19	+ 765	+350.61	+3.78	+03 35.9	- 3.1	15	46	42.3
20 TH	+19 56 05	+ 745	+354.39	+3.68	+03 32.8	- 3.6	15	50	38.9
21 FR	+20 08 30	+ 724	+358.07	+3.58	+03 29.2	- 4.1	15	54	35.4
22 SA	+20 20 34	+ 703	+361.65	+3.47	+03 25.1	- 4.7	15	58	32.0
23 SU	+20 32 18	+ 682	+365.12	+3.37	+03 20.4	- 5.2	16	02	28.6
24 MO	+20 43 40	+ 661	+368.49	+3.26	+03 15.3	- 5.7	16	06	25.1
25 TU	+20 54 41	+ 639	+371.76	+3.16	+03 09.6	- 6.2	16	10	21.7
26 WE	+21 05 20	+ 617	+374.91	+3.05	+03 03.4	- 6.6	16	14	18.2
27 TH	+21 15 37	+ 595	+377.96	+2.94	+02 56.8	- 7.1	16	18	14.8
28 FR	+21 25 33	+ 573	+380.90	+2.83	+02 49.7	- 7.5	16	22	11.4
29 SA	+21 35 06	+ 551	+383.73	+2.72	+02 42.2	- 7.9	16	26	07.9
30 SU	+21 44 16	+ 528	+386.45	+2.61	+02 34.2	- 8.4	16	30	04.5
31 MO	+21 53 04	+ 505	+389.06	+2.49	+02 25.9	- 8.8	16	34	01.0

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUN 1 TU	+22 01 29	+ 482	+391.55	+2.38	+02 17.1	- 9.1	16 37 57.6
2 WE	+22 09 31	+ 459	+393.93	+2.27	+02 08.0	- 9.5	16 41 54.1
3 TH	+22 17 10	+ 436	+396.20	+2.15	+01 58.5	- 9.9	16 45 50.7
4 FR	+22 24 26	+ 412	+398.35	+2.03	+01 48.6	-10.2	16 49 47.2
5 SA	+22 31 18	+ 388	+400.38	+1.92	+01 38.4	-10.5	16 53 43.8
6 SU	+22 37 46	+ 365	+402.30	+1.80	+01 27.9	-10.9	16 57 40.4
7 MO	+22 43 51	+ 341	+404.10	+1.68	+01 17.0	-11.2	17 01 36.9
8 TU	+22 49 32	+ 317	+405.79	+1.57	+01 05.8	-11.5	17 05 33.5
9 WE	+22 54 48	+ 293	+407.35	+1.45	+00 54.4	-11.7	17 09 30.0
10 TH	+22 59 41	+ 268	+408.79	+1.32	+00 42.6	-12.0	17 13 26.6
11 FR	+23 04 09	+ 244	+410.12	+1.20	+00 30.7	-12.2	17 17 23.2
12 SA	+23 08 13	+ 219	+411.32	+1.08	+00 18.5	-12.4	17 21 19.7
13 SU	+23 11 52	+ 195	+412.41	+0.96	+00 06.1	-12.6	17 25 16.3
14 MO	+23 15 07	+ 170	+413.37	+0.84	-00 06.5	-12.7	17 29 12.8
15 TU	+23 17 57	+ 145	+414.21	+0.72	-00 19.3	-12.9	17 33 09.4
16 WE	+23 20 23	+ 121	+414.93	+0.60	-00 32.1	-13.0	17 37 05.9
17 TH	+23 22 23	+ 96	+415.52	+0.47	-00 45.1	-13.1	17 41 02.5
18 FR	+23 23 59	+ 71	+416.00	+0.35	-00 58.2	-13.1	17 44 59.0
19 SA	+23 25 11	+ 46	+416.35	+0.23	-01 11.3	-13.2	17 48 55.6
20 SU	+23 25 57	+ 22	+416.58	+0.11	-01 24.5	-13.2	17 52 52.2
21 MO	+23 26 19	- 3	+416.68	-0.01	-01 37.7	-13.1	17 56 48.7
22 TU	+23 26 15	- 28	+416.67	-0.14	-01 50.8	-13.1	18 00 45.3
23 WE	+23 25 47	- 53	+416.53	-0.26	-02 03.9	-13.0	18 04 41.9
24 TH	+23 24 55	- 77	+416.27	-0.38	-02 16.9	-12.9	18 08 38.4
25 FR	+23 23 37	- 102	+415.89	-0.50	-02 29.8	-12.8	18 12 35.0
26 SA	+23 21 55	- 127	+415.38	-0.63	-02 42.5	-12.6	18 16 31.5
27 SU	+23 19 48	- 151	+414.76	-0.75	-02 55.1	-12.4	18 20 28.1
28 MO	+23 17 17	- 176	+414.01	-0.87	-03 07.5	-12.2	18 24 24.6
29 TU	+23 14 21	- 200	+413.14	-0.99	-03 19.7	-12.0	18 28 21.2
30 WE	+23 11 01	- 225	+412.15	-1.11	-03 31.7	-11.7	18 32 17.7

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUL 1 TH	+23 07 16		+411.04		-03 43.4		18 36 14.3
		- 249		-1.23		-11.5	
2 FR	+23 03 08		+409.82		-03 54.9		18 40 10.9
		- 273		-1.35		-11.2	
3 SA	+22 58 35		+408.47		-04 06.1		18 44 07.4
		- 297		-1.47		-10.9	
4 SU	+22 53 38		+407.00		-04 16.9		18 48 04.0
		- 321		-1.59		-10.6	
5 MO	+22 48 17		+405.42		-04 27.5		18 52 00.5
		- 345		-1.70		-10.2	
6 TU	+22 42 32		+403.72		-04 37.7		18 55 57.1
		- 368		-1.82		- 9.9	
7 WE	+22 36 24		+401.90		-04 47.6		18 59 53.7
		- 392		-1.94		- 9.5	
8 TH	+22 29 52		+399.96		-04 57.2		19 03 50.2
		- 415		-2.05		- 9.1	
9 FR	+22 22 57		+397.91		-05 06.3		19 07 46.8
		- 438		-2.16		- 8.8	
10 SA	+22 15 39		+395.75		-05 15.1		19 11 43.3
		- 461		-2.28		- 8.3	
11 SU	+22 07 57		+393.47		-05 23.4		19 15 39.9
		- 484		-2.39		- 7.9	
12 MO	+21 59 53		+391.08		-05 31.3		19 19 36.4
		- 507		-2.50		- 7.5	
13 TU	+21 51 26		+388.57		-05 38.8		19 23 33.0
		- 530		-2.62		- 7.0	
14 WE	+21 42 36		+385.96		-05 45.8		19 27 29.5
		- 552		-2.73		- 6.6	
15 TH	+21 33 24		+383.23		-05 52.4		19 31 26.1
		- 574		-2.83		- 6.1	
16 FR	+21 23 50		+380.40		-05 58.5		19 35 22.6
		- 596		-2.94		- 5.6	
17 SA	+21 13 54		+377.45		-06 04.1		19 39 19.2
		- 617		-3.05		- 5.1	
18 SU	+21 03 37		+374.40		-06 09.1		19 43 15.8
		- 639		-3.16		- 4.5	
19 MO	+20 52 58		+371.25		-06 13.7		19 47 12.3
		- 660		-3.26		- 4.0	
20 TU	+20 41 58		+367.99		-06 17.6		19 51 08.9
		- 681		-3.36		- 3.4	
21 WE	+20 30 37		+364.63		-06 21.1		19 55 05.5
		- 701		-3.46		- 2.9	
22 TH	+20 18 56		+361.16		-06 23.9		19 59 02.0
		- 722		-3.57		- 2.3	
23 FR	+20 06 54		+357.60		-06 26.2		20 02 58.6
		- 742		-3.66		- 1.7	
24 SA	+19 54 32		+353.94		-06 27.9		20 06 55.1
		- 762		-3.76		- 1.1	
25 SU	+19 41 50		+350.17		-06 29.0		20 10 51.7
		- 781		-3.86		- 0.5	
26 MO	+19 28 49		+346.32		-06 29.4		20 14 48.2
		- 801		-3.96		+ 0.2	
27 TU	+19 15 28		+342.36		-06 29.3		20 18 44.8
		- 820		-4.05		+ 0.8	
28 WE	+19 01 49		+338.32		-06 28.5		20 22 41.3
		- 838		-4.14		+ 1.4	
29 TH	+18 47 50		+334.18		-06 27.1		20 26 37.9
		- 857		-4.23		+ 2.0	
30 FR	+18 33 34		+329.94		-06 25.1		20 30 34.4
		- 875		-4.32		+ 2.6	
31 SA	+18 18 59		+325.62		-06 22.5		20 34 31.0
		- 893		-4.41		+ 3.2	

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
AUG 1 SU	+18 04 06	+ 911	+321.21	-4.50	-06 19.2	+ 3.9	20 38 27.6
2 MO	+17 48 55	+ 928	+316.72	-4.58	-06 15.4	+ 4.5	20 42 24.1
3 TU	+17 33 27	+ 945	+312.13	-4.67	-06 10.9	+ 5.1	20 46 20.7
4 WE	+17 17 42	+ 962	+307.47	-4.75	-06 05.8	+ 5.7	20 50 17.2
5 TH	+17 01 40	+ 979	+302.71	-4.83	-06 00.1	+ 6.3	20 54 13.8
6 FR	+16 45 21	+ 995	+297.88	-4.91	-05 53.9	+ 6.8	20 58 10.3
7 SA	+16 28 46	+1011	+292.97	-4.99	-05 47.0	+ 7.4	21 02 06.9
8 SU	+16 11 55	+1027	+287.98	-5.07	-05 39.6	+ 8.0	21 06 03.4
9 MO	+15 54 49	+1042	+282.91	-5.15	-05 31.6	+ 8.6	21 10 00.0
10 TU	+15 37 27	+1057	+277.76	-5.22	-05 23.0	+ 9.1	21 13 56.5
11 WE	+15 19 50	+1072	+272.54	-5.29	-05 13.9	+ 9.7	21 17 53.1
12 TH	+15 01 58	+1086	+267.25	-5.36	-05 04.3	+10.2	21 21 49.6
13 FR	+14 43 51	+1101	+261.88	-5.44	-04 54.0	+10.7	21 25 46.2
14 SA	+14 25 31	+1114	+256.45	-5.50	-04 43.3	+11.3	21 29 42.8
15 SU	+14 06 56	+1128	+250.94	-5.57	-04 32.0	+11.8	21 33 39.3
16 MO	+13 48 08	+1141	+245.37	-5.63	-04 20.2	+12.3	21 37 35.9
17 TU	+13 29 07	+1154	+239.74	-5.70	-04 07.9	+12.8	21 41 32.4
18 WE	+13 09 53	+1166	+234.04	-5.76	-03 55.1	+13.3	21 45 29.0
19 TH	+12 50 27	+1179	+228.28	-5.82	-03 41.8	+13.8	21 49 25.5
20 FR	+12 30 48	+1190	+222.46	-5.88	-03 27.9	+14.3	21 53 22.1
21 SA	+12 10 58	+1202	+216.58	-5.94	-03 13.6	+14.8	21 57 18.6
22 SU	+11 50 56	+1213	+210.65	-5.99	-02 58.8	+15.3	22 01 15.2
23 MO	+11 30 43	+1224	+204.66	-6.04	-02 43.6	+15.7	22 05 11.7
24 TU	+11 10 19	+1234	+198.61	-6.09	-02 27.9	+16.2	22 09 08.3
25 WE	+10 49 43	+1245	+192.52	-6.15	-02 11.7	+16.6	22 13 04.9
26 TH	+10 29 00	+1254	+186.37	-6.19	-01 55.1	+17.0	22 17 01.4
27 FR	+10 08 06	+1264	+180.18	-6.24	-01 38.1	+17.4	22 20 58.0
28 SA	+ 9 47 02	+1273	+173.94	-6.29	-01 20.7	+17.8	22 24 54.5
29 SU	+ 9 25 49	+1282	+167.65	-6.33	-01 02.9	+18.1	22 28 51.1
30 MO	+ 9 04 27	+1291	+161.32	-6.38	-00 44.8	+18.5	22 32 47.6
31 TU	+ 8 42 56	+1299	+154.94	-6.41	-00 26.3	+18.8	22 36 44.2

Table 2a. Sun, 1993, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
SEP 1 WE	+ 8 21 17	-1307	+148.53	-6.45	-00 07.5	+19.1	22 40 40.7
2 TH	+ 7 59 30	-1315	+142.07	-6.49	+00 11.7	+19.4	22 44 37.3
3 FR	+ 7 37 35	-1322	+135.58	-6.53	+00 31.0	+19.7	22 48 33.8
4 SA	+ 7 15 32	-1330	+129.05	-6.57	+00 50.7	+19.9	22 52 30.4
5 SU	+ 6 53 23	-1336	+122.48	-6.60	+01 10.6	+20.1	22 56 26.9
6 MO	+ 6 31 06	-1343	+115.88	-6.63	+01 30.7	+20.3	23 00 23.5
7 TU	+ 6 08 43	-1349	+109.25	-6.66	+01 51.0	+20.5	23 04 20.0
8 WE	+ 5 46 14	-1355	+102.59	-6.69	+02 11.5	+20.7	23 08 16.6
9 TH	+ 5 23 39	-1361	+ 95.90	-6.72	+02 32.2	+20.8	23 12 13.1
10 FR	+ 5 00 58	-1366	+ 89.18	-6.75	+02 53.0	+20.9	23 16 09.7
11 SA	+ 4 38 12	-1371	+ 82.43	-6.77	+03 13.9	+21.0	23 20 06.3
12 SU	+ 4 15 22	-1375	+ 75.66	-6.79	+03 35.0	+21.1	23 24 02.8
13 MO	+ 3 52 27	-1379	+ 68.87	-6.81	+03 56.1	+21.2	23 27 59.4
14 TU	+ 3 29 27	-1383	+ 62.06	-6.83	+04 17.2	+21.2	23 31 55.9
15 WE	+ 3 06 24	-1387	+ 55.23	-6.85	+04 38.5	+21.3	23 35 52.5
16 TH	+ 2 43 17	-1390	+ 48.38	-6.86	+04 59.7	+21.3	23 39 49.0
17 FR	+ 2 20 07	-1393	+ 41.52	-6.88	+05 21.0	+21.3	23 43 45.6
18 SA	+ 1 56 55	-1395	+ 34.64	-6.89	+05 42.3	+21.3	23 47 42.1
19 SU	+ 1 33 40	-1397	+ 27.75	-6.90	+06 03.6	+21.3	23 51 38.7
20 MO	+ 1 10 22	-1399	+ 20.85	-6.91	+06 24.8	+21.2	23 55 35.2
21 TU	+ 0 47 04	-1400	+ 13.94	-6.91	+06 46.0	+21.1	23 59 31.8
22 WE	+ 0 23 43	-1401	+ 7.03	-6.92	+07 07.2	+21.1	0 03 28.3
23 TH	+ 0 00 22	-1402	+ 0.11	-6.92	+07 28.2	+21.0	0 07 24.9
24 FR	- 0 23 00	-1402	- 6.81	-6.92	+07 49.2	+20.8	0 11 21.5
25 SA	- 0 46 22	-1402	- 13.74	-6.92	+08 10.1	+20.7	0 15 18.0
26 SU	- 1 09 44	-1402	- 20.66	-6.92	+08 30.7	+20.5	0 19 14.6
27 MO	- 1 33 06	-1401	- 27.58	-6.92	+08 51.3	+20.3	0 23 11.1
28 TU	- 1 56 27	-1400	- 34.50	-6.91	+09 11.6	+20.1	0 27 07.7
29 WE	- 2 19 47	-1399	- 41.42	-6.91	+09 31.7	+19.9	0 31 04.2
30 TH	- 2 43 06	-1397	- 48.33	-6.90	+09 51.6	+19.6	0 35 00.8

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
OCT 1 FR	- 3 06 24	-1395	- 55.23	-6.89	+10 11.3	+19.3	0 38 57.3
2 SA	- 3 29 39	-1393	- 62.12	-6.88	+10 30.6	+19.0	0 42 53.8
3 SU	- 3 52 52	-1390	- 69.00	-6.86	+10 49.6	+18.7	0 46 50.4
4 MO	- 4 16 03	-1388	- 75.87	-6.85	+11 08.3	+18.4	0 50 46.9
5 TU	- 4 39 10	-1384	- 82.72	-6.83	+11 26.7	+18.0	0 54 43.5
6 WE	- 5 02 14	-1381	- 89.55	-6.82	+11 44.7	+17.6	0 58 40.1
7 TH	- 5 25 15	-1376	- 96.37	-6.80	+12 02.3	+17.2	1 02 36.6
8 FR	- 5 48 11	-1372	-103.17	-6.78	+12 19.4	+16.7	1 06 33.2
9 SA	- 6 11 04	-1367	-109.94	-6.75	+12 36.1	+16.3	1 10 29.7
10 SU	- 6 33 51	-1362	-116.70	-6.73	+12 52.4	+15.8	1 14 26.3
11 MO	- 6 56 33	-1357	-123.42	-6.70	+13 08.2	+15.3	1 18 22.8
12 TU	- 7 19 10	-1351	-130.12	-6.67	+13 23.4	+14.8	1 22 19.4
13 WE	- 7 41 40	-1344	-136.79	-6.64	+13 38.2	+14.2	1 26 15.9
14 TH	- 8 04 04	-1338	-143.43	-6.61	+13 52.4	+13.7	1 30 12.5
15 FR	- 8 26 22	-1330	-150.03	-6.57	+14 06.1	+13.1	1 34 09.0
16 SA	- 8 48 32	-1323	-156.60	-6.53	+14 19.2	+12.6	1 38 05.6
17 SU	- 9 10 35	-1315	-163.14	-6.49	+14 31.8	+12.0	1 42 02.1
18 MO	- 9 32 30	-1307	-169.63	-6.45	+14 43.7	+11.4	1 45 58.7
19 TU	- 9 54 17	-1298	-176.08	-6.41	+14 55.1	+10.8	1 49 55.3
20 WE	-10 15 55	-1289	-182.49	-6.37	+15 05.9	+10.1	1 53 51.8
21 TH	-10 37 24	-1279	-188.86	-6.32	+15 16.0	+ 9.5	1 57 48.4
22 FR	-10 58 43	-1269	-195.17	-6.27	+15 25.5	+ 8.9	2 01 44.9
23 SA	-11 19 52	-1259	-201.44	-6.22	+15 34.4	+ 8.2	2 05 41.5
24 SU	-11 40 51	-1248	-207.66	-6.16	+15 42.6	+ 7.5	2 09 38.0
25 MO	-12 01 39	-1237	-213.82	-6.11	+15 50.1	+ 6.8	2 13 34.6
26 TU	-12 22 17	-1226	-219.93	-6.05	+15 56.9	+ 6.1	2 17 31.1
27 WE	-12 42 42	-1214	-225.99	-6.00	+16 02.9	+ 5.4	2 21 27.7
28 TH	-13 02 56	-1202	-231.98	-5.94	+16 08.3	+ 4.6	2 25 24.2
29 FR	-13 22 58	-1189	-237.92	-5.87	+16 12.9	+ 3.9	2 29 20.8
30 SA	-13 42 47	-1176	-243.79	-5.81	+16 16.8	+ 3.1	2 33 17.3
31 SU	-14 02 23	-1163	-249.59	-5.74	+16 19.9	+ 2.3	2 37 13.9

Table 2a. Sun, 1993, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
NOV 1 MO	-14 21 45	-1149	-255.34	-5.67	+16 22.1	+ 1.5	2 41 10.4
2 TU	-14 40 54	-1135	-261.01	-5.60	+16 23.6	+ 0.7	2 45 07.0
3 WE	-14 59 49	-1120	-266.61	-5.53	+16 24.3	- 0.1	2 49 03.6
4 TH	-15 18 29	-1105	-272.14	-5.46	+16 24.2	- 1.0	2 53 00.1
5 FR	-15 36 54	-1090	-277.60	-5.38	+16 23.2	- 1.8	2 56 56.7
6 SA	-15 55 03	-1074	-282.98	-5.30	+16 21.4	- 2.7	3 00 53.2
7 SU	-16 12 57	-1058	-288.28	-5.22	+16 18.7	- 3.5	3 04 49.8
8 MO	-16 30 35	-1041	-293.51	-5.14	+16 15.2	- 4.4	3 08 46.3
9 TU	-16 47 56	-1024	-298.65	-5.06	+16 10.8	- 5.3	3 12 42.9
10 WE	-17 05 00	-1006	-303.70	-4.97	+16 05.5	- 6.1	3 16 39.4
11 TH	-17 21 46	- 989	-308.67	-4.88	+15 59.4	- 7.0	3 20 36.0
12 FR	-17 38 15	- 970	-313.55	-4.79	+15 52.4	- 7.9	3 24 32.5
13 SA	-17 54 25	- 952	-318.35	-4.70	+15 44.5	- 8.7	3 28 29.1
14 SU	-18 10 17	- 933	-323.05	-4.61	+15 35.8	- 9.6	3 32 25.7
15 MO	-18 25 49	- 913	-327.65	-4.51	+15 26.3	-10.4	3 36 22.2
16 TU	-18 41 02	- 893	-332.16	-4.41	+15 15.9	-11.2	3 40 18.8
17 WE	-18 55 55	- 873	-336.57	-4.31	+15 04.7	-12.0	3 44 15.3
18 TH	-19 10 28	- 852	-340.88	-4.21	+14 52.6	-12.9	3 48 11.9
19 FR	-19 24 41	- 831	-345.09	-4.10	+14 39.7	-13.7	3 52 08.5
20 SA	-19 38 32	- 810	-349.19	-4.00	+14 26.1	-14.5	3 56 05.0
21 SU	-19 52 02	- 788	-353.19	-3.89	+14 11.6	-15.2	4 00 01.6
22 MO	-20 05 10	- 766	-357.09	-3.78	+13 56.4	-16.0	4 03 58.1
23 TU	-20 17 56	- 744	-360.87	-3.67	+13 40.4	-16.8	4 07 54.7
24 WE	-20 30 19	- 721	-364.54	-3.56	+13 23.6	-17.5	4 11 51.2
25 TH	-20 42 20	- 698	-368.10	-3.45	+13 06.0	-18.3	4 15 47.8
26 FR	-20 53 58	- 674	-371.54	-3.33	+12 47.8	-19.0	4 19 44.3
27 SA	-21 05 12	- 650	-374.87	-3.21	+12 28.7	-19.7	4 23 40.9
28 SU	-21 16 02	- 626	-378.09	-3.09	+12 09.0	-20.4	4 27 37.4
29 MO	-21 26 29	- 602	-381.18	-2.97	+11 48.6	-21.1	4 31 34.0
30 TU	-21 36 31	- 577	-384.15	-2.85	+11 27.5	-21.8	4 35 30.6

Table 2a. Sun, 1993, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
DEC 1 WE	-21 46 08	- 552	-387.00	-2.73	+11 05.7	-22.5	4 39 27.1
2 TH	-21 55 20	- 527	-389.73	-2.69	+10 43.2	-23.1	4 43 23.7
3 FR	-22 04 08	- 502	-392.33	-2.48	+10 20.1	-23.7	4 47 20.3
4 SA	-22 12 29	- 476	-394.81	-2.35	+09 56.4	-24.3	4 51 16.8
5 SU	-22 20 25	- 450	-397.16	-2.22	+09 32.1	-24.9	4 55 13.4
6 MO	-22 27 55	- 424	-399.38	-2.09	+09 07.2	-25.4	4 59 09.9
7 TU	-22 34 59	- 397	-401.46	-1.96	+08 41.8	-26.0	5 03 06.5
8 WE	-22 41 36	- 370	-403.44	-1.83	+08 15.8	-26.5	5 07 03.0
9 TH	-22 47 46	- 343	-405.27	-1.69	+07 49.3	-26.9	5 10 59.6
10 FR	-22 53 30	- 316	-406.96	-1.56	+07 22.4	-27.4	5 14 56.1
11 SA	-22 58 46	- 289	-408.52	-1.43	+06 55.0	-27.8	5 18 52.7
12 SU	-23 03 35	- 262	-409.95	-1.29	+06 27.2	-28.2	5 22 49.3
13 MO	-23 07 57	- 234	-411.24	-1.16	+05 59.1	-28.5	5 26 45.8
14 TU	-23 11 51	- 206	-412.40	-1.02	+05 30.6	-28.8	5 30 42.4
15 WE	-23 15 17	- 179	-413.42	-0.88	+05 01.8	-29.0	5 34 38.9
16 TH	-23 18 16	- 151	-414.30	-0.75	+04 32.8	-29.3	5 38 35.5
17 FR	-23 20 47	- 123	-415.05	-0.61	+04 03.5	-29.4	5 42 32.1
18 SA	-23 22 49	- 95	-415.65	-0.47	+03 34.1	-29.6	5 46 28.6
19 SU	-23 24 24	+ 66	-416.12	-0.33	+03 04.5	-29.7	5 50 25.2
20 MO	-23 25 30	+ 38	-416.45	-0.19	+02 34.8	-29.8	5 54 21.7
21 TU	-23 26 08	- 10	-416.63	-0.05	+02 05.0	-29.8	5 58 18.3
22 WE	-23 26 18	+ 18	-416.68	+0.09	+01 35.2	-29.8	6 02 14.8
23 TH	-23 26 00	+ 46	-416.59	+0.23	+01 05.4	-29.8	6 06 11.4
24 FR	-23 25 14	+ 75	-416.36	+0.37	+00 35.6	-29.8	6 10 07.9
25 SA	-23 23 59	+ 103	-415.99	+0.51	+00 05.8	-29.7	6 14 04.5
26 SU	-23 22 16	+ 131	-415.49	+0.65	-00 23.8	-29.5	6 18 01.1
27 MO	-23 20 05	+ 159	-414.84	+0.79	-00 53.4	-29.4	6 21 57.6
28 TU	-23 17 26	+ 187	-414.05	+0.92	-01 22.8	-29.2	6 25 54.2
29 WE	-23 14 19	+ 215	-413.13	+1.06	-01 52.0	-29.0	6 29 50.7
30 TH	-23 10 44	+ 243	-412.07	+1.20	-02 21.0	-28.8	6 33 47.3
31 FR	-23 06 41	+ 271	-410.87	+1.34	-02 49.8	-28.5	6 37 43.9
32 SA	-23 02 10		-409.53		-03 18.3		6 41 40.4

Table 2b. Sun, 1994, for zero hours universal time (GMT)

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JAN 0 FR	-23 06 41		-410.87		-02 49.8		6 37 43.9
JAN 1 SA	-23 02 10	+ 271	-409.53	+1.34	-03 18.3	-28.5	6 41 40.4
2 SU	-22 57 12	+ 298	-408.06	+1.47	-03 46.5	-28.2	6 45 37.0
3 MO	-22 51 46	+ 326	-406.45	+1.61	-04 14.4	-27.9	6 49 33.5
4 TU	-22 45 53	+ 353	-404.71	+1.74	-04 42.0	-27.6	6 53 30.1
5 WE	-22 39 33	+ 380	-402.83	+1.88	-05 09.1	-27.2	6 57 26.6
6 TH	-22 32 46	+ 407	-400.82	+2.01	-05 35.9	-26.8	7 01 23.2
7 FR	-22 25 32	+ 434	-398.67	+2.14	-06 02.3	-26.3	7 05 19.8
8 SA	-22 17 51	+ 461	-396.40	+2.28	-06 28.2	-25.9	7 09 16.3
9 SU	-22 09 44	+ 487	-394.00	+2.40	-06 53.6	-25.4	7 13 12.9
10 MO	-22 01 11	+ 513	-391.46	+2.53	-07 18.4	-24.9	7 17 09.4
11 TU	-21 52 12	+ 539	-388.80	+2.66	-07 42.8	-24.3	7 21 06.0
12 WE	-21 42 48	+ 564	-386.01	+2.79	-08 06.5	-23.8	7 25 02.6
13 TH	-21 32 58	+ 590	-383.10	+2.91	-08 29.7	-23.2	7 28 59.1
14 FR	-21 22 43	+ 615	-380.07	+3.04	-08 52.2	-22.5	7 32 55.7
15 SA	-21 12 04	+ 639	-376.91	+3.16	-09 14.1	-21.9	7 36 52.2
16 SU	-21 01 00	+ 664	-373.63	+3.28	-09 35.3	-21.2	7 40 48.8
17 MO	-20 49 33	+ 688	-370.24	+3.40	-09 55.8	-20.5	7 44 45.3
18 TU	-20 37 41	+ 711	-366.72	+3.51	-10 15.6	-19.8	7 48 41.9
19 WE	-20 25 26	+ 735	-363.09	+3.63	-10 34.7	-19.1	7 52 38.4
20 TH	-20 12 49	+ 758	-359.35	+3.74	-10 53.0	-18.3	7 56 35.0
21 FR	-19 59 48	+ 781	-355.50	+3.86	-11 10.5	-17.6	8 00 31.6
22 SA	-19 46 25	+ 803	-351.53	+3.97	-11 27.3	-16.8	8 04 28.1
23 SU	-19 32 40	+ 825	-347.46	+4.07	-11 43.3	-16.0	8 08 24.7
24 MO	-19 18 33	+ 847	-343.28	+4.18	-11 58.5	-15.2	8 12 21.2
25 TU	-19 04 05	+ 868	-338.99	+4.29	-12 12.9	-14.4	8 16 17.8
26 WE	-18 49 17	+ 889	-334.60	+4.39	-12 26.5	-13.6	8 20 14.4
27 TH	-18 34 07	+ 909	-330.11	+4.49	-12 39.3	-12.8	8 24 10.9
28 FR	-18 18 38	+ 930	-325.52	+4.59	-12 51.3	-12.0	8 28 07.5
29 SA	-18 02 48	+ 949	-320.83	+4.69	-13 02.5	-11.2	8 32 04.0
30 SU	-17 46 39	+ 969	-316.05	+4.79	-13 12.9	-10.4	8 36 00.6
31 MO	-17 30 11	+ 988	-311.17	+4.88	-13 22.4	- 9.6	8 39 57.1
		+1007		+4.97		- 8.8	

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
FEB 1 TU	-17 13 25	+1025	-306.20	+5.06	-13 31.2	- 8.0	8	43	53.7
2 WE	-16 56 20	+1043	-301.13	+5.15	-13 39.2	- 7.2	8	47	50.2
3 TH	-16 38 57	+1061	-295.98	+5.24	-13 46.3	- 6.4	8	51	46.8
4 FR	-16 21 16	+1078	-290.73	+5.32	-13 52.7	- 5.6	8	55	43.3
5 SA	-16 03 18	+1094	-285.42	+5.40	-13 58.3	- 4.8	8	59	39.9
6 SU	-15 45 04	+1111	-280.02	+5.49	-14 03.1	- 4.0	9	03	36.5
7 MO	-15 26 34	+1126	-274.54	+5.56	-14 07.1	- 3.2	9	07	33.0
8 TU	-15 07 47	+1142	-268.97	+5.64	-14 10.3	- 2.4	9	11	29.6
9 WE	-14 48 46	+1157	-263.34	+5.71	-14 12.8	- 1.7	9	15	26.1
10 TH	-14 29 29	+1171	-257.62	+5.78	-14 14.4	- 0.9	9	19	22.7
11 FR	-14 09 58	+1185	-251.84	+5.85	-14 15.3	- 0.1	9	23	19.2
12 SA	-13 50 13	+1199	-245.99	+5.92	-14 15.4	+ 0.7	9	27	15.8
13 SU	-13 30 14	+1212	-240.07	+5.99	-14 14.8	+ 1.4	9	31	12.3
14 MO	-13 10 02	+1225	-234.08	+6.05	-14 13.4	+ 2.2	9	35	08.9
15 TU	-12 49 37	+1237	-228.03	+6.11	-14 11.2	+ 2.9	9	39	05.4
16 WE	-12 29 00	+1249	-221.92	+6.17	-14 08.3	+ 3.6	9	43	02.0
17 TH	-12 08 10	+1261	-215.76	+6.23	-14 04.6	+ 4.4	9	46	58.5
18 FR	-11 47 10	+1272	-209.53	+6.28	-14 00.3	+ 5.1	9	50	55.1
19 SA	-11 25 58	+1282	-203.25	+6.33	-13 55.2	+ 5.8	9	54	51.6
20 SU	-11 04 35	+1293	-196.92	+6.39	-13 49.5	+ 6.4	9	58	48.2
21 MO	-10 43 03	+1303	-190.53	+6.43	-13 43.0	+ 7.1	10	02	44.8
22 TU	-10 21 20	+1312	-184.10	+6.48	-13 35.9	+ 7.8	10	06	41.3
23 WE	- 9 59 28	+1321	-177.62	+6.52	-13 28.2	+ 8.4	10	10	37.9
24 TH	- 9 37 27	+1330	-171.10	+6.57	-13 19.8	+ 9.0	10	14	34.4
25 FR	- 9 15 17	+1338	-164.53	+6.61	-13 10.8	+ 9.6	10	18	31.0
26 SA	- 8 52 59	+1346	-157.92	+6.65	-13 01.2	+10.2	10	22	27.5
27 SU	- 8 30 33	+1354	-151.27	+6.69	-12 51.0	+10.7	10	26	24.1
28 MO	- 8 07 59	+1361	-144.59	+6.72	-12 40.3	+11.2	10	30	20.6

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME	
	DEGREES		MILS					
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC	
MAR 1 TU	- 7 45 18	+1368	-137.87	+6.76	-12 29.1	+11.7	10 34 17.2	
2 WE	- 7 22 30	+1374	-131.11	+6.79	-12 17.4	+12.2	10 38 13.7	
3 TH	- 6 59 36	+1380	-124.33	+6.81	-12 05.1	+12.7	10 42 10.3	
4 FR	- 6 36 36	+1386	-117.51	+6.84	-11 52.5	+13.1	10 46 06.8	
5 SA	- 6 13 30	+1391	-110.67	+6.87	-11 39.4	+13.5	10 50 03.4	
6 SU	- 5 50 19	+1396	-103.80	+6.89	-11 25.8	+13.9	10 54 00.0	
7 MO	- 5 27 03	+1400	- 96.90	+6.91	-11 11.9	+14.3	10 57 56.5	
8 TU	- 5 03 42	+1405	- 89.99	+6.94	-10 57.6	+14.7	11 01 53.1	
9 WE	- 4 40 18	+1408	- 83.05	+6.95	-10 42.9	+15.0	11 05 49.6	
10 TH	- 4 16 49	+1411	- 76.10	+6.97	-10 27.8	+15.4	11 09 46.2	
11 FR	- 3 53 18	+1414	- 69.13	+6.98	-10 12.5	+15.7	11 13 42.7	
12 SA	- 3 29 44	+1417	- 62.14	+7.00	-09 56.8	+16.0	11 17 39.3	
13 SU	- 3 06 07	+1419	- 55.15	+7.01	-09 40.8	+16.3	11 21 35.8	
14 MO	- 2 42 28	+1420	- 48.14	+7.01	-09 24.5	+16.6	11 25 32.4	
15 TU	- 2 18 48	+1422	- 41.13	+7.02	-09 07.9	+16.8	11 29 28.9	
16 WE	- 1 55 06	+1423	- 34.10	+7.03	-08 51.1	+17.0	11 33 25.5	
17 TH	- 1 31 23	+1423	- 27.08	+7.03	-08 34.1	+17.3	11 37 22.0	
18 FR	- 1 07 40	+1423	- 20.05	+7.03	-08 16.8	+17.4	11 41 18.6	
19 SA	- 0 43 57	+1423	- 13.02	+7.03	-07 59.4	+17.6	11 45 15.1	
20 SU	- 0 20 14	+1423	- 5.99	+7.03	-07 41.8	+17.8	11 49 11.7	
21 MO	+ 0 03 29	+1422	+ 1.03	+7.02	-07 24.0	+17.9	11 53 08.2	
22 TU	+ 0 27 11	+1420	+ 8.05	+7.01	-07 06.1	+18.0	11 57 04.8	
23 WE	+ 0 50 51	+1419	+ 15.07	+7.01	-06 48.0	+18.1	12 01 01.3	
24 TH	+ 1 14 29	+1417	+ 22.07	+7.00	-06 29.9	+18.2	12 04 57.9	
25 FR	+ 1 38 06	+1414	+ 29.07	+6.98	-06 11.7	+18.3	12 08 54.5	
26 SA	+ 2 01 40	+1412	+ 36.05	+6.97	-05 53.4	+18.3	12 12 51.0	
27 SU	+ 2 25 12	+1409	+ 43.02	+6.96	-05 35.2	+18.3	12 16 47.5	
28 MO	+ 2 48 41	+1405	+ 49.98	+6.94	-05 16.9	+18.3	12 20 44.1	
29 TU	+ 3 12 06	+1402	+ 56.92	+6.92	-04 58.6	+18.2	12 24 40.6	
30 WE	+ 3 35 28	+1398	+ 63.84	+6.90	-04 40.4	+18.1	12 28 37.2	
31 TH	+ 3 58 45	+1393	+ 70.74	+6.88	-04 22.3	+18.0	12 32 33.7	

Table 2b. Sun, 1994, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
APR 1 FR	+ 4 21 59	+1389	+ 77.62	+6.86	-04 04.2	+17.9	12 36 30.5
2 SA	+ 4 45 08	+1384	+ 84.48	+6.83	-03 46.3	+17.8	12 40 26.9
3 SU	+ 5 08 12	+1378	+ 91.32	+6.80	-03 28.5	+17.6	12 44 23.4
4 MO	+ 5 31 10	+1373	+ 98.12	+6.78	-03 10.9	+17.5	12 48 20.0
5 TU	+ 5 54 03	+1367	+104.90	+6.75	-02 53.4	+17.3	12 52 16.5
6 WE	+ 6 16 49	+1360	+111.65	+6.72	-02 36.2	+17.1	12 56 13.1
7 TH	+ 6 39 30	+1353	+118.37	+6.68	-02 19.1	+16.8	13 00 09.6
8 FR	+ 7 02 03	+1346	+125.05	+6.65	-02 02.3	+16.6	13 04 06.2
9 SA	+ 7 24 29	+1339	+131.70	+6.61	-01 45.7	+16.3	13 08 02.7
10 SU	+ 7 46 48	+1331	+138.31	+6.57	-01 29.3	+16.1	13 11 59.3
11 MO	+ 8 08 59	+1323	+144.88	+6.53	-01 13.3	+15.8	13 15 55.8
12 TU	+ 8 31 02	+1314	+151.42	+6.49	-00 57.5	+15.5	13 19 52.4
13 WE	+ 8 52 56	+1305	+157.90	+6.44	-00 42.0	+15.2	13 23 48.9
14 TH	+ 9 14 41	+1296	+164.35	+6.40	-00 26.8	+14.9	13 27 45.5
15 FR	+ 9 36 17	+1286	+170.75	+6.35	-00 11.9	+14.5	13 31 42.0
16 SA	+ 9 57 43	+1276	+177.10	+6.30	+00 02.6	+14.2	13 35 38.6
17 SU	+10 19 00	+1266	+183.41	+6.25	+00 16.8	+13.8	13 39 35.2
18 MO	+10 40 06	+1255	+189.66	+6.20	+00 30.6	+13.4	13 43 31.7
19 TU	+11 01 01	+1244	+195.86	+6.14	+00 44.0	+13.1	13 47 28.3
20 WE	+11 21 46	+1233	+202.00	+6.09	+00 57.1	+12.7	13 51 24.8
21 TH	+11 42 19	+1222	+208.09	+6.03	+01 09.8	+12.3	13 55 21.4
22 FR	+12 02 40	+1210	+214.12	+5.98	+01 22.0	+11.8	13 59 17.9
23 SA	+12 22 50	+1197	+220.10	+5.91	+01 33.8	+11.4	14 03 14.5
24 SU	+12 42 47	+1185	+226.01	+5.85	+01 45.2	+10.9	14 07 11.0
25 MO	+13 02 32	+1172	+231.86	+5.79	+01 56.2	+10.5	14 11 07.6
26 TU	+13 22 04	+1159	+237.65	+5.72	+02 06.6	+10.0	14 15 04.1
27 WE	+13 41 23	+1145	+243.37	+5.65	+02 16.6	+ 9.5	14 19 00.7
28 TH	+14 00 28	+1132	+249.03	+5.59	+02 26.0	+ 8.9	14 22 57.2
29 FR	+14 19 19	+1117	+254.61	+5.52	+02 35.0	+ 8.4	14 26 53.8
30 SA	+14 37 57	+1103	+260.13	+5.45	+02 43.4	+ 7.9	14 30 50.4

Table 2b. Sun, 1994, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAY 1 SU	+14 56 20	+1088	+265.58	+5.37	+02 51.3	+ 7.3	14 34 46.9
2 MO	+15 14 28	+1073	+270.95	+5.30	+02 58.6	+ 6.8	14 38 43.5
3 TU	+15 32 22	+1058	+276.25	+5.22	+03 05.3	+ 6.2	14 42 40.0
4 WE	+15 49 59	+1042	+281.48	+5.15	+03 11.5	+ 5.6	14 46 36.6
5 TH	+16 07 22	+1026	+286.62	+5.07	+03 17.1	+ 5.0	14 50 33.1
6 FR	+16 24 28	+1010	+291.69	+4.99	+03 22.2	+ 4.5	14 54 29.7
7 SA	+16 41 17	+ 993	+296.68	+4.90	+03 26.6	+ 3.9	14 58 26.2
8 SU	+16 57 50	+ 976	+301.58	+4.82	+03 30.5	+ 3.3	15 02 22.8
9 MO	+17 14 07	+ 959	+306.40	+4.74	+03 33.8	+ 2.7	15 06 19.3
10 TU	+17 30 05	+ 941	+311.14	+4.65	+03 36.6	+ 2.2	15 10 15.9
11 WE	+17 45 47	+ 923	+315.79	+4.56	+03 38.7	+ 1.6	15 14 12.4
12 TH	+18 01 10	+ 905	+320.35	+4.47	+03 40.3	+ 1.0	15 18 09.0
13 FR	+18 16 15	+ 887	+324.82	+4.38	+03 41.3	+ 0.5	15 22 05.6
14 SA	+18 31 02	+ 868	+329.20	+4.29	+03 41.8	- 0.1	15 26 02.1
15 SU	+18 45 30	+ 849	+333.48	+4.19	+03 41.7	- 0.7	15 29 58.7
16 MO	+18 59 39	+ 830	+337.68	+4.10	+03 41.0	- 1.2	15 33 55.2
17 TU	+19 13 29	+ 810	+341.77	+4.00	+03 39.8	- 1.8	15 37 51.8
18 WE	+19 26 59	+ 790	+345.77	+3.90	+03 38.0	- 2.3	15 41 48.3
19 TH	+19 40 09	+ 770	+349.68	+3.80	+03 35.8	- 2.8	15 45 44.9
20 FR	+19 53 00	+ 750	+353.48	+3.70	+03 32.9	- 3.3	15 49 41.5
21 SA	+20 05 29	+ 729	+357.18	+3.60	+03 29.6	- 3.9	15 53 38.0
22 SU	+20 17 38	+ 708	+360.78	+3.50	+03 25.7	- 4.4	15 57 34.6
23 MO	+20 29 27	+ 687	+364.28	+3.39	+03 21.4	- 4.9	16 01 31.1
24 TU	+20 40 54	+ 666	+367.67	+3.29	+03 16.5	- 5.4	16 05 27.7
25 WE	+20 52 00	+ 644	+370.96	+3.18	+03 11.1	- 5.9	16 09 24.2
26 TH	+21 02 44	+ 623	+374.14	+3.08	+03 05.2	- 6.4	16 13 20.8
27 FR	+21 13 06	+ 601	+377.22	+2.97	+02 58.8	- 6.9	16 17 17.3
28 SA	+21 23 07	+ 578	+380.18	+2.85	+02 52.0	- 7.3	16 21 13.9
29 SU	+21 32 46	+ 556	+383.04	+2.75	+02 44.7	- 7.8	16 25 10.5
30 MO	+21 42 02	+ 533	+385.79	+2.63	+02 36.8	- 8.3	16 29 07.0
31 TU	+21 50 55	+ 511	+388.42	+2.52	+02 28.6	- 8.7	16 33 03.6

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUN 1 WE	+21 59 26	+ 488	+390.94	+2.41	+02 19.9	- 9.1	16 37 00.1
2 TH	+22 07 34	+ 465	+393.35	+2.30	+02 10.8	- 9.5	16 40 56.7
3 FR	+22 15 18	+ 441	+395.64	+2.18	+02 01.2	- 9.9	16 44 53.2
4 SA	+22 22 39	+ 418	+397.82	+2.06	+01 51.3	-10.3	16 48 49.8
5 SU	+22 29 37	+ 394	+399.89	+1.95	+01 41.0	-10.6	16 52 46.3
6 MO	+22 36 11	+ 370	+401.83	+1.83	+01 30.4	-11.0	16 56 42.9
7 TU	+22 42 22	+ 346	+403.66	+1.71	+01 19.4	-11.3	17 00 39.5
8 WE	+22 48 08	+ 322	+405.37	+1.59	+01 08.1	-11.6	17 04 36.0
9 TH	+22 53 30	+ 298	+406.97	+1.47	+00 56.6	-11.8	17 08 32.6
10 FR	+22 58 29	+ 274	+408.44	+1.35	+00 44.8	-12.0	17 12 29.1
11 SA	+23 03 03	+ 250	+409.79	+1.23	+00 32.7	-12.3	17 16 25.7
12 SU	+23 07 13	+ 225	+411.02	+1.11	+00 20.5	-12.4	17 20 22.3
13 MO	+23 10 58	+ 201	+412.14	+0.99	+00 08.0	-12.6	17 24 18.8
14 TU	+23 14 19	+ 176	+413.13	+0.87	-00 04.6	-12.7	17 28 15.4
15 WE	+23 17 15	+ 152	+414.00	+0.75	-00 17.3	-12.8	17 32 11.9
16 TH	+23 19 46	+ 127	+414.75	+0.63	-00 30.1	-12.9	17 36 08.5
17 FR	+23 21 53	+ 102	+415.37	+0.50	-00 43.0	-13.0	17 40 05.0
18 SA	+23 23 35	+ 77	+415.88	+0.38	-00 56.0	-13.0	17 44 01.6
19 SU	+23 24 53	+ 53	+416.26	+0.26	-01 08.9	-13.0	17 47 58.1
20 MO	+23 25 45	+ 28	+416.52	+0.14	-01 22.0	-13.0	17 51 54.7
21 TU	+23 26 13	+ 3	+416.66	+0.01	-01 34.9	-13.0	17 55 51.3
22 WE	+23 26 16	- 22	+416.67	-0.11	-01 47.9	-12.9	17 59 47.8
23 TH	+23 25 54	- 47	+416.56	-0.23	-02 00.8	-12.8	18 03 44.4
24 FR	+23 25 08	- 71	+416.33	-0.35	-02 13.7	-12.8	18 07 40.9
25 SA	+23 23 56	- 96	+415.98	-0.47	-02 26.4	-12.7	18 11 37.5
26 SU	+23 22 20	- 121	+415.51	-0.60	-02 39.1	-12.5	18 15 34.1
27 MO	+23 20 20	- 145	+414.91	-0.72	-02 51.6	-12.4	18 19 30.6
28 TU	+23 17 54	- 170	+414.19	-0.84	-03 04.0	-12.2	18 23 27.2
29 WE	+23 15 04	- 194	+413.36	-0.96	-03 16.3	-12.0	18 27 23.7
30 TH	+23 11 50	- 219	+412.40	-1.08	-03 28.3	-11.8	18 31 20.3

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUL 1 FR	+23 08 11	- 243	+411.31	-1.20	-03 40.1	-11.6	18 35 16.8
2 SA	+23 04 08	- 267	+410.11	-1.32	-03 51.7	-11.4	18 39 13.4
3 SU	+22 59 41	- 292	+408.79	-1.44	-04 03.1	-11.1	18 43 09.9
4 MO	+22 54 49	- 315	+407.35	-1.56	-04 14.2	-10.8	18 47 06.5
5 TU	+22 49 34	- 339	+405.80	-1.67	-04 25.0	-10.5	18 51 03.1
6 WE	+22 43 54	- 363	+404.12	-1.79	-04 35.5	-10.1	18 54 59.6
7 TH	+22 37 51	- 387	+402.33	-1.91	-04 45.6	- 9.8	18 58 56.2
8 FR	+22 31 25	- 410	+400.42	-2.02	-04 55.4	- 9.4	19 02 52.7
9 SA	+22 24 35	- 433	+398.39	-2.14	-05 04.8	- 9.0	19 06 49.3
10 SU	+22 17 22	- 456	+396.25	-2.25	-05 13.8	- 8.6	19 10 45.9
11 MO	+22 09 45	- 479	+394.00	-2.37	-05 22.3	- 8.1	19 14 42.4
12 TU	+22 01 46	- 502	+391.64	-2.48	-05 30.4	- 7.6	19 18 39.0
13 WE	+21 53 25	- 524	+389.16	-2.59	-05 38.1	- 7.2	19 22 35.5
14 TH	+21 44 41	- 546	+386.57	-2.70	-05 45.2	- 6.7	19 26 32.1
15 FR	+21 35 35	- 568	+383.87	-2.80	-05 51.9	- 6.1	19 30 28.6
16 SA	+21 26 06	- 590	+381.07	-2.91	-05 58.0	- 5.6	19 34 25.2
17 SU	+21 16 16	- 612	+378.15	-3.02	-06 03.7	- 5.1	19 38 21.7
18 MO	+21 06 04	- 633	+375.13	-3.13	-06 08.7	- 4.5	19 42 18.3
19 TU	+20 55 31	- 654	+372.01	-3.23	-06 13.2	- 4.0	19 46 14.9
20 WE	+20 44 37	- 675	+368.77	-3.33	-06 17.2	- 3.4	19 50 11.4
21 TH	+20 33 22	- 696	+365.44	-3.44	-06 20.6	- 2.8	19 54 08.0
22 FR	+20 21 46	- 716	+362.00	-3.54	-06 23.4	- 2.2	19 58 04.5
23 SA	+20 09 50	- 736	+358.47	-3.63	-06 25.6	- 1.7	20 02 01.1
24 SU	+19 57 33	- 756	+354.83	-3.73	-06 27.3	- 1.1	20 05 57.7
25 MO	+19 44 57	- 776	+351.09	-3.83	-06 28.4	- 0.5	20 09 54.2
26 TU	+19 32 01	- 796	+347.26	-3.93	-06 28.9	+ 0.1	20 13 50.8
27 WE	+19 18 45	- 815	+343.33	-4.02	-06 28.8	+ 0.7	20 17 47.3
28 TH	+19 05 10	- 834	+339.31	-4.12	-06 28.1	+ 1.2	20 21 43.9
29 FR	+18 51 16	- 853	+335.19	-4.21	-06 26.9	+ 1.8	20 25 40.4
30 SA	+18 37 03	- 871	+330.98	-4.30	-06 25.1	+ 2.4	20 29 37.0
31 SU	+18 22 32	- 889	+326.68	-4.39	-06 22.6	+ 3.0	20 33 33.5

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
AUG 1 MO	+18 07 43	- 907	+322.20	-4.48	-06 19.6	+ 3.6	20 37 30.1
2 TU	+17 52 36	- 925	+317.81	-4.57	-06 16.0	+ 4.2	20 41 26.6
3 WE	+17 37 12	- 942	+313.24	-4.65	-06 11.8	+ 4.8	20 45 23.2
4 TH	+17 21 30	- 959	+308.59	-4.74	-06 07.0	+ 5.4	20 49 19.8
5 FR	+17 05 31	- 975	+303.86	-4.81	-06 01.6	+ 6.0	20 53 16.3
6 SA	+16 49 16	- 992	+299.04	-4.90	-05 55.7	+ 6.6	20 57 12.9
7 SU	+16 32 44	-1008	+294.14	-4.98	-05 49.1	+ 7.2	21 01 09.4
8 MO	+16 15 57	-1023	+289.17	-5.05	-05 42.0	+ 7.7	21 05 06.0
9 TU	+15 58 53	-1039	+284.12	-5.13	-05 34.2	+ 8.3	21 09 02.5
10 WE	+15 41 35	-1054	+278.99	-5.20	-05 25.9	+ 8.9	21 12 59.1
11 TH	+15 24 01	-1068	+273.78	-5.27	-05 17.0	+ 9.5	21 16 55.6
12 FR	+15 06 13	-1083	+268.51	-5.35	-05 07.5	+10.1	21 20 52.2
13 SA	+14 48 10	-1097	+263.16	-5.42	-04 57.4	+10.7	21 24 48.7
14 SU	+14 29 54	-1111	+257.75	-5.49	-04 46.7	+11.2	21 28 45.3
15 MO	+14 11 23	-1124	+252.26	-5.55	-04 35.5	+11.8	21 32 41.8
16 TU	+13 52 39	-1137	+246.71	-5.61	-04 23.7	+12.3	21 36 38.4
17 WE	+13 33 42	-1150	+241.10	-5.68	-04 11.4	+12.9	21 40 35.0
18 TH	+13 14 32	-1162	+235.42	-5.74	-03 58.5	+13.4	21 44 31.5
19 FR	+12 55 10	-1175	+229.68	-5.80	-03 45.2	+13.9	21 48 28.1
20 SA	+12 35 35	-1187	+223.88	-5.86	-03 31.3	+14.4	21 52 24.6
21 SU	+12 15 49	-1198	+218.02	-5.92	-03 16.9	+14.8	21 56 21.2
22 MO	+11 55 50	-1210	+212.10	-5.98	-03 02.1	+15.3	22 00 17.7
23 TU	+11 35 41	-1221	+206.13	-6.03	-02 46.8	+15.7	22 04 14.3
24 WE	+11 15 20	-1231	+200.10	-6.08	-02 31.1	+16.1	22 08 10.8
25 TH	+10 54 49	-1242	+194.02	-6.13	-02 14.9	+16.6	22 12 07.4
26 FR	+10 34 07	-1252	+187.89	-6.18	-01 58.4	+16.9	22 16 03.9
27 SA	+10 13 15	-1262	+181.70	-6.23	-01 41.4	+17.3	22 20 00.5
28 SU	+ 9 52 13	-1271	+175.47	-6.28	-01 24.1	+17.7	22 23 57.0
29 MO	+ 9 31 02	-1281	+169.19	-6.33	-01 06.5	+18.0	22 27 53.6
30 TU	+ 9 09 41	-1289	+162.87	-6.37	-00 48.5	+18.3	22 31 50.1
31 WE	+ 8 48 12	-1298	+156.50	-6.41	-00 30.1	+18.6	22 35 46.7

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
SEP 1 TH	+ 8 26 34	-1306	+150.09	-6.45	-00 11.5	+18.9	22 39 43.3
2 FR	+ 8 04 48	-1314	+143.64	-6.49	+00 07.4	+19.2	22 43 39.8
3 SA	+ 7 42 54	-1321	+137.16	-6.52	+00 26.6	+19.5	22 47 36.4
4 SU	+ 7 20 53	-1329	+130.63	-6.56	+00 46.1	+19.7	22 51 32.9
5 MO	+ 6 58 44	-1335	+124.07	-6.59	+01 05.8	+19.9	22 55 29.5
6 TU	+ 6 36 29	-1342	+117.47	-6.63	+01 25.7	+20.1	22 59 26.0
7 WE	+ 6 14 07	-1348	+110.85	-6.66	+01 45.8	+20.4	23 03 22.6
8 TH	+ 5 51 39	-1354	+104.19	-6.69	+02 06.2	+20.5	23 07 19.1
9 FR	+ 5 29 05	-1359	+ 97.51	-6.71	+02 26.7	+20.7	23 11 15.7
10 SA	+ 5 06 26	-1364	+ 90.79	-6.74	+02 47.5	+20.9	23 15 12.2
11 SU	+ 4 43 41	-1369	+ 84.06	-6.76	+03 08.3	+21.0	23 19 08.8
12 MO	+ 4 20 52	-1374	+ 77.29	-6.79	+03 29.4	+21.1	23 23 05.3
13 TU	+ 3 57 59	-1378	+ 70.51	-6.80	+03 50.5	+21.3	23 27 01.9
14 WE	+ 3 35 01	-1381	+ 63.71	-6.82	+04 11.8	+21.3	23 30 58.4
15 TH	+ 3 11 59	-1385	+ 56.89	-6.84	+04 33.1	+21.4	23 34 55.0
16 FR	+ 2 48 55	-1388	+ 50.05	-6.85	+04 54.5	+21.4	23 38 51.6
17 SA	+ 2 25 46	-1391	+ 43.19	-6.87	+05 15.9	+21.5	23 42 48.1
18 SU	+ 2 02 35	-1393	+ 36.32	-6.88	+05 37.4	+21.5	23 46 44.7
19 MO	+ 1 39 22	-1396	+ 29.44	-6.89	+05 58.9	+21.4	23 50 41.2
20 TU	+ 1 16 06	-1398	+ 22.55	-6.90	+06 20.3	+21.4	23 54 37.8
21 WE	+ 0 52 49	-1399	+ 15.65	-6.91	+06 41.6	+21.3	23 58 34.3
22 TH	+ 0 29 30	-1400	+ 8.74	-6.91	+07 02.9	+21.2	0 02 30.8
23 FR	+ 0 06 09	-1401	+ 1.82	-6.92	+07 24.1	+21.1	0 06 27.4
24 SA	- 0 17 12	-1402	- 5.10	-6.92	+07 45.2	+20.9	0 10 23.9
25 SU	- 0 40 34	-1402	- 12.02	-6.92	+08 06.1	+20.7	0 14 20.5
26 MO	- 1 03 57	-1402	- 18.95	-6.92	+08 26.9	+20.6	0 18 17.1
27 TU	- 1 27 19	-1402	- 25.87	-6.92	+08 47.4	+20.3	0 22 13.6
28 WE	- 1 50 41	-1401	- 32.79	-6.92	+09 07.8	+20.1	0 26 10.2
29 TH	- 2 14 02	-1400	- 39.71	-6.91	+09 27.9	+19.9	0 30 06.7
30 FR	- 2 37 22	-1398	- 46.63	-6.90	+09 47.7	+19.6	0 34 03.3

Table 2b. Sun, 1994, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
OCT 1 SA	- 3 00 40	-1397	- 53.53	+6.90	+10 07.3	+19.3	0 37 59.8
2 SU	- 3 23 57	-1394	- 60.43	+6.88	+10 26.6	+19.0	0 41 56.4
3 MO	- 3 47 11	-1392	- 67.32	+6.87	+10 45.6	+18.6	0 45 52.9
4 TU	- 4 10 23	-1389	- 74.19	+6.86	+11 04.2	+18.3	0 49 49.5
5 WE	- 4 33 32	-1386	- 81.05	+6.84	+11 22.5	+17.9	0 53 46.0
6 TH	- 4 56 38	-1382	- 87.89	+6.82	+11 40.4	+17.6	0 57 42.6
7 FR	- 5 19 39	-1378	- 94.71	+6.80	+11 58.0	+17.2	1 01 39.1
8 SA	- 5 42 37	-1373	-101.52	+6.78	+12 15.1	+16.8	1 05 35.7
9 SU	- 6 05 30	-1368	-108.30	+6.76	+12 31.9	+16.3	1 09 32.2
10 MO	- 6 28 19	-1363	-115.06	+6.73	+12 48.2	+15.9	1 13 28.8
11 TU	- 6 51 02	-1358	-121.79	+6.71	+13 04.1	+15.4	1 17 25.4
12 WE	- 7 13 39	-1352	-128.49	+6.68	+13 19.6	+15.0	1 21 21.9
13 TH	- 7 36 11	-1345	-135.17	+6.64	+13 34.5	+14.5	1 25 18.5
14 FR	- 7 58 36	-1338	-141.81	+6.61	+13 49.0	+14.0	1 29 15.0
15 SA	- 8 20 55	-1331	-148.42	+6.57	+14 03.0	+13.4	1 33 11.6
16 SU	- 8 43 06	-1324	-154.99	+6.54	+14 16.4	+12.9	1 37 08.1
17 MO	- 9 05 10	-1316	-161.53	+6.50	+14 29.3	+12.3	1 41 04.7
18 TU	- 9 27 06	-1308	-168.03	+6.46	+14 41.5	+11.7	1 45 01.2
19 WE	- 9 48 54	-1299	-174.49	+6.41	+14 53.2	+11.1	1 48 57.8
20 TH	-10 10 33	-1290	-180.91	+6.37	+15 04.3	+10.4	1 52 54.3
21 FR	-10 32 04	-1281	-187.28	+6.33	+15 14.7	+ 9.8	1 56 50.9
22 SA	-10 53 25	-1271	-193.60	+6.28	+15 24.5	+ 9.1	2 00 47.4
23 SU	-11 14 36	-1261	-199.88	+6.23	+15 33.6	+ 8.4	2 04 44.0
24 MO	-11 35 38	-1251	-206.11	+6.18	+15 42.0	+ 7.7	2 08 40.5
25 TU	-11 56 29	-1240	-212.29	+6.12	+15 49.7	+ 7.0	2 12 37.1
26 WE	-12 17 09	-1229	-218.41	+6.07	+15 56.7	+ 6.2	2 16 33.6
27 TH	-12 37 38	-1217	-224.48	+6.01	+16 02.9	+ 5.5	2 20 30.2
28 FR	-12 57 55	-1205	-230.49	+5.95	+16 08.4	+ 4.7	2 24 26.8
29 SA	-13 18 00	-1193	-236.44	+5.89	+16 13.1	+ 3.9	2 28 23.3
30 SU	-13 37 53	-1180	-242.33	+5.83	+16 17.0	+ 3.1	2 32 19.9
31 MO	-13 57 32	-1166	-248.16	+5.76	+16 20.2	+ 2.3	2 36 16.4

Table 2b. Sun, 1994, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
NOV 1 TU	-14 16 59	-1153	-253.92	-5.69	+16 22.5	+ 1.5	2 40 13.0
2 WE	-14 36 11	-1139	-259.61	-5.62	+16 24.0	+ 0.7	2 44 09.5
3 TH	-14 55 10	-1124	-265.23	-5.55	+16 24.7	- 0.1	2 48 06.1
4 FR	-15 13 54	-1109	-270.79	-5.48	+16 24.6	- 0.9	2 52 02.6
5 SA	-15 32 23	-1094	-276.26	-5.40	+16 23.7	- 1.7	2 55 59.2
6 SU	-15 50 37	-1078	-281.66	-5.32	+16 22.0	- 2.6	2 59 55.7
7 MO	-16 08 35	-1062	-286.99	-5.24	+16 19.4	- 3.4	3 03 52.3
8 TU	-16 26 16	-1045	-292.23	-5.16	+16 16.0	- 4.2	3 07 48.9
9 WE	-16 43 41	-1028	-297.39	-5.08	+16 11.8	- 5.0	3 11 45.4
10 TH	-17 00 49	-1011	-302.47	-4.99	+16 06.8	- 5.9	3 15 42.0
11 FR	-17 17 40	- 993	-307.46	-4.90	+16 01.0	- 6.7	3 19 38.5
12 SA	-17 34 12	- 974	-312.36	-4.81	+15 54.3	- 7.5	3 23 35.1
13 SU	-17 50 27	- 956	-317.17	-4.72	+15 46.8	- 8.3	3 27 31.6
14 MO	-18 06 23	- 937	-321.89	-4.63	+15 38.4	- 9.2	3 31 28.2
15 TU	-18 22 00	- 917	-326.52	-4.53	+15 29.2	-10.0	3 35 24.7
16 WE	-18 37 17	- 898	-331.05	-4.43	+15 19.2	-10.8	3 39 21.3
17 TH	-18 52 15	- 878	-335.48	-4.34	+15 08.4	-11.7	3 43 17.8
18 FR	-19 06 52	- 857	-339.81	-4.23	+14 56.7	-12.5	3 47 14.4
19 SA	-19 21 09	- 836	-344.05	-4.13	+14 44.2	-13.3	3 51 10.9
20 SU	-19 35 05	- 815	-348.18	-4.02	+14 30.8	-14.2	3 55 07.5
21 MO	-19 48 40	- 793	-352.20	-3.92	+14 16.7	-15.0	3 59 04.1
22 TU	-20 01 54	- 771	-356.12	-3.81	+14 01.7	-15.8	4 03 00.6
23 WE	-20 14 45	- 749	-359.93	-3.70	+13 45.9	-16.6	4 06 57.2
24 TH	-20 27 14	- 726	-363.63	-3.59	+13 29.3	-17.4	4 10 53.7
25 FR	-20 39 21	- 703	-367.21	-3.47	+13 11.9	-18.2	4 14 50.3
26 SA	-20 51 04	- 680	-370.69	-3.36	+12 53.8	-18.9	4 18 46.8
27 SU	-21 02 25	- 656	-374.05	-3.24	+12 34.9	-19.7	4 22 43.4
28 MO	-21 13 21	- 632	-377.29	-3.12	+12 15.2	-20.4	4 26 40.0
29 TU	-21 23 53	- 608	-380.41	-3.00	+11 54.8	-21.1	4 30 36.5
30 WE	-21 34 02	- 584	-383.42	-2.88	+11 33.6	-21.8	4 34 33.1

Table 2b. Sun, 1994, for zero hours universal time (GNT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
DEC 1 TH	-21 43 45	- 559	-386.30	-2.76	+11 11.8	-22.5	4 38 29.6
2 FR	-21 53 04	- 533	-389.06	-2.63	+10 49.3	-23.1	4 42 26.2
3 SA	-22 01 57	- 508	-391.69	-2.51	+10 26.2	-23.7	4 46 22.7
4 SU	-22 10 25	- 482	-394.20	-2.38	+10 02.4	-24.3	4 50 19.3
5 MO	-22 18 28	- 456	-396.58	-2.25	+09 38.1	-24.9	4 54 15.9
6 TU	-22 26 04	- 430	-398.84	-2.12	+09 13.2	-25.4	4 58 12.4
7 WE	-22 33 14	- 404	-400.96	-2.00	+08 47.8	-25.9	5 02 09.0
8 TH	-22 39 58	- 377	-402.95	-1.86	+08 21.9	-26.4	5 06 05.5
9 FR	-22 46 15	- 350	-404.81	-1.73	+07 55.6	-26.8	5 10 02.1
10 SA	-22 52 05	- 323	-406.54	-1.60	+07 28.8	-27.2	5 13 58.6
11 SU	-22 57 28	- 296	-408.14	-1.46	+07 01.6	-27.6	5 17 55.2
12 MO	-23 02 24	- 268	-409.60	-1.32	+06 34.0	-27.9	5 21 51.8
13 TU	-23 06 53	- 241	-410.93	-1.19	+06 06.1	-28.3	5 25 48.3
14 WE	-23 10 54	- 213	-412.12	-1.05	+05 37.8	-28.5	5 29 44.9
15 TH	-23 14 27	- 185	-413.17	-0.91	+05 09.3	-28.8	5 33 41.4
16 FR	-23 17 32	- 158	-414.09	-0.78	+04 40.5	-29.0	5 37 38.0
17 SA	-23 20 10	- 130	-414.86	-0.64	+04 11.4	-29.2	5 41 34.5
18 SU	-23 22 19	- 102	-415.50	-0.50	+03 42.2	-29.4	5 45 31.1
19 MO	-23 24 01	- 73	-416.00	-0.36	+03 12.7	-29.6	5 49 27.7
20 TU	-23 25 14	- 45	-416.37	-0.22	+02 43.2	-29.7	5 53 24.2
21 WE	-23 26 00	- 17	-416.59	-0.08	+02 13.5	-29.8	5 57 20.8
22 TH	-23 26 16	+ 11	-416.67	+0.05	+01 43.7	-29.8	6 01 17.3
23 FR	-23 26 05	+ 40	-416.62	+0.20	+01 13.9	-29.8	6 05 13.9
24 SA	-23 25 26	+ 68	-416.42	+0.34	+00 44.1	-29.8	6 09 10.5
25 SU	-23 24 18	+ 96	-416.09	+0.47	+00 14.3	-29.8	6 13 07.0
26 MO	-23 22 41	+ 124	-415.61	+0.61	-00 15.5	-29.7	6 17 03.6
27 TU	-23 20 37	+ 153	-415.00	+0.76	-00 45.2	-29.6	6 21 00.1
28 WE	-23 18 05	+ 181	-414.24	+0.89	-01 14.8	-29.4	6 24 56.7
29 TH	-23 15 04	+ 209	-413.35	+1.03	-01 44.2	-29.3	6 28 53.2
30 FR	-23 11 35	+ 237	-412.32	+1.17	-02 13.5	-29.0	6 32 49.8
31 SA	-23 07 39	+ 264	-411.15	+1.30	-02 42.6	-28.8	6 36 46.3
32 SU	-23 03 14		-409.85		-03 11.3		6 40 42.9

Table 2c. Sun, 1995, for zero hours universal time (GMT)

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JAN 0 SA	-23 07 39		-411.15		-02 42.6		6 36 46.3
		+ 264		+1.30		-28.8	
JAN 1 SU	-23 03 14		-409.85		-03 11.3		6 40 42.9
		+ 292		+1.44		-28.5	
2 MO	-22 58 23		-408.41		-03 39.8		6 44 39.5
		+ 319		+1.58		-28.2	
3 TU	-22 53 03		-406.83		-04 08.0		6 48 36.0
		+ 347		+1.71		-27.8	
4 WE	-22 47 17		-405.12		-04 35.8		6 52 32.6
		+ 374		+1.85		-27.4	
5 TH	-22 41 03		-403.27		-05 03.2		6 56 29.2
		+ 401		+1.98		-27.0	
6 FR	-22 34 22		-401.29		-05 30.2		7 00 25.7
		+ 427		+2.11		-26.5	
7 SA	-22 27 15		-399.18		-05 56.7		7 04 22.3
		+ 454		+2.24		-26.0	
8 SU	-22 19 41		-396.94		-06 22.7		7 08 18.8
		+ 480		+2.37		-25.5	
9 MO	-22 11 40		-394.57		-06 48.1		7 12 15.4
		+ 506		+2.50		-24.9	
10 TU	-22 03 14		-392.07		-07 13.1		7 16 11.9
		+ 532		+2.63		-24.4	
11 WE	-21 54 22		-389.44		-07 37.5		7 20 08.5
		+ 558		+2.76		-23.8	
12 TH	-21 45 04		-386.69		-08 01.2		7 24 05.0
		+ 583		+2.88		-23.2	
13 FR	-21 35 21		-383.81		-08 24.4		7 28 01.6
		+ 608		+3.00		-22.5	
14 SA	-21 25 13		-380.80		-08 47.0		7 31 58.2
		+ 633		+3.13		-21.9	
15 SU	-21 14 40		-377.68		-09 08.8		7 35 54.7
		+ 657		+3.24		-21.2	
16 MO	-21 03 42		-374.43		-09 30.1		7 39 51.3
		+ 682		+3.37		-20.5	
17 TU	-20 52 21		-371.07		-09 50.6		7 43 47.8
		+ 705		+3.48		-19.9	
18 WE	-20 40 36		-367.58		-10 10.5		7 47 44.4
		+ 729		+3.60		-19.1	
19 TH	-20 28 27		-363.98		-10 29.6		7 51 40.9
		+ 752		+3.71		-18.4	
20 FR	-20 15 55		-360.27		-10 48.1		7 55 37.5
		+ 775		+3.83		-17.7	
21 SA	-20 02 59		-356.44		-11 05.8		7 59 34.0
		+ 798		+3.94		-17.0	
22 SU	-19 49 42		-352.50		-11 22.7		8 03 30.6
		+ 820		+4.05		-16.2	
23 MO	-19 36 02		-348.45		-11 38.9		8 07 27.2
		+ 842		+4.16		-15.5	
24 TU	-19 22 00		-344.30		-11 54.4		8 11 23.7
		+ 863		+4.26		-14.7	
25 WE	-19 07 37		-340.03		-12 09.1		8 15 20.3
		+ 884		+4.37		-13.9	
26 TH	-18 52 52		-335.66		-12 23.1		8 19 16.8
		+ 905		+4.47		-13.2	
27 FR	-18 37 47		-331.19		-12 36.2		8 23 13.4
		+ 926		+4.57		-12.4	
28 SA	-18 22 21		-326.62		-12 48.6		8 27 09.9
		+ 946		+4.67		-11.6	
29 SU	-18 06 36		-321.95		-13 00.2		8 31 06.5
		+ 965		+4.77		-10.8	
30 MO	-17 50 31		-317.19		-13 10.9		8 35 03.1
		+ 984		+4.86		-10.0	
31 TU	-17 34 07		-312.33		-13 20.9		8 38 59.6
		+1003		+4.95		- 9.1	

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
FEB 1 WE	-17 17 24	+1021	-307.38	+5.04	-13 30.1	- 8.3	8 42 56.2
2 TH	-17 00 22	+1039	-302.33	+5.13	-13 38.4	- 7.5	8 46 52.7
3 FR	-16 43 03	+1056	-297.20	+5.21	-13 45.9	- 6.7	8 50 49.3
4 SA	-16 25 27	+1074	-291.99	+5.30	-13 52.5	- 5.8	8 54 45.8
5 SU	-16 07 33	+1090	-286.68	+5.38	-13 58.4	- 5.0	8 58 42.4
6 MO	-15 49 23	+1106	-281.30	+5.46	-14 03.4	- 4.2	9 02 38.9
7 TU	-15 30 57	+1122	-275.84	+5.54	-14 07.6	- 3.4	9 06 35.5
8 WE	-15 12 15	+1138	-270.29	+5.62	-14 11.0	- 2.6	9 10 32.0
9 TH	-14 53 17	+1153	-264.68	+5.69	-14 13.5	- 1.8	9 14 28.6
10 FR	-14 34 05	+1167	-258.99	+5.76	-14 15.3	- 1.0	9 18 25.2
11 SA	-14 14 38	+1181	-253.22	+5.83	-14 16.2	- 0.2	9 22 21.7
12 SU	-13 54 56	+1195	-247.39	+5.90	-14 16.4	+ 0.6	9 26 18.3
13 MO	-13 35 01	+1208	-241.49	+5.97	-14 15.8	+ 1.4	9 30 14.8
14 TU	-13 14 53	+1221	-235.52	+6.03	-14 14.4	+ 2.1	9 34 11.4
15 WE	-12 54 32	+1234	-229.49	+6.09	-14 12.3	+ 2.9	9 38 07.9
16 TH	-12 33 58	+1246	-223.40	+6.15	-14 09.5	+ 3.6	9 42 04.5
17 FR	-12 13 12	+1258	-217.25	+6.21	-14 05.9	+ 4.3	9 46 01.0
18 SA	-11 52 15	+1269	-211.04	+6.27	-14 01.6	+ 5.0	9 49 57.6
19 SU	-11 31 06	+1280	-204.77	+6.32	-13 56.7	+ 5.6	9 53 54.1
20 MO	-11 09 46	+1291	-198.45	+6.38	-13 51.0	+ 6.3	9 57 50.7
21 TU	-10 48 15	+1301	-192.08	+6.42	-13 44.8	+ 6.9	10 01 47.2
22 WE	-10 26 35	+1310	-185.65	+6.47	-13 37.9	+ 7.5	10 05 43.8
23 TH	-10 04 44	+1320	-179.18	+6.52	-13 30.3	+ 8.1	10 09 40.3
24 FR	- 9 42 44	+1329	-172.66	+6.56	-13 22.2	+ 8.7	10 13 36.9
25 SA	- 9 20 36	+1337	-166.10	+6.60	-13 13.5	+ 9.3	10 17 33.5
26 SU	- 8 58 18	+1345	-159.50	+6.64	-13 04.2	+ 9.8	10 21 30.0
27 MO	- 8 35 53	+1353	-152.85	+6.68	-12 54.4	+10.4	10 25 26.6
28 TU	- 8 13 20	+1360	-146.17	+6.72	-12 44.0	+10.9	10 29 23.1

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAR 1 WE	- 7 50 40	+1367	-139.46	+6.75	-12 33.1	+11.4	10 33 19.7
2 TH	- 7 27 53	+1373	-132.71	+6.78	-12 21.6	+11.9	10 37 16.2
3 FR	- 7 05 00	+1379	-125.92	+6.81	-12 09.7	+12.4	10 41 12.8
4 SA	- 6 42 00	+1385	-119.11	+6.84	-11 57.2	+12.9	10 45 09.3
5 SU	- 6 18 56	+1390	-112.27	+6.86	-11 44.3	+13.4	10 49 05.9
6 MO	- 5 55 45	+1395	-105.41	+6.89	-11 31.0	+13.8	10 53 02.4
7 TU	- 5 32 31	+1399	- 98.52	+6.91	-11 17.2	+14.2	10 56 59.0
8 WE	- 5 09 11	+1403	- 91.61	+6.93	-11 03.0	+14.6	11 00 55.5
9 TH	- 4 45 48	+1407	- 84.68	+6.95	-10 48.3	+15.0	11 04 52.1
10 FR	- 4 22 21	+1410	- 77.73	+6.96	-10 33.3	+15.4	11 08 48.6
11 SA	- 3 58 51	+1413	- 70.77	+6.98	-10 17.9	+15.7	11 12 45.2
12 SU	- 3 35 18	+1415	- 63.79	+6.99	-10 02.2	+16.0	11 16 41.7
13 MO	- 3 11 43	+1418	- 56.80	+7.00	-09 46.2	+16.3	11 20 38.3
14 TU	- 2 48 05	+1419	- 49.80	+7.01	-09 29.8	+16.6	11 24 34.9
15 WE	- 2 24 26	+1421	- 42.79	+7.02	-09 13.2	+16.9	11 28 31.4
16 TH	- 2 00 45	+1422	- 35.78	+7.02	-08 56.3	+17.1	11 32 28.0
17 FR	- 1 37 03	+1422	- 28.76	+7.02	-08 39.2	+17.3	11 36 24.5
18 SA	- 1 13 21	+1423	- 21.73	+7.03	-08 21.9	+17.5	11 40 21.0
19 SU	- 0 49 38	+1423	- 14.71	+7.03	-08 04.3	+17.7	11 44 17.6
20 MO	- 0 25 55	+1423	- 7.68	+7.03	-07 46.7	+17.8	11 48 14.1
21 TU	- 0 02 12	+1422	- 0.65	+7.02	-07 28.9	+17.9	11 52 10.7
22 WE	+ 0 21 29	+1421	+ 6.37	+7.02	-07 11.0	+18.0	11 56 07.3
23 TH	+ 0 45 10	+1420	+ 13.38	+7.01	-06 53.0	+18.1	12 00 03.8
24 FR	+ 1 08 50	+1418	+ 20.39	+7.00	-06 34.9	+18.1	12 04 00.4
25 SA	+ 1 32 28	+1416	+ 27.40	+6.99	-06 16.8	+18.1	12 07 56.9
26 SU	+ 1 56 03	+1413	+ 34.39	+6.98	-05 58.7	+18.1	12 11 53.5
27 MO	+ 2 19 36	+1410	+ 41.37	+6.96	-05 40.6	+18.1	12 15 50.0
28 TU	+ 2 43 07	+1407	+ 48.33	+6.95	-05 22.4	+18.1	12 19 46.6
29 WE	+ 3 06 34	+1403	+ 55.28	+6.93	-05 04.3	+18.1	12 23 43.1
30 TH	+ 3 29 57	+1399	+ 62.21	+6.91	-04 46.3	+18.0	12 27 39.7
31 FR	+ 3 53 17	+1395	+ 69.12	+6.89	-04 28.3	+17.9	12 31 36.2

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
APR 1 SA	+ 4 16 32	+1390	+ 76.01	+6.86	-04 10.4	+17.8	12 35 32.8
2 SU	+ 4 39 42	+1385	+ 82.87	+6.84	-03 52.6	+17.7	12 39 29.3
3 MO	+ 5 02 47	+1380	+ 89.72	+6.81	-03 34.9	+17.6	12 43 25.9
4 TU	+ 5 25 47	+1374	+ 96.53	+6.79	-03 17.3	+17.4	12 47 22.4
5 WE	+ 5 48 41	+1368	+103.32	+6.76	-02 59.8	+17.3	12 51 19.0
6 TH	+ 6 11 29	+1362	+110.07	+6.73	-02 42.5	+17.1	12 55 15.5
7 FR	+ 6 34 11	+1355	+116.80	+6.69	-02 25.4	+16.9	12 59 12.1
8 SA	+ 6 56 46	+1348	+123.49	+6.66	-02 08.5	+16.7	13 03 08.6
9 SU	+ 7 19 13	+1340	+130.14	+6.62	-01 51.8	+16.5	13 07 05.2
10 MO	+ 7 41 33	+1332	+136.76	+6.58	-01 35.3	+16.3	13 11 01.8
11 TU	+ 8 03 45	+1324	+143.34	+6.54	-01 19.0	+16.0	13 14 58.3
12 WE	+ 8 25 49	+1315	+149.87	+6.49	-01 03.0	+15.7	13 18 54.9
13 TH	+ 8 47 45	+1307	+156.37	+6.45	-00 47.3	+15.4	13 22 51.4
14 FR	+ 9 09 31	+1297	+162.82	+6.40	-00 31.9	+15.1	13 26 47.9
15 SA	+ 9 31 09	+1288	+169.23	+6.36	-00 16.8	+14.8	13 30 44.5
16 SU	+ 9 52 37	+1278	+175.59	+6.31	-00 02.0	+14.4	13 34 41.0
17 MO	+10 13 55	+1268	+181.90	+6.26	+00 12.4	+14.0	13 38 37.6
18 TU	+10 35 03	+1258	+188.16	+6.21	+00 26.4	+13.6	13 42 34.2
19 WE	+10 56 01	+1247	+194.37	+6.16	+00 40.0	+13.2	13 46 30.7
20 TH	+11 16 48	+1236	+200.53	+6.10	+00 53.2	+12.8	13 50 27.3
21 FR	+11 37 24	+1225	+206.64	+6.05	+01 06.0	+12.3	13 54 23.8
22 SA	+11 57 48	+1213	+212.68	+5.99	+01 18.3	+11.9	13 58 20.4
23 SU	+12 18 01	+1201	+218.67	+5.93	+01 30.2	+11.4	14 02 16.9
24 MO	+12 38 02	+1188	+224.60	+5.87	+01 41.5	+10.9	14 06 13.5
25 TU	+12 57 50	+1176	+230.47	+5.81	+01 52.5	+10.4	14 10 10.1
26 WE	+13 17 26	+1162	+236.28	+5.74	+02 02.9	+ 9.9	14 14 06.6
27 TH	+13 36 48	+1149	+242.02	+5.67	+02 12.8	+ 9.4	14 18 03.1
28 FR	+13 55 57	+1135	+247.69	+5.60	+02 22.2	+ 8.9	14 21 59.7
29 SA	+14 14 53	+1121	+253.30	+5.54	+02 31.1	+ 8.4	14 25 56.2
30 SU	+14 33 34	+1107	+258.83	+5.47	+02 39.5	+ 7.9	14 29 52.8

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAY 1 MO	+14 52 00	+1092	+264.30	+5.39	+02 47.3	+ 7.5	14 33 49.4
2 TU	+15 10 13	+1077	+269.69	+5.32	+02 54.7	+ 6.8	14 37 45.9
3 WE	+15 28 09	+1062	+275.01	+5.24	+03 01.5	+ 6.3	14 41 42.5
4 TH	+15 45 51	+1046	+280.25	+5.17	+03 07.7	+ 5.7	14 45 39.0
5 FR	+16 03 17	+1030	+285.42	+5.09	+03 13.5	+ 5.2	14 49 35.6
6 SA	+16 20 27	+1014	+290.50	+5.01	+03 18.6	+ 4.6	14 53 32.1
7 SU	+16 37 20	+ 997	+295.51	+4.92	+03 23.3	+ 4.1	14 57 28.7
8 MO	+16 53 57	+ 980	+300.43	+4.84	+03 27.4	+ 3.5	15 01 25.3
9 TU	+17 10 17	+ 963	+305.27	+4.76	+03 30.9	+ 3.0	15 05 21.8
10 WE	+17 26 20	+ 945	+310.02	+4.67	+03 33.9	+ 2.4	15 09 18.4
11 TH	+17 42 05	+ 927	+314.69	+4.58	+03 36.3	+ 1.9	15 13 14.9
12 FR	+17 57 32	+ 909	+319.27	+4.49	+03 38.2	+ 1.3	15 17 11.5
13 SA	+18 12 41	+ 891	+323.76	+4.40	+03 39.6	+ 0.8	15 21 08.0
14 SU	+18 27 32	+ 872	+328.16	+4.31	+03 40.3	+ 0.2	15 25 04.6
15 MO	+18 42 04	+ 853	+332.46	+4.21	+03 40.5	- 0.4	15 29 01.1
16 TU	+18 56 17	+ 834	+336.68	+4.12	+03 40.1	- 0.9	15 32 57.7
17 WE	+19 10 11	+ 815	+340.80	+4.02	+03 39.2	- 1.5	15 36 54.2
18 TH	+19 23 46	+ 795	+344.82	+3.93	+03 37.7	- 2.1	15 40 50.8
19 FR	+19 37 00	+ 775	+348.74	+3.83	+03 35.6	- 2.7	15 44 47.4
20 SA	+19 49 55	+ 755	+352.57	+3.73	+03 32.9	- 3.2	15 48 43.9
21 SU	+20 02 30	+ 734	+356.30	+3.62	+03 29.7	- 3.8	15 52 40.5
22 MO	+20 14 44	+ 713	+359.92	+3.52	+03 25.9	- 4.3	15 56 37.0
23 TU	+20 26 37	+ 692	+363.44	+3.42	+03 21.6	- 4.9	16 00 33.6
24 WE	+20 38 10	+ 671	+366.86	+3.31	+03 16.7	- 5.4	16 04 30.1
25 TH	+20 49 21	+ 650	+370.18	+3.21	+03 11.3	- 5.9	16 08 26.7
26 FR	+21 00 10	+ 628	+373.38	+3.10	+03 05.4	- 6.4	16 12 23.2
27 SA	+21 10 38	+ 606	+376.48	+2.99	+02 59.0	- 6.9	16 16 19.8
28 SU	+21 20 44	+ 584	+379.48	+2.88	+02 52.1	- 7.4	16 20 16.3
29 MO	+21 30 28	+ 561	+382.36	+2.77	+02 44.7	- 7.8	16 24 12.9
30 TU	+21 39 49	+ 539	+385.13	+2.66	+02 36.8	- 8.3	16 28 09.5
31 WE	+21 48 48	+ 516	+387.79	+2.55	+02 28.6	- 8.7	16 32 06.0

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION			EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS			
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUN 1 TH	+21 57 24	+ 493	+390.34	+2.43	+02 19.9	- 9.1	16 36 02.6
2 FR	+22 05 38	+ 470	+392.78	+2.32	+02 10.8	- 9.5	16 39 59.1
3 SA	+22 13 28	+ 447	+395.10	+2.21	+02 01.3	- 9.8	16 43 55.7
4 SU	+22 20 55	+ 423	+397.31	+2.09	+01 51.5	-10.2	16 47 52.3
5 MO	+22 27 58	+ 400	+399.40	+1.98	+01 41.3	-10.5	16 51 48.8
6 TU	+22 34 38	+ 376	+401.37	+1.86	+01 30.8	-10.8	16 55 45.4
7 WE	+22 40 54	+ 352	+403.23	+1.74	+01 20.0	-11.1	16 59 41.9
8 TH	+22 46 46	+ 328	+404.97	+1.62	+01 08.9	-11.3	17 03 38.5
9 FR	+22 52 14	+ 304	+406.59	+1.50	+00 57.6	-11.6	17 07 35.0
10 SA	+22 57 18	+ 280	+408.09	+1.38	+00 46.0	-11.8	17 11 31.6
11 SU	+23 01 58	+ 255	+409.47	+1.26	+00 34.2	-12.0	17 15 28.1
12 MO	+23 06 13	+ 231	+410.73	+1.14	+00 22.2	-12.2	17 19 24.7
13 TU	+23 10 04	+ 207	+411.87	+1.02	+00 10.0	-12.4	17 23 21.3
14 WE	+23 13 31	+ 182	+412.89	+0.90	-00 02.4	-12.5	17 27 17.8
15 TH	+23 16 33	+ 157	+413.79	+0.78	-00 14.9	-12.7	17 31 14.4
16 FR	+23 19 10	+ 133	+414.57	+0.66	-00 27.6	-12.8	17 35 10.9
17 SA	+23 21 23	+ 108	+415.23	+0.53	-00 40.4	-12.9	17 39 07.5
18 SU	+23 23 11	+ 83	+415.76	+0.41	-00 53.3	-13.0	17 43 04.1
19 MO	+23 24 34	+ 58	+416.17	+0.29	-01 06.2	-13.0	17 47 00.6
20 TU	+23 25 33	+ 34	+416.46	+0.17	-01 19.2	-13.1	17 50 57.2
21 WE	+23 26 06	+ 9	+416.62	+0.04	-01 32.3	-13.1	17 54 53.7
22 TH	+23 26 15	- 16	+416.67	-0.08	-01 45.4	-13.1	17 58 50.3
23 FR	+23 25 59	- 41	+416.59	-0.20	-01 58.4	-13.0	18 02 46.8
24 SA	+23 25 18	- 66	+416.38	-0.33	-02 11.4	-12.9	18 06 43.4
25 SU	+23 24 12	- 90	+416.06	-0.44	-02 24.4	-12.8	18 10 39.9
26 MO	+23 22 42	- 115	+415.61	-0.57	-02 37.2	-12.7	18 14 36.5
27 TU	+23 20 47	- 140	+415.05	-0.69	-02 49.9	-12.6	18 18 33.1
28 WE	+23 18 27	- 164	+414.36	-0.81	-03 02.5	-12.4	18 22 29.6
29 TH	+23 15 43	- 189	+413.55	-0.93	-03 14.9	-12.2	18 26 26.2
30 FR	+23 12 34	- 213	+412.61	-1.05	-03 27.1	-12.0	18 30 22.7

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
JUL 1 SA	+23 09 01		+411.56		-03 39.1		18	34	19.3
		- 237		-1.17		-11.7			
2 SU	+23 05 04		+410.39		-03 50.8		18	38	15.8
		- 261		-1.29		-11.4			
3 MO	+23 00 42		+409.10		-04 02.2		18	42	12.4
		- 286		-1.41		-11.1			
4 TU	+22 55 57		+407.69		-04 13.4		18	46	09.0
		- 310		-1.53		-10.8			
5 WE	+22 50 47		+406.16		-04 24.2		18	50	05.5
		- 333		-1.64		-10.5			
6 TH	+22 45 14		+404.51		-04 34.6		18	54	02.1
		- 357		-1.76		-10.1			
7 FR	+22 39 17		+402.75		-04 44.7		18	57	58.6
		- 381		-1.88		- 9.7			
8 SA	+22 32 56		+400.87		-04 54.5		19	01	55.2
		- 404		-2.00		- 9.3			
9 SU	+22 26 13		+398.88		-05 03.8		19	05	51.7
		- 427		-2.11		- 8.9			
10 MO	+22 19 05		+396.77		-05 12.7		19	09	48.3
		- 450		-2.22		- 8.5			
11 TU	+22 11 35		+394.54		-05 21.1		19	13	44.9
		- 473		-2.34		- 8.0			
12 WE	+22 03 42		+392.21		-05 29.2		19	17	41.4
		- 496		-2.45		- 7.6			
13 TH	+21 55 26		+389.76		-05 36.7		19	21	38.0
		- 518		-2.56		- 7.1			
14 FR	+21 46 48		+387.20		-05 43.8		19	25	34.5
		- 541		-2.67		- 6.6			
15 SA	+21 37 47		+384.53		-05 50.5		19	29	31.1
		- 563		-2.78		- 6.2			
16 SU	+21 28 25		+381.75		-05 56.6		19	33	27.6
		- 585		-2.89		- 5.7			
17 MO	+21 18 40		+378.86		-06 02.3		19	37	24.2
		- 607		-3.00		- 5.2			
18 TU	+21 08 33		+375.87		-06 07.4		19	41	20.7
		- 628		-3.10		- 4.6			
19 WE	+20 58 05		+372.77		-06 12.1		19	45	17.3
		- 649		-3.20		- 4.1			
20 TH	+20 47 16		+369.56		-06 16.2		19	49	13.9
		- 671		-3.31		- 3.6			
21 FR	+20 36 05		+366.25		-06 19.8		19	53	10.4
		- 691		-3.41		- 3.1			
22 SA	+20 24 34		+362.83		-06 22.9		19	57	07.0
		- 712		-3.52		- 2.5			
23 SU	+20 12 42		+359.32		-06 25.4		20	01	03.5
		- 732		-3.61		- 1.9			
24 MO	+20 00 30		+355.70		-06 27.3		20	05	00.1
		- 752		-3.71		- 1.4			
25 TU	+19 47 57		+351.99		-06 28.7		20	08	56.6
		- 772		-3.81		- 0.8			
26 WE	+19 35 05		+348.17		-06 29.4		20	12	53.2
		- 791		-3.91		- 0.2			
27 TH	+19 21 54		+344.27		-06 29.6		20	16	49.8
		- 811		-4.00		+ 0.4			
28 FR	+19 08 23		+340.26		-06 29.2		20	20	46.3
		- 830		-4.10		+ 1.0			
29 SA	+18 54 34		+336.17		-06 28.2		20	24	42.9
		- 848		-4.19		+ 1.6			
30 SU	+18 40 25		+331.98		-06 26.6		20	28	39.4
		- 867		-4.28		+ 2.2			
31 MO	+18 25 59		+327.70		-06 24.4		20	32	36.0
		- 885		-4.37		+ 2.8			

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC		
AUG 1 TU	+18 11 14	- 902	+323.33	-4.45	-06 21.6	+ 3.5	20 36 32.5		
2 WE	+17 56 12	- 920	+318.87	-4.54	-06 18.1	+ 4.1	20 40 29.1		
3 TH	+17 40 52	- 937	+314.33	-4.63	-06 14.0	+ 4.7	20 44 25.6		
4 FR	+17 25 15	- 954	+309.70	-4.71	-06 09.3	+ 5.3	20 48 22.2		
5 SA	+17 09 21	- 971	+304.99	-4.80	-06 04.0	+ 6.0	20 52 18.7		
6 SU	+16 53 10	- 987	+300.20	-4.87	-05 58.0	+ 6.6	20 56 15.3		
7 MO	+16 36 43	-1003	+295.32	-4.95	-05 51.4	+ 7.2	21 00 11.9		
8 TU	+16 20 00	-1019	+290.37	-5.03	-05 44.2	+ 7.8	21 04 08.4		
9 WE	+16 03 01	-1034	+285.34	-5.11	-05 36.4	+ 8.4	21 08 05.0		
10 TH	+15 45 47	-1049	+280.23	-5.18	-05 28.0	+ 9.0	21 12 01.5		
11 FR	+15 28 18	-1064	+275.05	-5.25	-05 19.1	+ 9.5	21 15 58.1		
12 SA	+15 10 34	-1079	+269.80	-5.33	-05 09.5	+10.1	21 19 54.6		
13 SU	+14 52 36	-1093	+264.47	-5.40	-04 59.4	+10.6	21 23 51.2		
14 MO	+14 34 23	-1107	+259.08	-5.47	-04 48.8	+11.2	21 27 47.7		
15 TU	+14 15 56	-1121	+253.61	-5.54	-04 37.6	+11.7	21 31 44.3		
16 WE	+13 57 15	-1134	+248.08	-5.60	-04 25.9	+12.2	21 35 40.8		
17 TH	+13 38 21	-1147	+242.48	-5.66	-04 13.7	+12.7	21 39 37.4		
18 FR	+13 19 14	-1160	+236.81	-5.73	-04 01.0	+13.2	21 43 33.9		
19 SA	+12 59 55	-1172	+231.08	-5.79	-03 47.8	+13.7	21 47 30.5		
20 SU	+12 40 22	-1184	+225.30	-5.85	-03 34.1	+14.1	21 51 27.1		
21 MO	+12 20 38	-1196	+219.45	-5.91	-03 20.0	+14.6	21 55 23.6		
22 TU	+12 00 42	-1207	+213.54	-5.96	-03 05.4	+15.1	21 59 20.2		
23 WE	+11 40 35	-1219	+207.58	-6.02	-02 50.3	+15.5	22 03 16.7		
24 TH	+11 20 16	-1229	+201.56	-6.07	-02 34.8	+15.9	22 07 13.3		
25 FR	+10 59 47	-1240	+195.49	-6.12	-02 18.9	+16.3	22 11 09.8		
26 SA	+10 39 07	-1250	+189.37	-6.17	-02 02.6	+16.7	22 15 06.4		
27 SU	+10 18 17	-1260	+183.19	-6.22	-01 45.8	+17.1	22 19 02.9		
28 MO	+ 9 57 17	-1269	+176.97	-6.27	-01 28.7	+17.5	22 22 59.5		
29 TU	+ 9 36 08	-1278	+170.71	-6.31	-01 11.2	+17.9	22 26 56.0		
30 WE	+ 9 14 50	-1287	+164.39	-6.36	-00 53.3	+18.2	22 30 52.6		
31 TH	+ 8 53 23	-1295	+158.04	-6.40	-00 35.1	+18.6	22 34 49.1		

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
SEP 1 FR	+ 8 31 47	-1304	+151.64	-6.44	-00 16.5	+18.9	22 38 45.7
2 SA	+ 8 10 04	-1311	+145.20	-6.47	+00 02.4	+19.2	22 42 42.2
3 SU	+ 7 48 12	-1319	+138.73	-6.51	+00 21.6	+19.5	22 46 38.8
4 MO	+ 7 26 13	-1326	+132.21	-6.55	+00 41.1	+19.8	22 50 35.3
5 TU	+ 7 04 07	-1333	+125.67	-6.58	+01 00.9	+20.0	22 54 31.9
6 WE	+ 6 41 55	-1339	+119.08	-6.61	+01 20.9	+20.3	22 58 28.5
7 TH	+ 6 19 35	-1346	+112.47	-6.65	+01 41.2	+20.5	23 02 25.0
8 FR	+ 5 57 10	-1351	+105.83	-6.67	+02 01.7	+20.7	23 06 21.6
9 SA	+ 5 34 38	-1357	+ 99.15	-6.70	+02 22.4	+20.9	23 10 18.1
10 SU	+ 5 12 01	-1362	+ 92.45	-6.73	+02 43.2	+21.0	23 14 14.7
11 MO	+ 4 49 19	-1367	+ 85.72	-6.75	+03 04.2	+21.1	23 18 11.2
12 TU	+ 4 26 32	-1372	+ 78.97	-6.78	+03 25.3	+21.2	23 22 07.8
13 WE	+ 4 03 40	-1376	+ 72.20	-6.80	+03 46.5	+21.3	23 26 04.3
14 TH	+ 3 40 43	-1381	+ 65.40	-6.82	+04 07.8	+21.4	23 30 00.9
15 FR	+ 3 17 43	-1384	+ 58.58	-6.83	+04 29.2	+21.4	23 33 57.4
16 SA	+ 2 54 38	-1388	+ 51.74	-6.85	+04 50.6	+21.4	23 37 54.0
17 SU	+ 2 31 31	-1391	+ 44.89	-6.87	+05 12.0	+21.4	23 41 50.5
18 MO	+ 2 08 20	-1393	+ 38.02	-6.88	+05 33.4	+21.4	23 45 47.1
19 TU	+ 1 45 07	-1396	+ 31.14	-6.89	+05 54.7	+21.3	23 49 43.6
20 WE	+ 1 21 51	-1398	+ 24.25	-6.90	+06 16.1	+21.3	23 53 40.2
21 TH	+ 0 58 33	-1399	+ 17.35	-6.91	+06 37.3	+21.2	23 57 36.7
22 FR	+ 0 35 14	-1401	+ 10.44	-6.92	+06 58.5	+21.1	0 01 33.3
23 SA	+ 0 11 53	-1402	+ 3.52	-6.92	+07 19.6	+21.0	0 05 29.8
24 SU	- 0 11 29	-1402	- 3.40	-6.92	+07 40.5	+20.8	0 09 26.4
25 MO	- 0 34 51	-1403	- 10.33	-6.93	+08 01.4	+20.7	0 13 22.9
26 TU	- 0 58 14	-1403	- 17.25	-6.93	+08 22.0	+20.5	0 17 19.5
27 WE	- 1 21 37	-1402	- 24.18	-6.92	+08 42.6	+20.3	0 21 16.0
28 TH	- 1 44 59	-1401	- 31.10	-6.92	+09 02.9	+20.1	0 25 12.6
29 FR	- 2 08 20	-1400	- 38.02	-6.91	+09 23.0	+19.9	0 29 09.1
30 SA	- 2 31 40	-1399	- 44.94	-6.91	+09 42.9	+19.7	0 33 05.7

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
OCT 1 SU	- 2 54 59	+1397	- 51.84	+6.90	+10 02.6	+19.4	0 37 02.2
2 MO	- 3 18 15	-1394	- 58.74	-6.88	+10 22.0	+19.1	0 40 58.8
3 TU	- 3 41 30	-1392	- 65.63	-6.87	+10 41.2	+18.9	0 44 55.4
4 WE	- 4 04 41	-1389	- 72.50	-6.86	+11 00.0	+18.5	0 48 51.9
5 TH	- 4 27 50	-1385	- 79.36	-6.84	+11 18.6	+18.2	0 52 48.5
6 FR	- 4 50 56	+1382	- 86.20	+6.82	+11 36.8	+17.8	0 56 45.0
7 SA	- 5 13 58	-1378	- 93.02	-6.80	+11 54.6	+17.4	1 00 41.6
8 SU	- 5 36 55	-1374	- 99.83	-6.79	+12 12.0	+17.0	1 04 38.1
9 MO	- 5 59 49	-1369	-106.61	-6.78	+12 29.1	+16.6	1 08 34.7
10 TU	- 6 22 38	+1364	-113.37	-6.74	+12 45.7	+16.1	1 12 31.2
11 WE	- 6 45 22	-1359	-120.11	-6.71	+13 01.8	+15.7	1 16 27.8
12 TH	- 7 08 00	-1353	-126.82	-6.68	+13 17.5	+15.2	1 20 24.3
13 FR	- 7 30 33	-1347	-133.50	-6.65	+13 32.6	+14.6	1 24 20.9
14 SA	- 7 53 00	-1340	-140.15	-6.62	+13 47.2	+14.1	1 28 17.4
15 SU	- 8 15 20	+1333	-146.76	-6.58	+14 01.3	+13.5	1 32 14.0
16 MO	- 8 37 33	-1326	-153.35	-6.55	+14 14.9	+12.9	1 36 10.5
17 TU	- 8 59 39	-1318	-159.90	-6.51	+14 27.8	+12.3	1 40 07.1
18 WE	- 9 21 38	-1310	-166.41	-6.47	+14 40.2	+11.7	1 44 03.6
19 TH	- 9 43 28	-1302	-172.88	-6.43	+14 51.9	+11.1	1 48 00.2
20 FR	-10 05 10	+1293	-179.31	-6.39	+15 03.0	+10.5	1 51 56.7
21 SA	-10 26 44	-1284	-185.70	-6.34	+15 13.4	+ 9.8	1 55 53.3
22 SU	-10 48 08	-1274	-192.04	-6.29	+15 23.2	+ 9.1	1 59 49.8
23 MO	-11 09 22	-1264	-198.33	-6.24	+15 32.4	+ 8.4	2 03 46.4
24 TU	-11 30 26	-1254	-204.57	-6.19	+15 40.8	+ 7.7	2 07 42.9
25 WE	-11 51 20	-1243	-210.77	-6.14	+15 48.5	+ 7.0	2 11 39.5
26 TH	-12 12 04	-1232	-216.91	-6.08	+15 55.5	+ 6.3	2 15 36.0
27 FR	-12 32 35	-1220	-222.99	-6.02	+16 01.9	+ 5.6	2 19 32.6
28 SA	-12 52 56	-1208	-229.02	-5.97	+16 07.5	+ 4.9	2 23 29.2
29 SU	-13 13 04	-1196	-234.98	-5.91	+16 12.3	+ 4.1	2 27 25.7
30 MO	-13 33 00	-1183	-240.89	-5.84	+16 16.4	+ 3.4	2 31 22.3
31 TU	-13 52 42	-1169	-246.73	-5.77	+16 19.8	+ 2.6	2 35 18.8

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
NOV 1 WE	-14 12 12	-1156	-252.50	-5.71	+16 22.4	+ 1.8	2 39 15.4
2 TH	-14 31 28	-1142	-258.21	-5.66	+16 24.3	+ 1.1	2 43 11.9
3 FR	-14 50 29	-1127	-263.85	-5.57	+16 25.3	+ 0.3	2 47 08.5
4 SA	-15 09 16	-1112	-269.41	-5.49	+16 25.6	- 0.5	2 51 05.0
5 SU	-15 27 49	-1097	-274.91	-5.42	+16 25.1	- 1.4	2 55 01.6
6 MO	-15 46 05	-1081	-280.32	-5.34	+16 23.7	- 2.2	2 58 58.1
7 TU	-16 04 07	-1065	-285.66	-5.26	+16 21.5	- 3.0	3 02 54.7
8 WE	-16 21 52	-1049	-290.92	-5.18	+16 18.5	- 3.9	3 06 51.2
9 TH	-16 39 21	-1032	-296.10	-5.10	+16 14.6	- 4.7	3 10 47.8
10 FR	-16 56 33	-1015	-301.20	-5.01	+16 09.9	- 5.6	3 14 44.4
11 SA	-17 13 27	- 997	-306.21	-4.92	+16 04.4	- 6.4	3 18 40.9
12 SU	-17 30 04	- 979	-311.13	-4.83	+15 57.9	- 7.3	3 22 37.5
13 MO	-17 46 23	- 961	-315.97	-4.75	+15 50.6	- 8.2	3 26 34.0
14 TU	-18 02 24	- 942	-320.71	-4.65	+15 42.5	- 9.0	3 30 30.6
15 WE	-18 18 05	- 922	-325.36	-4.55	+15 33.5	- 9.9	3 34 27.1
16 TH	-18 33 28	- 903	-329.92	-4.46	+15 23.6	-10.8	3 38 23.7
17 FR	-18 48 31	- 883	-334.37	-4.36	+15 12.8	-11.6	3 42 20.3
18 SA	-19 03 14	- 862	-338.73	-4.26	+15 01.2	-12.5	3 46 16.8
19 SU	-19 17 36	- 842	-342.99	-4.16	+14 48.8	-13.3	3 50 13.4
20 MO	-19 31 38	- 821	-347.15	-4.05	+14 35.5	-14.1	3 54 09.9
21 TU	-19 45 18	- 799	-351.20	-3.95	+14 21.3	-15.0	3 58 06.5
22 WE	-19 58 37	- 777	-355.15	-3.84	+14 06.4	-15.8	4 02 03.0
23 TH	-20 11 35	- 755	-358.99	-3.73	+13 50.6	-16.6	4 05 59.6
24 FR	-20 24 10	- 732	-362.71	-3.61	+13 34.0	-17.3	4 09 56.1
25 SA	-20 36 22	- 709	-366.33	-3.50	+13 16.7	-18.1	4 13 52.7
26 SU	-20 48 11	- 686	-369.83	-3.39	+12 58.6	-18.8	4 17 49.3
27 MO	-20 59 37	- 662	-373.22	-3.27	+12 39.8	-19.5	4 21 45.8
28 TU	-21 10 40	- 639	-376.49	-3.16	+12 20.3	-20.2	4 25 42.4
29 WE	-21 21 18	- 614	-379.65	-3.03	+12 00.1	-20.9	4 29 38.9
30 TH	-21 31 33	- 590	-382.68	-2.91	+11 39.2	-21.6	4 33 35.5

Table 2c. Sun, 1995, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
DEC 1 FR	-21 41 22	- 565	-385.59	-2.79	+11 17.7	-22.2	4 37 32.0
2 SA	-21 50 47	- 540	-388.38	-2.67	+10 55.5	-22.8	4 41 28.6
3 SU	-21 59 47	- 514	-391.05	-2.54	+10 32.7	-23.4	4 45 25.1
4 MO	-22 08 21	- 489	-393.59	-2.41	+10 09.2	-24.0	4 49 21.7
5 TU	-22 16 30	- 463	-396.00	-2.29	+09 45.2	-24.6	4 53 18.3
6 WE	-22 24 12	- 437	-398.28	-2.16	+09 20.7	-25.1	4 57 14.8
7 TH	-22 31 29	- 410	-400.44	-2.02	+08 55.5	-25.6	5 01 11.4
8 FR	-22 38 19	- 384	-402.46	-1.90	+08 29.9	-26.1	5 05 07.9
9 SA	-22 44 42	- 357	-404.36	-1.76	+08 03.8	-26.6	5 09 04.5
10 SU	-22 50 39	- 330	-406.12	-1.63	+07 37.2	-27.0	5 13 01.1
11 MO	-22 56 09	- 303	-407.75	-1.50	+07 10.2	-27.5	5 16 57.6
12 TU	-23 01 12	- 275	-409.24	-1.36	+06 42.7	-27.9	5 20 54.2
13 WE	-23 05 47	- 248	-410.60	-1.22	+06 14.8	-28.2	5 24 50.7
14 TH	-23 09 54	- 220	-411.82	-1.09	+05 46.6	-28.5	5 28 47.3
15 FR	-23 13 35	- 192	-412.91	-0.95	+05 18.1	-28.8	5 32 43.8
16 SA	-23 16 47	- 164	-413.86	-0.81	+04 49.2	-29.1	5 36 40.4
17 SU	-23 19 31	- 136	-414.67	-0.67	+04 20.1	-29.4	5 40 36.9
18 MO	-23 21 48	- 108	-415.35	-0.53	+03 50.8	-29.6	5 44 33.5
19 TU	-23 23 36	- 80	-415.88	-0.40	+03 21.2	-29.7	5 48 30.1
20 WE	-23 24 56	- 52	-416.28	-0.26	+02 51.5	-29.9	5 52 26.6
21 TH	-23 25 48	- 24	-416.53	-0.12	+02 21.6	-29.9	5 56 23.2
22 FR	-23 26 12	+ 4	-416.65	+0.02	+01 51.7	-30.0	6 00 19.7
23 SA	-23 26 07	+ 33	-416.63	+0.16	+01 21.7	-30.0	6 04 16.3
24 SU	-23 25 35	+ 61	-416.47	+0.30	+00 51.7	-30.0	6 08 12.9
25 MO	-23 24 34	+ 89	-416.17	+0.44	+00 21.8	-29.9	6 12 09.4
26 TU	-23 23 05	+ 117	-415.73	+0.58	-00 08.1	-29.8	6 16 06.0
27 WE	-23 21 08	+ 145	-415.15	+0.72	-00 37.9	-29.6	6 20 02.5
28 TH	-23 18 42	+ 173	-414.43	+0.85	-01 07.5	-29.4	6 23 59.1
29 FR	-23 15 49	+ 201	-413.57	+0.99	-01 37.0	-29.2	6 27 55.6
30 SA	-23 12 27	+ 229	-412.58	+1.13	-02 06.2	-29.0	6 31 52.2
31 SU	-23 08 38	+ 257	-411.45	+1.27	-02 35.2	-28.7	6 35 48.8
32 MO	-23 04 21		-410.18		-03 03.9		6 39 45.3

Table 2d. Sun, 1996, for zero hours universal time (GMT)

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JAN 0 SU	-23 08 38		-411.45		-02 35.2		6 35 48.8
		+ 257		+1.27		-28.7	
JAN 1 MO	-23 04 21		-410.18		-03 03.9		6 39 45.3
		+ 285		+1.41		-28.4	
2 TU	-22 59 36		-408.77		-03 32.3		6 43 41.9
		+ 312		+1.54		-28.1	
3 WE	-22 54 24		-407.23		-04 00.4		6 47 38.4
		+ 340		+1.68		-27.7	
4 TH	-22 48 44		-405.55		-04 28.2		6 51 35.0
		+ 367		+1.81		-27.3	
5 FR	-22 42 37		-403.74		-04 55.5		6 55 31.5
		+ 394		+1.95		-26.9	
6 SA	-22 36 03		-401.79		-05 22.4		6 59 28.1
		+ 421		+2.08		-26.5	
7 SU	-22 29 03		-399.72		-05 48.9		7 03 24.7
		+ 447		+2.21		-26.0	
8 MO	-22 21 35		-397.51		-06 14.9		7 07 21.2
		+ 474		+2.34		-25.5	
9 TU	-22 13 42		-395.17		-06 40.4		7 11 17.8
		+ 500		+2.47		-25.0	
10 WE	-22 05 22		-392.70		-07 05.5		7 15 14.3
		+ 526		+2.60		-24.5	
11 TH	-21 56 36		-390.10		-07 30.0		7 19 10.9
		+ 552		+2.73		-23.9	
12 FR	-21 47 24		-387.38		-07 53.9		7 23 07.4
		+ 577		+2.85		-23.4	
13 SA	-21 37 47		-384.53		-08 17.3		7 27 04.0
		+ 602		+2.97		-22.8	
14 SU	-21 27 45		-381.55		-08 40.1		7 31 00.5
		+ 627		+3.10		-22.2	
15 MO	-21 17 17		-378.46		-09 02.2		7 34 57.1
		+ 652		+3.22		-21.5	
16 TU	-21 06 25		-375.24		-09 23.8		7 38 53.7
		+ 676		+3.34		-20.9	
17 WE	-20 55 09		-371.90		-09 44.6		7 42 50.2
		+ 700		+3.46		-20.2	
18 TH	-20 43 29		-368.44		-10 04.8		7 46 46.8
		+ 724		+3.58		-19.5	
19 FR	-20 31 25		-364.87		-10 24.4		7 50 43.3
		+ 747		+3.69		-18.8	
20 SA	-20 18 58		-361.18		-10 43.2		7 54 39.9
		+ 770		+3.80		-18.1	
21 SU	-20 06 08		-357.37		-11 01.2		7 58 36.5
		+ 793		+3.92		-17.3	
22 MO	-19 52 56		-353.46		-11 18.6		8 02 33.0
		+ 815		+4.02		-16.6	
23 TU	-19 39 21		-349.44		-11 35.1		8 06 29.6
		+ 837		+4.13		-15.8	
24 WE	-19 25 24		-345.31		-11 50.9		8 10 26.1
		+ 858		+4.24		-15.0	
25 TH	-19 11 06		-341.07		-12 05.8		8 14 22.7
		+ 879		+4.34		-14.2	
26 FR	-18 56 27		-336.73		-12 20.0		8 18 19.2
		+ 900		+4.44		-13.3	
27 SA	-18 41 27		-332.28		-12 33.4		8 22 15.8
		+ 920		+4.54		-12.5	
28 SU	-18 26 07		-327.74		-12 45.9		8 26 12.3
		+ 940		+4.64		-11.7	
29 MO	-18 10 27		-323.09		-12 57.6		8 30 08.9
		+ 960		+4.74		-10.9	
30 TU	-17 54 27		-318.35		-13 08.4		8 34 05.4
		+ 979		+4.83		-10.0	
31 WE	-17 38 08		-313.52		-13 18.5		8 38 02.0
		+ 998		+4.93		- 9.2	

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
FEB 1 TH	-17 21 30	+1016	+308.59	+5.02	-13 27.7	- 8.4	8	41	58.6
2 FR	-17 04 34	+1034	-303.58	+5.11	-13 36.0	- 7.5	8	45	55.1
3 SA	-16 47 20	+1052	-298.47	+5.20	-13 43.6	- 6.7	8	49	51.7
4 SU	-16 29 48	+1069	-293.28	+5.28	-13 50.3	- 5.9	8	53	48.2
5 MO	-16 11 59	+1086	-288.00	+5.36	-13 56.2	- 5.1	8	57	44.8
6 TU	-15 53 54	+1102	-282.64	+5.44	-14 01.3	- 4.3	9	01	41.3
7 WE	-15 35 32	+1118	-277.19	+5.52	-14 05.6	- 3.5	9	05	37.9
8 TH	-15 16 53	+1134	-271.67	+5.60	-14 09.1	- 2.7	9	09	34.4
9 FR	-14 58 00	+1149	-266.07	+5.67	-14 11.8	- 1.9	9	13	31.0
10 SA	-14 38 51	+1164	-260.40	+5.75	-14 13.8	- 1.2	9	17	27.5
11 SU	-14 19 27	+1178	-254.65	+5.82	-14 14.9	- 0.4	9	21	24.1
12 MO	-13 59 49	+1192	-248.83	+5.89	-14 15.4	+ 0.3	9	25	20.6
13 TU	-13 39 57	+1206	-242.95	+5.96	-14 15.0	+ 1.1	9	29	17.2
14 WE	-13 19 51	+1219	-236.99	+6.02	-14 14.0	+ 1.8	9	33	13.8
15 TH	-12 59 32	+1232	-230.97	+6.08	-14 12.2	+ 2.5	9	37	10.3
16 FR	-12 39 00	+1244	-224.89	+6.14	-14 09.7	+ 3.2	9	41	06.9
17 SA	-12 18 17	+1256	-218.75	+6.20	-14 06.4	+ 3.9	9	45	03.4
18 SU	-11 57 21	+1267	-212.55	+6.26	-14 02.5	+ 4.6	9	49	00.0
19 MO	-11 36 14	+1278	-206.29	+6.31	-13 57.9	+ 5.3	9	52	56.5
20 TU	-11 14 56	+1288	-199.98	+6.36	-13 52.6	+ 6.0	9	56	53.1
21 WE	-10 53 28	+1299	-193.62	+6.41	-13 46.6	+ 6.6	10	00	49.6
22 TH	-10 31 49	+1308	-187.20	+6.46	-13 40.0	+ 7.3	10	04	46.2
23 FR	-10 10 01	+1318	-180.74	+6.51	-13 32.7	+ 7.9	10	08	42.7
24 SA	- 9 48 03	+1326	-174.24	+6.55	-13 24.8	+ 8.6	10	12	39.3
25 SU	- 9 25 57	+1335	-167.69	+6.59	-13 16.2	+ 9.2	10	16	35.8
26 MO	- 9 03 42	+1343	-161.10	+6.63	-13 07.0	+ 9.8	10	20	32.4
27 TU	- 8 41 19	+1351	-154.46	+6.67	-12 57.3	+10.3	10	24	29.0
28 WE	- 8 18 48	+1358	-147.79	+6.71	-12 46.9	+10.9	10	28	25.5
29 TH	- 7 56 11	+1365	-141.09	+6.74	-12 36.0	+11.4	10	32	22.1

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAR 1 FR	- 7 33 26	+1371	-134.35	+6.77	-12 24.6	+12.0	10 36 18.6
2 SA	- 7 10 35	+1377	-127.58	+6.80	-12 12.6	+12.5	10 40 15.2
3 SU	- 6 47 38	+1383	-120.78	+6.83	-12 00.2	+12.9	10 44 11.7
4 MO	- 6 24 35	+1388	-113.95	+6.85	-11 47.2	+13.4	10 48 08.3
5 TU	- 6 01 27	+1393	-107.10	+6.88	-11 33.8	+13.8	10 52 04.8
6 WE	- 5 38 14	+1398	-100.22	+6.90	-11 20.0	+14.2	10 56 01.4
7 TH	- 5 14 56	+1402	- 93.31	+6.92	-11 05.8	+14.6	10 59 57.9
8 FR	- 4 51 34	+1406	- 86.39	+6.94	-10 51.2	+15.0	11 03 54.5
9 SA	- 4 28 08	+1409	- 79.45	+6.96	-10 36.2	+15.3	11 07 51.0
10 SU	- 4 04 39	+1412	- 72.49	+6.97	-10 20.8	+15.6	11 11 47.6
11 MO	- 3 41 07	+1415	- 65.51	+6.99	-10 05.2	+15.9	11 15 44.1
12 TU	- 3 17 31	+1418	- 58.53	+7.00	-09 49.3	+16.2	11 19 40.7
13 WE	- 2 53 54	+1420	- 51.53	+7.01	-09 33.0	+16.5	11 23 37.2
14 TH	- 2 30 14	+1421	- 44.52	+7.02	-09 16.6	+16.7	11 27 33.8
15 FR	- 2 06 33	+1422	- 37.50	+7.02	-08 59.9	+16.9	11 31 30.4
16 SA	- 1 42 51	+1423	- 30.47	+7.03	-08 42.9	+17.1	11 35 26.9
17 SU	- 1 19 08	+1424	- 23.45	+7.03	-08 25.8	+17.3	11 39 23.5
18 MO	- 0 55 24	+1424	- 16.42	+7.03	-08 08.5	+17.5	11 43 20.0
19 TU	- 0 31 40	+1423	- 9.38	+7.03	-07 51.1	+17.6	11 47 16.6
20 WE	- 0 07 57	+1423	- 2.36	+7.03	-07 33.5	+17.7	11 51 13.1
21 TH	+ 0 15 46	+1422	+ 4.67	+7.02	-07 15.7	+17.9	11 55 09.6
22 FR	+ 0 39 27	+1420	+ 11.69	+7.01	-06 57.9	+18.0	11 59 06.2
23 SA	+ 1 03 07	+1418	+ 18.70	+7.00	-06 39.9	+18.0	12 03 02.7
24 SU	+ 1 26 46	+1416	+ 25.71	+6.99	-06 21.9	+18.1	12 06 59.3
25 MO	+ 1 50 22	+1414	+ 32.70	+6.98	-06 03.8	+18.1	12 10 55.9
26 TU	+ 2 13 55	+1411	+ 39.68	+6.97	-05 45.6	+18.2	12 14 52.4
27 WE	+ 2 37 26	+1407	+ 46.65	+6.95	-05 27.5	+18.2	12 18 49.0
28 TH	+ 3 00 54	+1404	+ 53.60	+6.93	-05 09.3	+18.2	12 22 45.5
29 FR	+ 3 24 17	+1400	+ 60.53	+6.91	-04 51.1	+18.1	12 26 42.1
30 SA	+ 3 47 37	+1396	+ 67.44	+6.89	-04 33.0	+18.1	12 30 38.6
31 SU	+ 4 10 53	+1391	+ 74.33	+6.87	-04 14.9	+18.0	12 34 35.2

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
APR 1 MO	+ 4 34 04	+1386	+ 81.20	+6.84	-03 56.9	+17.9	12 38 31.7
2 TU	+ 4 57 09	+1381	+ 88.05	+6.82	-03 39.0	+17.8	12 42 28.3
3 WE	+ 5 20 10	+1375	+ 94.86	+6.79	-03 21.3	+17.6	12 46 24.8
4 TH	+ 5 43 05	+1369	+101.65	+6.76	-03 03.6	+17.5	12 50 21.4
5 FR	+ 6 05 54	+1363	+108.41	+6.73	-02 46.2	+17.3	12 54 17.9
6 SA	+ 6 28 36	+1356	+115.14	+6.70	-02 28.9	+17.1	12 58 14.5
7 SU	+ 6 51 12	+1349	+121.84	+6.66	-02 11.8	+16.8	13 02 11.0
8 MO	+ 7 13 41	+1342	+128.50	+6.63	-01 55.0	+16.6	13 06 07.6
9 TU	+ 7 36 03	+1334	+135.13	+6.59	-01 38.4	+16.3	13 10 04.1
10 WE	+ 7 58 17	+1326	+141.72	+6.55	-01 22.1	+16.0	13 14 00.7
11 TH	+ 8 20 24	+1318	+148.26	+6.51	-01 06.1	+15.7	13 17 57.3
12 FR	+ 8 42 22	+1309	+154.77	+6.46	-00 50.4	+15.4	13 21 53.8
13 SA	+ 9 04 11	+1300	+161.24	+6.42	-00 35.0	+15.0	13 25 50.4
14 SU	+ 9 25 51	+1291	+167.66	+6.38	-00 20.0	+14.7	13 29 46.9
15 MO	+ 9 47 22	+1281	+174.03	+6.33	-00 05.3	+14.3	13 33 43.5
16 TU	+10 08 43	+1271	+180.36	+6.28	+00 09.1	+13.9	13 37 40.0
17 WE	+10 29 55	+1261	+186.64	+6.23	+00 23.0	+13.6	13 41 36.6
18 TH	+10 50 55	+1250	+192.87	+6.17	+00 36.6	+13.2	13 45 33.1
19 FR	+11 11 46	+1239	+199.04	+6.12	+00 49.7	+12.8	13 49 29.7
20 SA	+11 32 25	+1228	+205.16	+6.06	+01 02.5	+12.3	13 53 26.2
21 SU	+11 52 52	+1216	+211.22	+6.00	+01 14.8	+11.9	13 57 22.8
22 MO	+12 13 08	+1204	+217.22	+5.95	+01 26.7	+11.5	14 01 19.3
23 TU	+12 33 12	+1191	+223.17	+5.88	+01 38.2	+11.0	14 05 15.9
24 WE	+12 53 03	+1179	+229.05	+5.82	+01 49.2	+10.6	14 09 12.4
25 TH	+13 12 42	+1165	+234.87	+5.75	+01 59.8	+10.1	14 13 09.0
26 FR	+13 32 07	+1152	+240.63	+5.69	+02 09.9	+ 9.6	14 17 05.5
27 SA	+13 51 19	+1138	+246.32	+5.62	+02 19.5	+ 9.1	14 21 02.1
28 SU	+14 10 17	+1124	+251.94	+5.55	+02 28.7	+ 8.6	14 24 58.6
29 MO	+14 29 02	+1110	+257.49	+5.48	+02 37.3	+ 8.1	14 28 55.2
30 TU	+14 47 31	+1095	+262.97	+5.41	+02 45.5	+ 7.6	14 32 51.7

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIM
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAY 1 WE	+15 05 47	+1080	+268.38	+5.33	+02 53.1	+ 7.1	14 36 48.3
2 TH	+15 23 47	+1065	+273.71	+5.26	+03 00.2	+ 6.6	14 40 44.8
3 FR	+15 41 31	+1049	+278.97	+5.18	+03 06.7	+ 6.0	14 44 41.4
4 SA	+15 59 01	+1033	+284.15	+5.10	+03 12.8	+ 5.5	14 48 38.0
5 SU	+16 16 14	+1017	+289.25	+5.02	+03 18.2	+ 4.9	14 52 34.5
6 MO	+16 33 11	+1001	+294.28	+4.94	+03 23.1	+ 4.3	14 56 31.1
7 TU	+16 49 52	+ 984	+299.22	+4.86	+03 27.4	+ 3.7	15 00 27.6
8 WE	+17 06 16	+ 967	+304.08	+4.78	+03 31.2	+ 3.1	15 04 24.2
9 TH	+17 22 22	+ 949	+308.85	+4.69	+03 34.3	+ 2.6	15 08 20.8
10 FR	+17 38 12	+ 932	+313.54	+4.60	+03 36.9	+ 2.0	15 12 17.3
11 SA	+17 53 44	+ 914	+318.14	+4.51	+03 38.8	+ 1.4	15 16 13.9
12 SU	+18 08 57	+ 896	+322.65	+4.42	+03 40.2	+ 0.8	15 20 10.4
13 MO	+18 23 53	+ 877	+327.08	+4.33	+03 41.0	+ 0.2	15 24 07.0
14 TU	+18 38 30	+ 858	+331.41	+4.24	+03 41.1	- 0.4	15 28 03.5
15 WE	+18 52 48	+ 839	+335.64	+4.14	+03 40.7	- 1.0	15 32 00.1
16 TH	+19 06 47	+ 820	+339.79	+4.05	+03 39.8	- 1.5	15 35 56.6
17 FR	+19 20 27	+ 800	+343.84	+3.95	+03 38.2	- 2.1	15 39 53.2
18 SA	+19 33 47	+ 780	+347.79	+3.85	+03 36.1	- 2.7	15 43 49.7
19 SU	+19 46 47	+ 760	+351.64	+3.75	+03 33.5	- 3.2	15 47 46.3
20 MO	+19 59 26	+ 739	+355.39	+3.65	+03 30.3	- 3.7	15 51 42.8
21 TU	+20 11 46	+ 719	+359.04	+3.55	+03 26.5	- 4.2	15 55 39.4
22 WE	+20 23 44	+ 698	+362.59	+3.45	+03 22.3	- 4.8	15 59 36.0
23 TH	+20 35 22	+ 676	+366.03	+3.34	+03 17.5	- 5.3	16 03 32.5
24 FR	+20 46 38	+ 655	+369.37	+3.23	+03 12.3	- 5.7	16 07 29.1
25 SA	+20 57 33	+ 633	+372.61	+3.13	+03 06.5	- 6.2	16 11 25.6
26 SU	+21 08 06	+ 611	+375.73	+3.02	+03 00.3	- 6.7	16 15 22.2
27 MO	+21 18 18	+ 589	+378.75	+2.91	+02 53.6	- 7.1	16 19 18.7
28 TU	+21 28 07	+ 567	+381.66	+2.80	+02 46.5	- 7.6	16 23 15.3
29 WE	+21 37 33	+ 544	+384.46	+2.69	+02 38.9	- 8.0	16 27 11.8
30 TH	+21 46 38	+ 522	+387.15	+2.58	+02 30.9	- 8.4	16 31 08.4
31 FR	+21 55 19	+ 499	+389.72	+2.46	+02 22.5	- 8.8	16 35 04.9

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
JUN 1 SA	+22 03 38	+ 476	+392.19	+2.35	+02 13.7	- 9.2	16	39	01.5
2 SU	+22 11 33	+ 452	+396.54	+2.23	+02 04.5	- 9.6	16	42	58.1
3 MO	+22 19 06	+ 429	+398.77	+2.12	+01 54.9	-10.0	16	46	54.6
4 TU	+22 26 15	+ 405	+400.89	+2.00	+01 45.0	-10.3	16	50	51.2
5 WE	+22 33 00	+ 382	+402.77	+1.89	+01 34.7	-10.7	16	54	47.8
6 TH	+22 39 22	+ 358	+404.54	+1.77	+01 24.0	-11.0	16	58	44.3
7 FR	+22 45 20	+ 334	+406.19	+1.65	+01 13.0	-11.3	17	02	40.9
8 SA	+22 50 54	+ 310	+407.72	+1.53	+01 01.7	-11.6	17	06	37.4
9 SU	+22 56 04	+ 286	+409.13	+1.41	+00 50.2	-11.8	17	10	34.0
10 MO	+23 00 49	+ 261	+410.42	+1.29	+00 38.3	-12.1	17	14	30.5
11 TU	+23 05 11	+ 237	+411.59	+1.17	+00 26.2	-12.3	17	18	27.1
12 WE	+23 09 08	+ 213	+412.64	+1.05	+00 13.9	-12.5	17	22	23.6
13 TH	+23 12 40	+ 188	+413.57	+0.93	+00 01.4	-12.7	17	26	20.2
14 FR	+23 15 48	+ 163	+414.38	+0.80	-00 11.2	-12.8	17	30	16.7
15 SA	+23 18 32	+ 139	+415.06	+0.69	-00 24.0	-12.9	17	34	13.3
16 SU	+23 20 50	+ 114	+415.63	+0.56	-00 37.0	-13.0	17	38	09.9
17 MO	+23 22 44	+ 89	+416.07	+0.44	-00 50.0	-13.1	17	42	06.4
18 TU	+23 24 14	+ 65	+416.39	+0.32	-01 03.1	-13.1	17	46	03.0
19 WE	+23 25 18	+ 40	+416.58	+0.20	-01 16.2	-13.1	17	49	59.5
20 TH	+23 25 58	+ 15	+416.66	+0.07	-01 29.3	-13.1	17	53	56.1
21 FR	+23 26 13	- 10	+416.61	-0.05	-01 42.4	-13.1	17	57	52.7
22 SA	+23 26 03	- 35	+416.44	-0.17	-01 55.5	-13.0	18	01	49.2
23 SU	+23 25 29	- 59	+416.14	-0.29	-02 08.5	-12.9	18	05	45.8
24 MO	+23 24 29	- 84	+415.73	-0.41	-02 21.4	-12.8	18	09	42.3
25 TU	+23 23 05	- 109	+415.19	-0.54	-02 34.1	-12.6	18	13	38.9
26 WE	+23 21 16	- 133	+414.53	-0.66	-02 46.8	-12.5	18	17	35.4
27 TH	+23 19 03	- 158	+413.75	-0.78	-02 59.3	-12.3	18	21	32.0
28 FR	+23 16 25	- 182	+412.85	-0.90	-03 11.5	-12.1	18	25	28.5
29 SA	+23 13 23	- 207	+411.83	-1.02	-03 23.6	-11.8	18	29	25.1
30 SU	+23 09 56	- 231		-1.14	-03 35.5	-11.6	18	33	21.7

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUL 1 MO	+23 06 04	- 255	+410.69	-1.26	-03 47.1	-11.3	18 37 18.2
2 TU	+23 01 49	- 280	+409.43	-1.38	-03 58.4	-11.1	18 41 14.8
3 WE	+22 57 09	- 304	+408.05	-1.50	-04 09.5	-10.8	18 45 11.3
4 TH	+22 52 06	- 327	+406.55	-1.61	-04 20.3	-10.5	18 49 07.9
5 FR	+22 46 38	- 351	+404.93	-1.73	-04 30.7	-10.2	18 53 04.5
6 SA	+22 40 47	- 375	+403.20	-1.85	-04 40.9	- 9.8	18 57 01.0
7 SU	+22 34 32	- 398	+401.34	-1.97	-04 50.7	- 9.5	19 00 57.6
8 MO	+22 27 54	- 422	+399.38	-2.08	-05 00.2	- 9.1	19 04 54.1
9 TU	+22 20 52	- 445	+397.29	-2.20	-05 09.2	- 8.7	19 08 50.7
10 WE	+22 13 27	- 468	+395.10	-2.31	-05 17.9	- 8.3	19 12 47.2
11 TH	+22 05 39	- 491	+392.79	-2.42	-05 26.2	- 7.8	19 16 43.8
12 FR	+21 57 29	- 513	+390.36	-2.53	-05 34.1	- 7.4	19 20 40.3
13 SA	+21 48 55	- 536	+387.83	-2.65	-05 41.5	- 6.9	19 24 36.9
14 SU	+21 40 00	- 558	+385.18	-2.76	-05 48.4	- 6.4	19 28 33.5
15 MO	+21 30 42	- 580	+382.43	-2.86	-05 54.8	- 5.9	19 32 30.0
16 TU	+21 21 02	- 601	+379.57	-2.97	-06 00.8	- 5.4	19 36 26.6
17 WE	+21 11 01	- 623	+376.60	-3.08	-06 06.2	- 4.9	19 40 23.1
18 TH	+21 00 38	- 644	+373.52	-3.18	-06 11.1	- 4.3	19 44 19.7
19 FR	+20 49 54	- 665	+370.34	-3.28	-06 15.5	- 3.8	19 48 16.2
20 SA	+20 38 48	- 686	+367.05	-3.39	-06 19.2	- 3.2	19 52 12.8
21 SU	+20 27 22	- 707	+363.66	-3.49	-06 22.5	- 2.6	19 56 09.3
22 MO	+20 15 35	- 727	+360.18	-3.59	-06 25.1	- 2.0	20 00 05.9
23 TU	+20 03 29	- 747	+356.59	-3.69	-06 27.1	- 1.4	20 04 02.4
24 WE	+19 51 02	- 767	+352.90	-3.79	-06 28.6	- 0.8	20 07 59.0
25 TH	+19 38 15	- 786	+349.11	-3.88	-06 29.4	- 0.2	20 11 55.6
26 FR	+19 25 08	- 806	+345.23	-3.98	-06 29.6	+ 0.4	20 15 52.1
27 SA	+19 11 43	- 825	+341.25	-4.07	-06 29.3	+ 1.0	20 19 48.7
28 SU	+18 57 58	- 843	+337.18	-4.16	-06 28.2	+ 1.6	20 23 45.2
29 MO	+18 43 55	- 862	+333.01	-4.26	-06 26.6	+ 2.2	20 27 41.8
30 TU	+18 29 34	- 880	+328.76	-4.35	-06 24.4	+ 2.8	20 31 38.4
31 WE	+18 14 54	- 898	+324.41	-4.43	-06 21.5	+ 3.5	20 35 34.9

Table 2d. Sun, 1996, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
AUG 1 TH	+17 59 56	- 915	+319.98	-4.52	-06 18.1	+ 4.1	20	39	31.5
2 FR	+17 44 41	- 933	+315.46	-4.61	-06 14.0	+ 4.6	20	43	28.0
3 SA	+17 29 08	- 950	+310.85	-4.69	-06 09.4	+ 5.2	20	47	24.6
4 SU	+17 13 18	- 967	+306.16	-4.78	-06 04.2	+ 5.8	20	51	21.1
5 MO	+16 57 11	- 983	+301.39	-4.85	-05 58.3	+ 6.4	20	55	17.7
6 TU	+16 40 48	- 999	+296.53	-4.93	-05 52.0	+ 7.0	20	59	14.2
7 WE	+16 24 09	-1015	+291.60	-5.01	-05 45.0	+ 7.5	21	03	10.8
8 TH	+16 07 13	-1031	+286.58	-5.09	-05 37.4	+ 8.1	21	07	07.3
9 FR	+15 50 02	-1046	+281.49	-5.17	-05 29.3	+ 8.7	21	11	03.9
10 SA	+15 32 36	-1061	+276.33	-5.24	-05 20.7	+ 9.2	21	15	00.4
11 SU	+15 14 55	-1076	+271.09	-5.31	-05 11.4	+ 9.8	21	18	57.0
12 MO	+14 56 59	-1090	+265.77	-5.38	-05 01.6	+10.3	21	22	53.6
13 TU	+14 38 49	-1104	+260.39	-5.45	-04 51.3	+10.9	21	26	50.1
14 WE	+14 20 25	-1118	+254.94	-5.52	-04 40.4	+11.4	21	30	46.7
15 TH	+14 01 47	-1131	+249.42	-5.59	-04 29.0	+12.0	21	34	43.2
16 FR	+13 42 56	-1144	+243.83	-5.65	-04 17.0	+12.5	21	38	39.8
17 SA	+13 23 52	-1157	+238.18	-5.71	-04 04.6	+13.0	21	42	36.3
18 SU	+13 04 35	-1169	+232.47	-5.77	-03 51.6	+13.5	21	46	32.9
19 MO	+12 45 06	-1181	+226.70	-5.83	-03 38.0	+14.0	21	50	29.4
20 TU	+12 25 25	-1193	+220.86	-5.89	-03 24.0	+14.5	21	54	26.0
21 WE	+12 05 32	-1204	+214.97	-5.95	-03 09.5	+15.0	21	58	22.5
22 TH	+11 45 27	-1216	+209.02	-6.00	-02 54.5	+15.5	22	02	19.1
23 FR	+11 25 12	-1226	+203.02	-6.05	-02 39.1	+15.9	22	06	15.6
24 SA	+11 04 46	-1237	+196.97	-6.11	-02 23.2	+16.4	22	10	12.2
25 SU	+10 44 09	-1247	+190.86	-6.16	-02 06.8	+16.8	22	14	08.7
26 MO	+10 23 22	-1257	+184.70	-6.21	-01 50.0	+17.2	22	18	05.3
27 TU	+10 02 25	-1266	+178.50	-6.25	-01 32.9	+17.6	22	22	01.9
28 WE	+ 9 41 19	-1275	+172.24	-6.30	-01 15.3	+17.9	22	25	58.4
29 TH	+ 9 20 04	-1284	+165.95	-6.34	-00 57.4	+18.3	22	29	55.0
30 FR	+ 8 58 40	-1293	+159.60	-6.39	-00 39.1	+18.6	22	33	51.5
31 SA	+ 8 37 07	-1301	+153.22	-6.42	-00 20.5	+18.9	22	37	48.1

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
SEP 1 SU	+ 8 15 25	-1309	+146.79	-6.46	-00 01.6	+19.2	22	41	44.6
2 MO	+ 7 53 36	-1317	+140.33	-6.50	+00 17.6	+19.5	22	45	41.2
3 TU	+ 7 31 39	-1324	+133.82	-6.54	+00 37.1	+19.7	22	49	37.7
4 WE	+ 7 09 34	-1332	+127.28	-6.58	+00 56.8	+19.9	22	53	34.3
5 TH	+ 6 47 23	-1338	+120.71	-6.61	+01 16.7	+20.1	22	57	30.8
6 FR	+ 6 25 05	-1345	+114.10	-6.64	+01 36.9	+20.3	23	01	27.4
7 SA	+ 6 02 40	-1351	+107.46	-6.67	+01 57.2	+20.5	23	05	23.9
8 SU	+ 5 40 09	-1356	+100.79	-6.70	+02 17.7	+20.7	23	09	20.5
9 MO	+ 5 17 33	-1362	+ 94.09	-6.73	+02 38.4	+20.8	23	13	17.0
10 TU	+ 4 54 51	-1367	+ 87.36	-6.75	+02 59.2	+20.9	23	17	13.6
11 WE	+ 4 32 04	-1372	+ 80.61	-6.78	+03 20.1	+21.0	23	21	10.1
12 TH	+ 4 09 12	-1376	+ 73.84	-6.80	+03 41.1	+21.1	23	25	06.7
13 FR	+ 3 46 16	-1380	+ 67.04	-6.81	+04 02.2	+21.2	23	29	03.2
14 SA	+ 3 23 16	-1384	+ 60.23	-6.83	+04 23.4	+21.3	23	32	59.8
15 SU	+ 3 00 12	-1387	+ 53.39	-6.85	+04 44.7	+21.3	23	36	56.3
16 MO	+ 2 37 05	-1390	+ 46.54	-6.86	+05 06.0	+21.3	23	40	52.9
17 TU	+ 2 13 55	-1393	+ 39.68	-6.88	+05 27.3	+21.3	23	44	49.4
18 WE	+ 1 50 42	-1395	+ 32.80	-6.89	+05 48.7	+21.3	23	48	46.0
19 TH	+ 1 27 27	-1397	+ 25.91	-6.90	+06 10.0	+21.3	23	52	42.5
20 FR	+ 1 04 10	-1399	+ 19.01	-6.91	+06 31.3	+21.3	23	56	39.1
21 SA	+ 0 40 51	-1400	+ 12.10	-6.91	+06 52.6	+21.2	0	00	35.7
22 SU	+ 0 17 31	-1401	+ 5.19	-6.92	+07 13.8	+21.1	0	04	32.2
23 MO	- 0 05 50	-1402	- 1.73	-6.92	+07 34.9	+21.0	0	08	28.8
24 TU	- 0 29 12	-1402	- 8.65	-6.92	+07 55.9	+20.9	0	12	25.3
25 WE	- 0 52 33	-1402	- 15.57	-6.92	+08 16.8	+20.7	0	16	21.9
26 TH	- 1 15 55	-1401	- 22.50	-6.92	+08 37.5	+20.5	0	20	18.4
27 FR	- 1 39 17	-1401	- 29.42	-6.92	+08 58.0	+20.3	0	24	15.0
28 SA	- 2 02 37	-1400	- 36.33	-6.91	+09 18.4	+20.1	0	28	11.5
29 SU	- 2 25 57	-1398	- 43.25	-6.90	+09 38.4	+19.8	0	32	08.1
30 MO	- 2 49 16	-1397	- 50.15	-6.90	+09 58.3	+19.6	0	36	04.6

Table 2d. Sun, 1996, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
OCT 1 TU	- 3 12 33	-1395	- 57.05	-6.89	+10 17.8	+19.3	0	40	01.2
2 WE	- 3 35 47	-1392	- 63.94	-6.87	+10 37.1	+18.9	0	43	57.7
3 TH	- 3 59 00	-1390	- 70.81	-6.86	+10 56.0	+18.6	0	47	54.3
4 FR	- 4 22 10	-1387	- 77.68	-6.85	+11 14.6	+18.2	0	51	50.8
5 SA	- 4 45 16	-1383	- 84.52	-6.83	+11 32.8	+17.8	0	55	47.4
6 SU	- 5 08 20	-1379	- 91.36	-6.81	+11 50.7	+17.4	0	59	43.9
7 MO	- 5 31 19	-1375	- 98.17	-6.79	+12 08.1	+17.0	1	03	40.5
8 TU	- 5 54 14	-1371	-104.96	-6.77	+12 25.1	+16.6	1	07	37.0
9 WE	- 6 17 05	-1366	-111.73	-6.75	+12 41.6	+16.1	1	11	33.6
10 TH	- 6 39 51	-1360	-118.47	-6.72	+12 57.7	+15.6	1	15	30.1
11 FR	- 7 02 31	-1355	-125.19	-6.69	+13 13.3	+15.1	1	19	26.7
12 SA	- 7 25 06	-1349	-131.88	-6.66	+13 28.5	+14.6	1	23	23.2
13 SU	- 7 47 35	-1342	-138.54	-6.63	+13 43.1	+14.1	1	27	19.8
14 MO	- 8 09 57	-1335	-145.17	-6.59	+13 57.2	+13.6	1	31	16.3
15 TU	- 8 32 13	-1328	-151.77	-6.56	+14 10.7	+13.0	1	35	12.9
16 WE	- 8 54 21	-1321	-158.32	-6.52	+14 23.8	+12.4	1	39	09.4
17 TH	- 9 16 21	-1313	-164.85	-6.48	+14 36.2	+11.9	1	43	06.0
18 FR	- 9 38 14	-1304	-171.33	-6.44	+14 48.1	+11.3	1	47	02.6
19 SA	- 9 59 58	-1295	-177.77	-6.40	+14 59.3	+10.7	1	50	59.1
20 SU	-10 21 33	-1286	-184.16	-6.35	+15 10.0	+10.0	1	54	55.7
21 MO	-10 42 59	-1276	-190.51	-6.30	+15 20.0	+ 9.4	1	58	52.2
22 TU	-11 04 15	-1266	-196.82	-6.25	+15 29.4	+ 8.7	2	02	48.8
23 WE	-11 25 22	-1256	-203.07	-6.20	+15 38.2	+ 8.1	2	06	45.3
24 TH	-11 46 18	-1245	-209.27	-6.15	+15 46.3	+ 7.4	2	10	41.9
25 FR	-12 07 03	-1234	-215.42	-6.09	+15 53.6	+ 6.7	2	14	38.4
26 SA	-12 27 37	-1222	-221.52	-6.03	+16 00.3	+ 5.9	2	18	35.0
27 SU	-12 47 59	-1211	-227.55	-5.98	+16 06.2	+ 5.2	2	22	31.5
28 MO	-13 08 10	-1198	-233.53	-5.92	+16 11.4	+ 4.4	2	26	28.1
29 TU	-13 28 08	-1186	-239.45	-5.86	+16 15.9	+ 3.7	2	30	24.6
30 WE	-13 47 54	-1172	-245.30	-5.79	+16 19.5	+ 2.9	2	34	21.2
31 TH	-14 07 26	-1159	-251.09	-5.72	+16 22.4	+ 2.1	2	38	17.7

Table 2d. Sun, 1996, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
NOV 1 FR	-14 26 45	-1145	-256.81	-5.65	+16 24.4	+ 1.2	2 42 14.3
2 SA	-14 45 50	-1131	-262.47	-5.59	+16 25.7	+ 0.4	2 46 10.9
3 SU	-15 04 41	-1116	-268.05	-5.51	+16 26.1	- 0.4	2 50 07.4
4 MO	-15 23 17	-1101	-273.57	-5.44	+16 25.7	- 1.3	2 54 04.0
5 TU	-15 41 38	-1085	-279.00	-5.36	+16 24.4	- 2.1	2 58 00.5
6 WE	-15 59 43	-1070	-284.36	-5.28	+16 22.3	- 3.0	3 01 57.1
7 TH	-16 17 33	-1053	-289.64	-5.20	+16 19.3	- 3.8	3 05 53.6
8 FR	-16 35 06	-1036	-294.85	-5.12	+16 15.5	- 4.7	3 09 50.2
9 SA	-16 52 23	-1019	-299.96	-5.03	+16 10.9	- 5.5	3 13 46.7
10 SU	-17 09 22	-1002	-305.00	-4.95	+16 05.3	- 6.4	3 17 43.3
11 MO	-17 26 04	- 984	-309.94	-4.86	+15 59.0	- 7.2	3 21 39.8
12 TU	-17 42 27	- 965	-314.80	-4.77	+15 51.7	- 8.1	3 25 36.4
13 WE	-17 58 33	- 947	-319.57	-4.68	+15 43.7	- 8.9	3 29 32.9
14 TH	-18 14 19	- 927	-324.24	-4.58	+15 34.8	- 9.7	3 33 29.5
15 FR	-18 29 47	- 908	-328.82	-4.48	+15 25.0	-10.6	3 37 26.1
16 SA	-18 44 55	- 888	-333.31	-4.39	+15 14.4	-11.4	3 41 22.6
17 SU	-18 59 43	- 867	-337.69	-4.28	+15 03.0	-12.2	3 45 19.2
18 MO	-19 14 10	- 847	-341.98	-4.18	+14 50.8	-13.0	3 49 15.7
19 TU	-19 28 17	- 826	-346.16	-4.08	+14 37.8	-13.8	3 53 12.3
20 WE	-19 42 02	- 804	-350.23	-3.97	+14 24.0	-14.6	3 57 08.8
21 TH	-19 55 26	- 782	-354.20	-3.86	+14 09.4	-15.4	4 01 05.4
22 FR	-20 08 28	- 760	-358.07	-3.75	+13 54.0	-16.2	4 05 01.9
23 SA	-20 21 08	- 737	-361.82	-3.64	+13 37.8	-16.9	4 08 58.5
24 SU	-20 33 26	- 715	-365.46	-3.53	+13 20.9	-17.7	4 12 55.1
25 MO	-20 45 21	- 691	-368.99	-3.41	+13 03.2	-18.5	4 16 51.6
26 TU	-20 56 52	- 668	-372.40	-3.30	+12 44.7	-19.2	4 20 48.2
27 WE	-21 08 00	- 644	-375.70	-3.18	+12 25.5	-19.9	4 24 44.7
28 TH	-21 18 44	- 620	-378.88	-3.06	+12 05.6	-20.6	4 28 41.3
29 FR	-21 29 04	- 595	-381.94	-2.94	+11 45.0	-21.3	4 32 37.9
30 SA	-21 38 59	- 571	-384.89	-2.82	+11 23.6	-22.0	4 36 34.4

Table 2d. Sun, 1996, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
DEC 1 SU	-21 48 30	- 546	-387.70	-2.70	+11 01.6	-22.7	4 40 31.0
2 MO	-21 57 36	- 520	-390.40	-2.57	+10 38.9	-23.3	4 44 27.5
3 TU	-22 06 16	- 495	-392.97	-2.44	+10 15.6	-23.9	4 48 24.1
4 WE	-22 14 31	- 469	-395.41	-2.32	+09 51.6	-24.5	4 52 20.6
5 TH	-22 22 20	- 443	-397.73	-2.19	+09 27.1	-25.1	4 56 17.2
6 FR	-22 29 43	- 417	-399.92	-2.06	+09 02.0	-25.7	5 00 13.7
7 SA	-22 36 40	- 390	-401.97	-1.93	+08 36.3	-26.2	5 04 10.3
8 SU	-22 43 10	- 363	-403.90	-1.79	+08 10.1	-26.7	5 08 06.8
9 MO	-22 49 13	- 336	-405.69	-1.66	+07 43.5	-27.1	5 12 03.4
10 TU	-22 54 49	- 309	-407.36	-1.53	+07 16.4	-27.5	5 16 00.0
11 WE	-22 59 59	- 282	-408.88	-1.39	+06 48.9	-27.9	5 19 56.5
12 TH	-23 04 41	- 255	-410.28	-1.26	+06 21.0	-28.3	5 23 53.1
13 FR	-23 08 55	- 227	-411.53	-1.12	+05 52.7	-28.6	5 27 49.6
14 SA	-23 12 42	- 199	-412.65	-0.98	+05 24.1	-28.8	5 31 46.2
15 SU	-23 16 02	- 171	-413.64	-0.84	+04 55.3	-29.1	5 35 42.8
16 MO	-23 18 53	- 143	-414.48	-0.71	+04 26.2	-29.3	5 39 39.3
17 TU	-23 21 16	- 115	-415.19	-0.57	+03 57.0	-29.4	5 43 35.9
18 WE	-23 23 12	- 87	-415.76	-0.43	+03 27.5	-29.6	5 47 32.4
19 TH	-23 24 39	- 59	-416.19	-0.29	+02 58.0	-29.7	5 51 29.0
20 FR	-23 25 38	- 31	-416.48	-0.15	+02 28.3	-29.7	5 55 25.5
21 SA	-23 26 09	- 3	-416.64	-0.01	+01 58.5	-29.8	5 59 22.1
22 SU	-23 26 11	+ 26	-416.65	+0.13	+01 28.8	-29.8	6 03 18.6
23 MO	-23 25 45	+ 54	-416.52	+0.27	+00 59.0	-29.8	6 07 15.2
24 TU	-23 24 52	+ 82	-416.25	+0.40	+00 29.2	-29.7	6 11 11.8
25 WE	-23 23 29	+ 110	-415.85	+0.54	-00 00.5	-29.6	6 15 08.3
26 TH	-23 21 39	+ 139	-415.30	+0.69	-00 30.2	-29.5	6 19 04.9
27 FR	-23 19 20	+ 167	-414.62	+0.82	-00 59.7	-29.4	6 23 01.5
28 SA	-23 16 34	+ 195	-413.80	+0.96	-01 29.1	-29.2	6 26 58.0
29 SU	-23 13 19	+ 223	-412.83	+1.10	-01 58.3	-29.0	6 30 54.6
30 MO	-23 09 36	+ 250	-411.73	+1.23	-02 27.3	-28.8	6 34 51.1
31 TU	-23 05 26	+ 278	-410.50	+1.37	-02 56.1	-28.5	6 38 47.7
32 WE	-23 00 48		-409.12		-03 24.6		6 42 44.2

Table 2e. Sun, 1997, for zero hours universal time (GMT)

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
JAN 0 TU	-23 05 26		-410.50		-02 56.1		6	38	47.7
JAN 1 WE	-23 00 48	+ 278	-409.12	+1.37	-03 24.6	-28.5	6	42	44.2
2 TH	-22 55 42	+ 306	-407.61	+1.51	-03 52.8	-28.2	6	46	40.8
3 FR	-22 50 09	+ 333	-405.97	+1.64	-04 20.7	-27.9	6	50	37.3
4 SA	-22 44 08	+ 360	-404.19	+1.78	-04 48.3	-27.5	6	54	33.9
5 SU	-22 37 41	+ 388	-402.27	+1.92	-05 15.5	-27.2	6	58	30.4
6 MO	-22 30 46	+ 414	-400.23	+2.04	-05 42.2	-26.7	7	02	27.0
7 TU	-22 23 25	+ 441	-398.05	+2.18	-06 08.5	-26.3	7	06	23.6
8 WE	-22 15 37	+ 468	-395.74	+2.31	-06 34.3	-25.8	7	10	20.1
9 TH	-22 07 23	+ 494	-393.30	+2.44	-06 59.7	-25.3	7	14	16.7
10 FR	-21 58 44	+ 520	-390.73	+2.57	-07 24.5	-24.8	7	18	13.3
11 SA	-21 49 38	+ 546	-388.04	+2.70	-07 48.7	-24.2	7	22	09.8
12 SU	-21 40 07	+ 571	-385.22	+2.82	-08 12.3	-23.6	7	26	06.4
13 MO	-21 30 11	+ 596	-382.28	+2.94	-08 35.3	-23.0	7	30	02.9
14 TU	-21 19 50	+ 621	-379.21	+3.07	-08 57.7	-22.4	7	33	59.5
15 WE	-21 09 04	+ 646	-376.02	+3.19	-09 19.3	-21.7	7	37	56.0
16 TH	-20 57 54	+ 670	-372.71	+3.31	-09 40.3	-21.0	7	41	52.6
17 FR	-20 46 20	+ 694	-369.29	+3.43	-10 00.6	-20.3	7	45	49.1
18 SA	-20 34 23	+ 718	-365.74	+3.55	-10 20.2	-19.6	7	49	45.7
19 SU	-20 22 02	+ 741	-362.08	+3.66	-10 39.0	-18.8	7	53	42.2
20 MO	-20 09 18	+ 764	-358.31	+3.77	-10 57.1	-18.1	7	57	38.8
21 TU	-19 56 11	+ 787	-354.43	+3.89	-11 14.4	-17.3	8	01	35.4
22 WE	-19 42 42	+ 809	-350.43	+4.00	-11 31.0	-16.6	8	05	31.9
23 TH	-19 28 51	+ 831	-346.33	+4.10	-11 46.8	-15.8	8	09	28.5
24 FR	-19 14 39	+ 852	-342.12	+4.21	-12 01.8	-15.0	8	13	25.0
25 SA	-19 00 05	+ 874	-337.80	+4.32	-12 16.0	-14.2	8	17	21.6
26 SU	-18 45 11	+ 895	-333.39	+4.42	-12 29.4	-13.4	8	21	18.2
27 MO	-18 29 56	+ 915	-328.87	+4.52	-12 42.0	-12.6	8	25	14.7
28 TU	-18 14 20	+ 935	-324.25	+4.62	-12 53.9	-11.8	8	29	11.3
29 WE	-17 58 25	+ 955	-319.53	+4.72	-13 04.9	-11.0	8	33	07.8
30 TH	-17 42 11	+ 974	-314.72	+4.81	-13 15.1	-10.2	8	37	04.4
31 FR	-17 25 37	+ 993	-309.81	+4.90	-13 24.6	- 9.4	8	41	00.9
		+1012		+5.00		- 8.6			

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
FEB 1 SA	-17 08 45	+1030	-304.82	+5.09	-13 33.2	- 7.8	8 44 57.5
2 SU	-16 51 35	+1048	-299.73	+5.18	-13 41.0	- 7.0	8 48 54.0
3 MO	-16 34 07	+1065	-294.55	+5.26	-13 48.1	- 6.2	8 52 50.6
4 TU	-16 16 22	+1082	-289.29	+5.34	-13 54.3	- 5.5	8 56 47.1
5 WE	-15 58 20	+1099	-283.95	+5.43	-13 59.8	- 4.7	9 00 43.7
6 TH	-15 40 01	+1115	-278.52	+5.51	-14 04.4	- 3.9	9 04 40.3
7 FR	-15 21 26	+1130	-273.02	+5.58	-14 08.3	- 3.1	9 08 36.8
8 SA	-15 02 36	+1146	-267.43	+5.66	-14 11.4	- 2.3	9 12 33.4
9 SU	-14 43 30	+1160	-261.78	+5.73	-14 13.7	- 1.5	9 16 29.9
10 MO	-14 24 09	+1175	-256.05	+5.80	-14 15.1	- 0.7	9 20 26.5
11 TU	-14 04 34	+1189	-250.24	+5.87	-14 15.8	+ 0.1	9 24 23.0
12 WE	-13 44 46	+1202	-244.37	+5.94	-14 15.7	+ 0.9	9 28 19.6
13 TH	-13 24 43	+1215	-238.44	+6.00	-14 14.9	+ 1.6	9 32 16.1
14 FR	-13 04 28	+1228	-232.43	+6.06	-14 13.2	+ 2.4	9 36 12.7
15 SA	-12 44 00	+1240	-226.37	+6.12	-14 10.8	+ 3.1	9 40 09.2
16 SU	-12 23 20	+1252	-220.24	+6.18	-14 07.7	+ 3.9	9 44 05.8
17 MO	-12 02 27	+1264	-214.06	+6.24	-14 03.8	+ 4.6	9 48 02.3
18 TU	-11 41 24	+1275	-207.82	+6.30	-13 59.2	+ 5.3	9 51 58.9
19 WE	-11 20 09	+1285	-201.53	+6.35	-13 53.9	+ 6.0	9 55 55.5
20 TH	-10 58 44	+1295	-195.18	+6.40	-13 48.0	+ 6.6	9 59 52.0
21 FR	-10 37 08	+1305	-188.78	+6.44	-13 41.3	+ 7.3	10 03 48.6
22 SA	-10 15 23	+1315	-182.34	+6.49	-13 34.0	+ 7.9	10 07 45.1
23 SU	- 9 53 28	+1324	-175.84	+6.54	-13 26.1	+ 8.5	10 11 41.7
24 MO	- 9 31 25	+1332	-169.31	+6.58	-13 17.6	+ 9.1	10 15 38.2
25 TU	- 9 09 12	+1341	-162.73	+6.62	-13 08.5	+ 9.7	10 19 34.8
26 WE	- 8 46 52	+1349	-156.11	+6.66	-12 58.8	+10.3	10 23 31.3
27 TH	- 8 24 23	+1356	-149.45	+6.70	-12 48.5	+10.8	10 27 27.9
28 FR	- 8 01 47	+1363	-142.75	+6.73	-12 37.7	+11.3	10 31 24.4

Table 2a. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAR 1 SA	- 7 39 04	+1370	-136.02	+6.77	-12 26.4	+11.8	10 35 21.0
2 SU	- 7 16 14	+1376	-129.26	+6.80	-12 14.6	+12.3	10 39 17.5
3 MO	- 6 53 18	+1382	-122.46	+6.82	-12 02.4	+12.7	10 43 14.1
4 TU	- 6 30 16	+1388	-115.63	+6.85	-11 49.6	+13.2	10 47 10.6
5 WE	- 6 07 08	+1393	-108.78	+6.88	-11 36.5	+13.6	10 51 07.2
6 TH	- 5 43 56	+1397	-101.90	+6.90	-11 22.9	+14.0	10 55 03.7
7 FR	- 5 20 38	+1402	- 95.00	+6.92	-11 08.9	+14.4	10 59 00.3
8 SA	- 4 57 17	+1406	- 88.08	+6.94	-10 54.6	+14.7	11 02 56.8
9 SU	- 4 33 51	+1409	- 81.14	+6.96	-10 39.8	+15.1	11 06 53.4
10 MO	- 4 10 22	+1412	- 74.18	+6.97	-10 24.7	+15.4	11 10 49.9
11 TU	- 3 46 50	+1415	- 67.21	+6.99	-10 09.3	+15.8	11 14 46.5
12 WE	- 3 23 15	+1417	- 60.22	+7.00	-09 53.5	+16.1	11 18 43.0
13 TH	- 2 59 38	+1419	- 53.22	+7.01	-09 37.4	+16.4	11 22 39.6
14 FR	- 2 35 59	+1421	- 46.22	+7.02	-09 21.1	+16.6	11 26 36.1
15 SA	- 2 12 18	+1422	- 39.20	+7.02	-09 04.4	+16.9	11 30 32.7
16 SU	- 1 48 36	+1423	- 32.18	+7.03	-08 47.5	+17.1	11 34 29.2
17 MO	- 1 24 53	+1423	- 25.15	+7.03	-08 30.4	+17.4	11 38 25.8
18 TU	- 1 01 10	+1423	- 18.13	+7.03	-08 13.0	+17.5	11 42 22.4
19 WE	- 0 37 27	+1423	- 11.10	+7.03	-07 55.5	+17.7	11 46 18.9
20 TH	- 0 13 44	+1422	- 4.07	+7.02	-07 37.8	+17.9	11 50 15.5
21 FR	+ 0 09 58	+1421	+ 2.95	+7.02	-07 19.9	+18.0	11 54 12.0
22 SA	+ 0 33 39	+1420	+ 9.97	+7.01	-07 01.9	+18.1	11 58 08.6
23 SU	+ 0 57 19	+1418	+ 16.98	+7.00	-06 43.8	+18.2	12 02 05.1
24 MO	+ 1 20 57	+1416	+ 23.98	+6.99	-06 25.7	+18.2	12 06 01.7
25 TU	+ 1 44 33	+1414	+ 30.98	+6.98	-06 07.4	+18.3	12 09 58.2
26 WE	+ 2 08 06	+1411	+ 37.96	+6.97	-05 49.2	+18.3	12 13 54.8
27 TH	+ 2 31 37	+1408	+ 44.92	+6.95	-05 30.9	+18.2	12 17 51.3
28 FR	+ 2 55 05	+1405	+ 51.88	+6.94	-05 12.7	+18.2	12 21 47.9
29 SA	+ 3 18 30	+1401	+ 58.81	+6.92	-04 54.5	+18.1	12 25 44.4
30 SU	+ 3 41 51	+1397	+ 65.73	+6.90	-04 36.3	+18.1	12 29 41.0
31 MO	+ 4 05 07	+1392	+ 72.63	+6.87	-04 18.3	+18.0	12 33 37.5

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
APR 1 TU	+ 4 28 20	+1388	+ 79.50	+6.85	-04 00.3	+17.8	12 37 34.1
2 WE	+ 4 51 27	+1382	+ 86.36	+6.82	-03 42.5	+17.7	12 41 30.6
3 TH	+ 5 14 30	+1377	+ 93.18	+6.80	-03 24.8	+17.5	12 45 27.2
4 FR	+ 5 37 27	+1371	+ 99.98	+6.77	-03 07.3	+17.4	12 49 23.7
5 SA	+ 6 00 18	+1365	+106.75	+6.74	-02 49.9	+17.2	12 53 20.3
6 SU	+ 6 23 03	+1358	+113.49	+6.71	-02 32.8	+17.0	12 57 16.8
7 MO	+ 6 45 41	+1351	+120.20	+6.67	-02 15.8	+16.7	13 01 13.4
8 TU	+ 7 08 12	+1344	+126.88	+6.64	-01 59.1	+16.5	13 05 09.9
9 WE	+ 7 30 37	+1337	+133.51	+6.60	-01 42.6	+16.3	13 09 06.5
10 TH	+ 7 52 53	+1329	+140.11	+6.56	-01 26.3	+16.0	13 13 03.0
11 FR	+ 8 15 02	+1320	+146.67	+6.52	-01 10.3	+15.7	13 16 59.6
12 SA	+ 8 37 02	+1312	+153.19	+6.48	-00 54.6	+15.4	13 20 56.1
13 SU	+ 8 58 53	+1302	+159.67	+6.43	-00 39.1	+15.1	13 24 52.7
14 MO	+ 9 20 36	+1293	+166.10	+6.39	-00 24.0	+14.8	13 28 49.3
15 TU	+ 9 42 09	+1283	+172.49	+6.34	-00 09.1	+14.5	13 32 45.8
16 WE	+10 03 32	+1273	+178.83	+6.29	+00 05.4	+14.2	13 36 42.4
17 TH	+10 24 46	+1263	+185.11	+6.24	+00 19.5	+13.8	13 40 38.9
18 FR	+10 45 49	+1252	+191.35	+6.18	+00 33.3	+13.4	13 44 35.5
19 SA	+11 06 41	+1241	+197.54	+6.13	+00 46.7	+13.0	13 48 32.0
20 SU	+11 27 22	+1230	+203.66	+6.07	+00 59.7	+12.6	13 52 28.6
21 MO	+11 47 52	+1218	+209.74	+6.01	+01 12.3	+12.2	13 56 25.1
22 TU	+12 08 10	+1206	+215.75	+5.96	+01 24.5	+11.7	14 00 21.7
23 WE	+12 28 16	+1194	+221.71	+5.90	+01 36.2	+11.3	14 04 18.2
24 TH	+12 48 10	+1181	+227.60	+5.83	+01 47.5	+10.8	14 08 14.8
25 FR	+13 07 51	+1168	+233.44	+5.77	+01 58.3	+10.3	14 12 11.3
26 SA	+13 27 19	+1155	+239.21	+5.70	+02 08.6	+ 9.8	14 16 07.9
27 SU	+13 46 34	+1142	+244.91	+5.64	+02 18.4	+ 9.3	14 20 04.4
28 MO	+14 05 36	+1128	+250.55	+5.57	+02 27.7	+ 8.8	14 24 01.0
29 TU	+14 24 24	+1113	+256.12	+5.50	+02 36.4	+ 8.2	14 27 57.6
30 WE	+14 42 57	+1099	+261.62	+5.43	+02 44.7	+ 7.7	14 31 54.1

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
MAY 1 TH	+15 01 16	+1084	+267.04	+5.35	+02 52.3	+ 7.1	14 35 50.7
2 FR	+15 19 20	+1069	+272.40	+5.28	+02 59.4	+ 6.6	14 39 47.2
3 SA	+15 37 09	+1054	+277.68	+5.20	+03 06.0	+ 6.0	14 43 43.8
4 SU	+15 54 43	+1038	+282.88	+5.13	+03 12.0	+ 5.4	14 47 40.3
5 MO	+16 12 01	+1022	+288.00	+5.05	+03 17.4	+ 4.9	14 51 36.9
6 TU	+16 29 02	+1005	+293.05	+4.96	+03 22.3	+ 4.3	14 55 33.4
7 WE	+16 45 47	+ 988	+298.01	+4.88	+03 26.5	+ 3.7	14 59 30.0
8 TH	+17 02 16	+ 971	+302.89	+4.80	+03 30.3	+ 3.2	15 03 26.5
9 FR	+17 18 27	+ 954	+307.69	+4.71	+03 33.4	+ 2.6	15 07 23.1
10 SA	+17 34 21	+ 936	+312.40	+4.62	+03 36.0	+ 2.0	15 11 19.6
11 SU	+17 49 58	+ 918	+317.03	+4.53	+03 38.1	+ 1.5	15 15 16.2
12 MO	+18 05 16	+ 900	+321.56	+4.44	+03 39.5	+ 0.9	15 19 12.8
13 TU	+18 20 16	+ 882	+326.01	+4.36	+03 40.5	+ 0.4	15 23 09.3
14 WE	+18 34 58	+ 863	+330.36	+4.26	+03 40.8	- 0.2	15 27 05.9
15 TH	+18 49 21	+ 844	+334.62	+4.17	+03 40.6	- 0.7	15 31 02.4
16 FR	+19 03 24	+ 824	+338.79	+4.07	+03 39.9	- 1.3	15 34 59.0
17 SA	+19 17 09	+ 805	+342.86	+3.98	+03 38.6	- 1.8	15 38 55.5
18 SU	+19 30 33	+ 785	+346.83	+3.88	+03 36.8	- 2.4	15 42 52.1
19 MO	+19 43 38	+ 764	+350.70	+3.77	+03 34.5	- 2.9	15 46 48.6
20 TU	+19 56 22	+ 744	+354.48	+3.67	+03 31.6	- 3.4	15 50 45.2
21 WE	+20 08 46	+ 723	+358.15	+3.57	+03 28.1	- 4.0	15 54 41.7
22 TH	+20 20 49	+ 702	+361.72	+3.47	+03 24.2	- 4.5	15 58 38.3
23 FR	+20 32 32	+ 681	+365.19	+3.36	+03 19.7	- 5.0	16 02 34.9
24 SA	+20 43 53	+ 660	+368.56	+3.26	+03 14.7	- 5.5	16 06 31.4
25 SU	+20 54 53	+ 638	+371.82	+3.15	+03 09.2	- 6.0	16 10 28.0
26 MO	+21 05 31	+ 616	+374.97	+3.04	+03 03.1	- 6.5	16 14 24.5
27 TU	+21 15 47	+ 594	+378.01	+2.93	+02 56.6	- 7.0	16 18 21.1
28 WE	+21 25 42	+ 572	+380.95	+2.82	+02 49.6	- 7.5	16 22 17.7
29 TH	+21 35 14	+ 550	+383.77	+2.72	+02 42.1	- 8.0	16 26 14.2
30 FR	+21 44 24	+ 527	+386.49	+2.60	+02 34.1	- 8.4	16 30 10.8
31 SA	+21 53 11	+ 504	+389.09	+2.49	+02 25.7	- 8.9	16 34 07.3

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUN 1 SU	+22 01 36	+ 481	+391.58	+2.38	+02 16.8	- 9.3	16 38 03.9
2 MO	+22 09 37	+ 458	+393.96	+2.26	+02 07.6	- 9.7	16 42 00.4
3 TU	+22 17 15	+ 435	+396.22	+2.15	+01 57.9	-10.1	16 45 57.0
4 WE	+22 24 30	+ 411	+398.37	+2.03	+01 47.8	-10.4	16 49 53.5
5 TH	+22 31 22	+ 388	+400.40	+1.92	+01 37.4	-10.7	16 53 50.1
6 FR	+22 37 49	+ 364	+402.32	+1.80	+01 26.7	-11.0	16 57 46.6
7 SA	+22 43 53	+ 340	+404.12	+1.68	+01 15.6	-11.3	17 01 43.2
8 SU	+22 49 33	+ 316	+405.80	+1.56	+01 04.3	-11.6	17 05 39.8
9 MO	+22 54 50	+ 292	+407.36	+1.44	+00 52.7	-11.8	17 09 36.3
10 TU	+22 59 41	+ 268	+408.80	+1.32	+00 40.9	-12.0	17 13 32.9
11 WE	+23 04 09	+ 243	+410.12	+1.20	+00 28.8	-12.2	17 17 29.4
12 TH	+23 08 12	+ 219	+411.32	+1.08	+00 16.6	-12.4	17 21 26.0
13 FR	+23 11 51	+ 194	+412.40	+0.96	+00 04.2	-12.5	17 25 22.5
14 SA	+23 15 05	+ 170	+413.36	+0.84	-00 08.4	-12.7	17 29 19.1
15 SU	+23 17 55	+ 145	+414.20	+0.72	-00 21.0	-12.8	17 33 15.7
16 MO	+23 20 19	+ 120	+414.91	+0.59	-00 33.8	-12.8	17 37 12.2
17 TU	+23 22 19	+ 95	+415.50	+0.47	-00 46.6	-12.9	17 41 08.8
18 WE	+23 23 55	+ 71	+415.97	+0.35	-00 59.5	-12.9	17 45 05.3
19 TH	+23 25 05	+ 46	+416.32	+0.23	-01 12.5	-13.0	17 49 01.9
20 FR	+23 25 51	+ 21	+416.55	+0.10	-01 25.4	-13.0	17 52 58.4
21 SA	+23 26 12	- 4	+416.65	-0.02	-01 38.4	-12.9	17 56 55.0
22 SU	+23 26 08	- 29	+416.63	-0.14	-01 51.3	-12.9	18 00 51.6
23 MO	+23 25 40	- 53	+416.49	-0.26	-02 04.2	-12.8	18 04 48.1
24 TU	+23 24 46	- 78	+416.23	-0.39	-02 17.0	-12.8	18 08 44.7
25 WE	+23 23 28	- 103	+415.84	-0.51	-02 29.8	-12.7	18 12 41.2
26 TH	+23 21 45	- 128	+415.34	-0.63	-02 42.4	-12.5	18 16 37.8
27 FR	+23 19 38	- 152	+414.71	-0.75	-02 55.0	-12.4	18 20 34.3
28 SA	+23 17 06	- 177	+413.95	-0.87	-03 07.4	-12.2	18 24 30.9
29 SU	+23 14 09	- 201	+413.08	-0.99	-03 19.6	-12.0	18 28 27.4
30 MO	+23 10 48	- 225	+412.09	-1.11	-03 31.6	-11.8	18 32 24.0

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION			EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS			
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
JUL 1 TU	+23 07 03	- 250	+410.98	-1.23	-03 43.5	-11.6	18 36 20.6
2 WE	+23 02 53	- 274	+409.74	-1.35	-03 55.1	-11.3	18 40 17.1
3 TH	+22 58 19	- 298	+408.39	-1.47	-04 06.4	-11.0	18 44 13.7
4 FR	+22 53 21	- 322	+406.92	-1.59	-04 17.4	-10.7	18 48 10.2
5 SA	+22 47 59	- 346	+405.33	-1.71	-04 28.2	-10.4	18 52 06.8
6 SU	+22 42 14	- 369	+403.62	-1.82	-04 38.6	-10.0	18 56 03.4
7 MO	+22 36 05	- 393	+401.80	-1.94	-04 48.6	- 9.7	18 59 59.9
8 TU	+22 29 32	- 416	+399.86	-2.05	-04 58.2	- 9.2	19 03 56.5
9 WE	+22 22 36	- 439	+397.81	-2.17	-05 07.5	- 8.8	19 07 53.0
10 TH	+22 15 17	- 462	+395.64	-2.28	-05 16.3	- 8.4	19 11 49.6
11 FR	+22 07 35	- 485	+393.36	-2.40	-05 24.7	- 7.9	19 15 46.1
12 SA	+21 59 30	- 507	+390.96	-2.50	-05 32.6	- 7.4	19 19 42.7
13 SU	+21 51 03	- 530	+388.46	-2.62	-05 40.1	- 7.0	19 23 39.2
14 MO	+21 42 13	- 552	+385.84	-2.73	-05 47.0	- 6.4	19 27 35.8
15 TU	+21 33 01	- 574	+383.11	-2.83	-05 53.5	- 5.9	19 31 32.3
16 WE	+21 23 26	- 596	+380.28	-2.94	-05 59.4	- 5.4	19 35 28.9
17 TH	+21 13 31	- 617	+377.34	-3.05	-06 04.8	- 4.9	19 39 25.5
18 FR	+21 03 13	- 639	+374.29	-3.16	-06 09.7	- 4.3	19 43 22.0
19 SA	+20 52 34	- 660	+371.13	-3.26	-06 14.0	- 3.8	19 47 18.6
20 SU	+20 41 34	- 681	+367.87	-3.36	-06 17.8	- 3.2	19 51 15.1
21 MO	+20 30 14	- 701	+364.51	-3.46	-06 21.0	- 2.6	19 55 11.7
22 TU	+20 18 32	- 722	+361.05	-3.57	-06 23.6	- 2.1	19 59 08.3
23 WE	+20 06 30	- 742	+357.48	-3.66	-06 25.7	- 1.5	20 03 04.8
24 TH	+19 54 08	- 762	+353.82	-3.76	-06 27.2	- 1.0	20 07 01.4
25 FR	+19 41 26	- 782	+350.06	-3.86	-06 28.2	- 0.4	20 10 57.9
26 SA	+19 28 25	- 801	+346.20	-3.96	-06 28.6	+ 0.2	20 14 54.5
27 SU	+19 15 04	- 820	+342.24	-4.05	-06 28.4	+ 0.8	20 18 51.0
28 MO	+19 01 23	- 839	+338.19	-4.14	-06 27.6	+ 1.4	20 22 47.6
29 TU	+18 47 24	- 858	+334.05	-4.24	-06 26.3	+ 1.9	20 26 44.1
30 WE	+18 33 07	- 876	+329.81	-4.33	-06 24.3	+ 2.5	20 30 40.7
31 TH	+18 18 31	- 894	+325.48	-4.41	-06 21.8	+ 3.1	20 34 37.2

Table 2a. Sun, 1997, for zero hours universal time (GMT) – continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
AUG 1 FR	+18 03 37	- 912	+321.07	-4.50	-06 18.7	+ 3.7	20	38	33.8
2 SA	+17 48 25	- 929	+316.57	-4.59	-06 14.9	+ 4.3	20	42	30.4
3 SU	+17 32 56	- 946	+311.98	-4.67	-06 10.6	+ 4.9	20	46	26.9
4 MO	+17 17 10	- 963	+307.31	-4.76	-06 05.7	+ 5.5	20	50	23.5
5 TU	+17 01 07	- 979	+302.55	-4.83	-06 00.1	+ 6.1	20	54	20.0
6 WE	+16 44 47	- 996	+297.72	-4.92	-05 54.0	+ 6.7	20	58	16.6
7 TH	+16 28 12	-1011	+292.80	-4.99	-05 47.3	+ 7.3	21	02	13.1
8 FR	+16 11 20	-1027	+287.80	-5.07	-05 39.9	+ 7.9	21	06	09.7
9 SA	+15 54 13	-1042	+282.73	-5.15	-05 32.0	+ 8.5	21	10	06.2
10 SU	+15 36 51	-1057	+277.58	-5.22	-05 23.4	+ 9.1	21	14	02.8
11 MO	+15 19 14	-1072	+272.36	-5.29	-05 14.3	+ 9.7	21	17	59.3
12 TU	+15 01 22	-1086	+267.07	-5.36	-05 04.6	+10.3	21	21	55.9
13 WE	+14 43 15	-1100	+261.71	-5.43	-04 54.3	+10.9	21	25	52.4
14 TH	+14 24 55	-1114	+256.27	-5.50	-04 43.4	+11.4	21	29	49.0
15 FR	+14 06 21	-1127	+250.77	-5.57	-04 32.0	+12.0	21	33	45.6
16 SA	+13 47 34	-1140	+245.20	-5.63	-04 20.0	+12.5	21	37	42.1
17 SU	+13 28 34	-1153	+239.57	-5.69	-04 07.5	+13.0	21	41	38.7
18 MO	+13 09 20	-1166	+233.88	-5.76	-03 54.4	+13.5	21	45	35.2
19 TU	+12 49 55	-1178	+228.12	-5.82	-03 40.9	+14.0	21	49	31.8
20 WE	+12 30 17	-1190	+222.31	-5.88	-03 26.9	+14.5	21	53	28.3
21 TH	+12 10 27	-1201	+216.43	-5.93	-03 12.4	+14.9	21	57	24.9
22 FR	+11 50 26	-1213	+210.50	-5.99	-02 57.4	+15.4	22	01	21.4
23 SA	+11 30 13	-1224	+204.51	-6.04	-02 42.0	+15.8	22	05	18.0
24 SU	+11 09 49	-1234	+198.47	-6.09	-02 26.2	+16.2	22	09	14.5
25 MO	+10 49 15	-1245	+192.37	-6.15	-02 10.0	+16.6	22	13	11.1
26 TU	+10 28 30	-1255	+186.22	-6.20	-01 53.4	+17.0	22	17	07.6
27 WE	+10 07 35	-1265	+180.03	-6.25	-01 36.4	+17.3	22	21	04.2
28 TH	+ 9 46 31	-1274	+173.78	-6.29	-01 19.1	+17.7	22	25	00.8
29 FR	+ 9 25 17	-1283	+167.49	-6.34	-01 01.4	+18.0	22	28	57.3
30 SA	+ 9 03 54	-1292	+161.16	-6.38	-00 43.3	+18.4	22	32	53.9
31 SU	+ 8 42 22	-1300	+154.78	-6.42	-00 25.0	+18.7	22	36	50.4

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
SEP 1 MO	+ 8 20 42	-1308	+148.36	-6.46	-00 06.3	+19.0	22 40 47.0
2 TU	+ 7 58 54	-1316	+141.90	-6.50	+00 12.7	+19.3	22 44 43.5
3 WE	+ 7 36 58	-1323	+135.40	-6.53	+00 31.9	+19.5	22 48 40.1
4 TH	+ 7 14 55	-1330	+128.87	-6.57	+00 51.4	+19.8	22 52 36.6
5 FR	+ 6 52 45	-1337	+122.30	-6.60	+01 11.2	+20.0	22 56 33.2
6 SA	+ 6 30 28	-1343	+115.70	-6.63	+01 31.2	+20.2	23 00 29.7
7 SU	+ 6 08 05	-1349	+109.06	-6.66	+01 51.5	+20.5	23 04 26.3
8 MO	+ 5 45 36	-1355	+102.40	-6.69	+02 11.9	+20.6	23 08 22.8
9 TU	+ 5 23 01	-1360	+ 95.71	-6.72	+02 32.6	+20.8	23 12 19.4
10 WE	+ 5 00 20	-1365	+ 88.99	-6.74	+02 53.4	+21.0	23 16 15.9
11 TH	+ 4 37 35	-1370	+ 82.25	-6.77	+03 14.4	+21.1	23 20 12.5
12 FR	+ 4 14 45	-1374	+ 75.48	-6.79	+03 35.5	+21.2	23 24 09.0
13 SA	+ 3 51 50	-1378	+ 68.69	-6.80	+03 56.8	+21.3	23 28 05.6
14 SU	+ 3 28 52	-1382	+ 61.89	-6.82	+04 18.1	+21.4	23 32 02.1
15 MO	+ 3 05 50	-1386	+ 55.06	-6.84	+04 39.5	+21.5	23 35 58.7
16 TU	+ 2 42 44	-1389	+ 48.22	-6.86	+05 01.0	+21.5	23 39 55.2
17 WE	+ 2 19 35	-1392	+ 41.36	-6.87	+05 22.4	+21.5	23 43 51.8
18 TH	+ 1 56 24	-1394	+ 34.49	-6.88	+05 43.9	+21.5	23 47 48.3
19 FR	+ 1 33 10	-1396	+ 27.60	-6.89	+06 05.4	+21.4	23 51 44.9
20 SA	+ 1 09 54	-1398	+ 20.71	-6.90	+06 26.8	+21.3	23 55 41.4
21 SU	+ 0 46 36	-1400	+ 13.81	-6.91	+06 48.1	+21.2	23 59 38.0
22 MO	+ 0 23 16	-1401	+ 6.89	-6.92	+07 09.4	+21.1	0 03 34.5
23 TU	- 0 00 05	-1402	- 0.02	-6.92	+07 30.5	+21.0	0 07 31.1
24 WE	- 0 23 27	-1402	- 6.95	-6.92	+07 51.5	+20.8	0 11 27.7
25 TH	- 0 46 49	-1402	- 13.87	-6.92	+08 12.3	+20.6	0 15 24.2
26 FR	- 1 10 11	-1402	- 20.80	-6.92	+08 32.9	+20.4	0 19 20.8
27 SA	- 1 33 33	-1402	- 27.72	-6.92	+08 53.4	+20.2	0 23 17.3
28 SU	- 1 56 55	-1401	- 34.64	-6.92	+09 13.6	+20.0	0 27 13.9
29 MO	- 2 20 16	-1400	- 41.56	-6.91	+09 33.6	+19.7	0 31 10.4
30 TU	- 2 43 35	-1398	- 48.47	-6.90	+09 53.4	+19.5	0 35 07.0

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
OCT 1 WE	- 3 06 53	-1396	- 55.37	-6.89	+10 12.8	+19.2	0	39	03.5
2 TH	- 3 30 09	-1394	- 62.27	-6.88	+10 32.0	+18.9	0	43	00.1
3 FR	- 3 53 23	-1391	- 69.15	-6.87	+10 50.9	+18.6	0	46	56.6
4 SA	- 4 16 34	-1388	- 76.02	-6.85	+11 09.5	+18.2	0	50	53.2
5 SU	- 4 39 41	-1384	- 82.87	-6.83	+11 27.7	+17.9	0	54	49.7
6 MO	- 5 02 46	-1381	- 89.71	-6.82	+11 45.6	+17.5	0	58	46.3
7 TU	- 5 25 46	-1376	- 96.53	-6.80	+12 03.1	+17.1	1	02	42.8
8 WE	- 5 48 43	-1372	-103.32	-6.78	+12 20.2	+16.7	1	06	39.4
9 TH	- 6 11 34	-1367	-110.10	-6.75	+12 36.9	+16.3	1	10	35.9
10 FR	- 6 34 21	-1361	-116.85	-6.72	+12 53.2	+15.8	1	14	32.5
11 SA	- 6 57 03	-1356	-123.57	-6.70	+13 09.1	+15.4	1	18	29.0
12 SU	- 7 19 38	-1350	-130.26	-6.67	+13 24.5	+14.9	1	22	25.6
13 MO	- 7 42 08	-1343	-136.93	-6.63	+13 39.4	+14.4	1	26	22.1
14 TU	- 8 04 31	-1336	-143.56	-6.60	+13 53.7	+13.9	1	30	18.7
15 WE	- 8 26 48	-1329	-150.16	-6.56	+14 07.6	+13.3	1	34	15.2
16 TH	- 8 48 57	-1322	-156.72	-6.53	+14 20.9	+12.7	1	38	11.8
17 FR	- 9 10 58	-1314	-163.25	-6.49	+14 33.7	+12.2	1	42	08.3
18 SA	- 9 32 52	-1306	-169.74	-6.45	+14 45.8	+11.5	1	46	04.9
19 SU	- 9 54 38	-1297	-176.19	-6.40	+14 57.4	+10.9	1	50	01.4
20 MO	-10 16 15	-1288	-182.59	-6.36	+15 08.3	+10.2	1	53	58.0
21 TU	-10 37 43	-1279	-188.95	-6.32	+15 18.5	+ 9.6	1	57	54.6
22 WE	-10 59 01	-1269	-195.27	-6.27	+15 28.1	+ 8.9	2	01	51.1
23 TH	-11 20 10	-1259	-201.53	-6.22	+15 37.0	+ 8.2	2	05	47.7
24 FR	-11 41 09	-1248	-207.75	-6.16	+15 45.1	+ 7.5	2	09	44.2
25 SA	-12 01 57	-1237	-213.91	-6.11	+15 52.6	+ 6.7	2	13	40.8
26 SU	-12 22 34	-1226	-220.02	-6.05	+15 59.3	+ 6.0	2	17	37.3
27 MO	-12 43 00	-1214	-226.07	-6.00	+16 05.3	+ 5.2	2	21	33.9
28 TU	-13 03 14	-1202	-232.07	-5.94	+16 10.5	+ 4.5	2	25	30.4
29 WE	-13 23 16	-1189	-238.00	-5.87	+16 15.0	+ 3.7	2	29	27.0
30 TH	-13 43 05	-1176	-243.88	-5.81	+16 18.7	+ 2.9	2	33	23.5
31 FR	-14 02 41	-1163	-249.68	-5.74	+16 21.6	+ 2.1	2	37	20.1

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME
	DEGREES		MILS				
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC
NOV 1 SA	-14 22 04	-1149	-255.43	-5.67	+16 23.7	+ 1.3	2 41 16.6
2 SU	-14 41 13	-1135	-261.10	-5.60	+16 25.1	+ 0.5	2 45 13.2
3 MO	-15 00 07	-1120	-266.70	-5.53	+16 25.6	- 0.3	2 49 09.7
4 TU	-15 18 47	-1105	-272.23	-5.46	+16 25.3	- 1.1	2 53 06.3
5 WE	-15 37 12	-1089	-277.69	-5.38	+16 24.2	- 1.9	2 57 02.9
6 TH	-15 55 22	-1073	-283.07	-5.30	+16 22.3	- 2.7	3 00 59.4
7 FR	-16 13 15	-1057	-288.37	-5.22	+16 19.6	- 3.5	3 04 56.0
8 SA	-16 30 52	-1040	-293.59	-5.14	+16 16.1	- 4.3	3 08 52.5
9 SU	-16 48 13	-1023	-298.73	-5.05	+16 11.8	- 5.2	3 12 49.1
10 MO	-17 05 16	-1006	-303.78	-4.97	+16 06.6	- 6.0	3 16 45.6
11 TU	-17 22 02	- 988	-308.75	-4.88	+16 00.6	- 6.8	3 20 42.2
12 WE	-17 38 29	- 969	-313.63	-4.79	+15 53.8	- 7.7	3 24 38.7
13 TH	-17 54 39	- 951	-318.41	-4.70	+15 46.1	- 8.5	3 28 35.3
14 FR	-18 10 29	- 932	-323.11	-4.60	+15 37.6	- 9.4	3 32 31.8
15 SA	-18 26 01	- 912	-327.71	-4.50	+15 28.2	-10.2	3 36 28.4
16 SU	-18 41 13	- 892	-332.21	-4.40	+15 18.0	-11.0	3 40 25.0
17 MO	-18 56 05	- 872	-336.62	-4.31	+15 07.0	-11.9	3 44 21.5
18 TU	-19 10 37	- 851	-340.92	-4.20	+14 55.1	-12.7	3 48 18.1
19 WE	-19 24 49	- 831	-345.13	-4.10	+14 42.3	-13.6	3 52 14.6
20 TH	-19 38 39	- 809	-349.23	-4.00	+14 28.8	-14.4	3 56 11.2
21 FR	-19 52 08	- 788	-353.23	-3.89	+14 14.4	-15.2	4 00 07.8
22 SA	-20 05 16	- 766	-357.12	-3.78	+13 59.1	-16.0	4 04 04.3
23 SU	-20 18 02	- 743	-360.90	-3.67	+13 43.1	-16.8	4 08 00.9
24 MO	-20 30 25	- 720	-364.57	-3.56	+13 26.2	-17.6	4 11 57.4
25 TU	-20 42 25	- 697	-368.12	-3.44	+13 08.6	-18.4	4 15 54.0
26 WE	-20 54 02	- 674	-371.57	-3.33	+12 50.2	-19.2	4 19 50.5
27 TH	-21 05 16	- 650	-374.90	-3.21	+12 31.0	-19.9	4 23 47.1
28 FR	-21 16 07	- 626	-378.11	-3.09	+12 11.1	-20.6	4 27 43.6
29 SA	-21 26 33	- 602	-381.20	-2.97	+11 50.5	-21.3	4 31 40.2
30 SU	-21 36 35	- 577	-384.17	-2.85	+11 29.2	-22.0	4 35 36.7

Table 2e. Sun, 1997, for zero hours universal time (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS						
	° ′ ″	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)	MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
DEC 1 MO	-21 46 12	- 552	-387.02	-2.73	+11 07.2	-22.6	4	39	33.3
2 TU	-21 55 24	- 527	-389.75	-2.60	+10 44.5	-23.3	4	43	29.9
3 WE	-22 04 11	- 501	-392.35	-2.47	+10 21.3	-23.8	4	47	26.4
4 TH	-22 12 32	- 476	-394.83	-2.35	+09 57.4	-24.4	4	51	23.0
5 FR	-22 20 28	- 450	-397.17	-2.22	+09 33.0	-25.0	4	55	19.5
6 SA	-22 27 57	- 423	-399.39	-2.09	+09 08.1	-25.5	4	59	16.1
7 SU	-22 35 01	- 397	-401.49	-1.96	+08 42.6	-25.9	5	03	12.7
8 MO	-22 41 37	- 370	-403.44	-1.83	+08 16.7	-26.4	5	07	09.2
9 TU	-22 47 47	- 343	-405.27	-1.69	+07 50.3	-26.8	5	11	05.8
10 WE	-22 53 30	- 316	-406.97	-1.56	+07 23.4	-27.2	5	15	02.3
11 TH	-22 58 46	- 289	-408.52	-1.43	+06 56.2	-27.6	5	18	58.9
12 FR	-23 03 35	- 261	-409.95	-1.29	+06 28.6	-28.0	5	22	55.4
13 SA	-23 07 56	- 234	-411.24	-1.16	+06 00.7	-28.3	5	26	52.0
14 SU	-23 11 50	- 206	-412.39	-1.02	+05 32.4	-28.6	5	30	48.5
15 MO	-23 15 15	- 178	-413.41	-0.88	+05 03.8	-28.8	5	34	45.1
16 TU	-23 18 14	- 150	-414.29	-0.74	+04 35.0	-29.1	5	38	41.7
17 WE	-23 20 44	- 122	-415.03	-0.60	+04 05.9	-29.3	5	42	38.2
18 TH	-23 22 46	- 94	-415.63	-0.46	+03 36.6	-29.5	5	46	34.8
19 FR	-23 24 20	- 66	-416.10	-0.33	+03 07.1	-29.6	5	50	31.3
20 SA	-23 25 26	- 38	-416.42	-0.19	+02 37.5	-29.7	5	54	27.9
21 SU	-23 26 03	- 9	-416.61	-0.04	+02 07.7	-29.8	5	58	24.5
22 MO	-23 26 13	+ 19	-416.66	+0.09	+01 37.9	-29.9	6	02	21.0
23 TU	-23 25 54	+ 47	-416.56	+0.23	+01 08.0	-29.9	6	06	17.6
24 WE	-23 25 07	+ 75	-416.33	+0.37	+00 38.1	-29.9	6	10	14.1
25 TH	-23 23 52	+ 104	-415.96	+0.51	+00 08.3	-29.8	6	14	10.7
26 FR	-23 22 08	+ 132	-415.45	+0.65	-00 21.5	-29.7	6	18	07.2
27 SA	-23 19 56	+ 160	-414.80	+0.79	-00 51.2	-29.6	6	22	03.8
28 SU	-23 17 17	+ 188	-414.01	+0.93	-01 20.8	-29.4	6	26	00.3
29 MO	-23 14 09	+ 216	-413.08	+1.07	-01 50.3	-29.2	6	29	56.9
30 TU	-23 10 33	+ 244	-412.02	+1.20	-02 19.5	-29.0	6	33	53.5
31 WE	-23 06 30	+ 271	-410.81	+1.34	-02 48.4	-28.7	6	37	50.0
32 TH	-23 01 58		-409.47		-03 17.1		6	41	46.6

Table 6a. Grid convergence nomograph

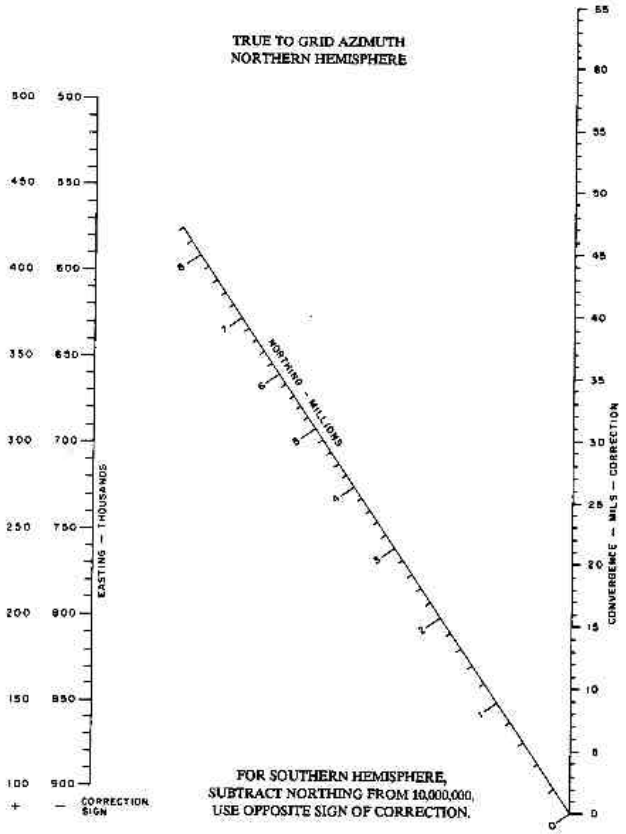

Table 9. Alphabetical star list

STAR	CONSTELLATION	NUMBER	MAGNITUDE
Acamar, Theta (θ) Eridani	Eridanus	12	3.4
Achernar, Alpha (α) Eridani	Eridanus	9	0.6
Acrux, Alpha (α) Crucis	Crux	42	1.0
Adhara, Epsilon (ε) Canis Majoris	Canis Major	26	1.6
Aldebaran, Alpha (α) Tauri	Taurus	15	1.1
Alhena, Gamma (γ) Geminorum*	Gemini	24	1.9
Alioth, Epsilon (ε) Ursae Majoris	Ursa Major	45	1.7
Alkaid (Benetnasch), Eta (η) Ursae Majoris	Ursa Major	48	1.9
Al Na'ir, Alpha (α) Gruis	Grus	71	2.2
Alnilam, Epsilon (ε) Orionis	Orion	20	1.7
Alnitak, Zeta (ζ) Orionis*	Orion	21	2.0
Alpha (α) Ceti, Menkar**	Cetus	13	2.8
Alpha (α) Persei, Mirfak	Perseus	44	1.9
Alpha (α) Tri Aust, Atria	Triangulum Australe	58	1.9
Alphard, Alpha (α) Hydrae	Hydra	35	2.2
Alphecca, Alpha (α) Coronae Bor	Corona Borealis	55	2.3
Alpheratz, Alpha (α) Andromedae	Andromeda	1	2.1
(Al Suhail) Suhail, Lambda (λ) Velorum	Vela (Argo)	33	2.2
Altair, Alpha (α) Aquilae	Aquila	66	0.9
Ankaa, Alpha (α) Phoenicis**	Phoenix	4	2.4
Antares, Alpha (α) Scorpii	Scorpius	57	1.2
Arcturus, Alpha (α) Bootis	Bootes	51	0.2
Atria, Alpha (α) Tri Aust	Triangulum Australe	58	1.9
Avior, Epsilon (ε) Carinae	Carina (Argo, Vela)	32	1.7
Bellatrix, Gamma (γ) Orionis	Orion	18	1.7
Beta (β) Centauri, Hadar	Centaurus	49	0.9
Beta (β) Crucis, Mimosa*	Crux	44	1.5
Beta (β) Hydrus	Hydra	3	2.9
Betelgeuse (Betelgeux), Alpha (α) Orionis	Orion	22	0.1
Canopus, Alpha (α) Carinae	Carina (Argo, Vela)	23	-0.9
Capella, Alpha (α) Aurigae	Auriga	17	0.2
Caph, Beta (β) Cassiopeiae*	Cassiopeia	2	2.4
Castor, Alpha (α) Geminorum*	Gemini	28	1.6
Delta (δ) Canis Majoris, Wezen*	Canis Major	27	2.0
Deneb, Alpha (α) Cygni	Cygnus	68	1.3
Denebola, Beta (β) Leonis	Leo	39	2.2
Diphda (Deneb Kaitos), Beta (β) Ceti	Cetus	6	2.2
Dschubba, Delta (δ) Scorpii**	Scorpius	56	2.5
Dubhe, Alpha (α) Ursae Majoris	Ursa Major	38	1.9
Elnath (El Nath), Beta (β) Tauri	Taurus	19	1.8
Eltanin (Eltanin), Gamma (γ) Draconis	Draco	62	2.4
Enif, Epsilon (ε) Pegasi	Pegasus	70	2.5
Epsilon (ε) Carinae, Avior	Carina (Argo, Vela)	32	1.7
Fomalhaut, Alpha (α) Piscis Austrini	Piscis Austrinus	72	1.3
Gacrux, Gamma (γ) Crucis	Crux	43	1.6
Gamma (γ) Cassiopeiae*	Cassiopeia	7	1.6-2.8
Gamma (γ) Velorum (Gamma Argus)*	Vela (Argo)	31	1.9
Gamma (γ) Geminorum, Alhena*	Gemini	24	1.9
Gienah, Gamma (γ) Corvi**	Corvus	41	2.8
Hadar, Beta (β) Centauri	Centaurus	49	0.9
Hamal, Alpha (α) Arietis	Aries	11	2.2
Kaus Australis, Epsilon (ε) Sagittarii	Sagittarius	63	1.9

Table 9. Alphabetical star list - continued

STAR	CONSTELLATION	NUMBER	MAGNITUDE
Kochab, Beta (β) Ursae Minoris	Ursa Minor	54	2.2
Markab, Alpha (α) Pegasi	Pegasus	73	2.6
Menkar, Alpha (α) Ceti**	Cetus	43	2.8
Menkent, Theta (θ) Centauri	Centaurus	50	2.3
Merak, Beta (β) Ursae Majoris*	Ursa Major	37	2.4
Misplacidus, Beta (β) Carinae	Carina (Argo)	34	1.8
Mimosa, Beta (β) Crucis*	Crux	44	1.3
Mirfak (Marfak), Alpha (α) Persei	Perseus	14	1.9
Mizar, Zeta (ζ) Ursae Majoris*	Ursa Major	46	2.4
Nunki, Sigma (σ) Sagittarii	Sagittarius	65	2.1
(Octantis) Nu (ν) Octantis***	Octans	69	3.7
Peacock, Alpha (α) Pavonis	Pavo	67	2.1
Phecda, Gamma (γ) Ursae Majoris*	Ursa Major	40	2.5
Polaris, Alpha (α) Ursae Minoris***	Ursa Minor	10	2.1
Pollux, Beta (β) Geminorum	Gemini	30	1.2
Procyon, Alpha (α) Canis Minoris	Canis Minor	29	0.5
Rasalhague, Alpha (α) Ophiuchi	Ophiuchus	61	2.1
Regulus, Alpha (α) Leonis	Leo	36	1.3
Rigel, Beta (β) Orionis	Orion	16	0.3
Rigil Kentaurus, Alpha (α) Centauri	Centaurus	52	0.1
Ruchbah, Delta (δ) Cassiopeiae*	Cassiopeia	8	2.8
Sabik, Eta (η) Ophiuchi	Ophiuchus	59	2.6
Scaula (Shaula), Lambda (λ) Scorpii	Scorpius	60	1.7
Schedar (Schedir), Alpha (α) Cassiopeiae	Cassiopeia	5	2.3
Sirius, Alpha (α) Canis Majoris	Canis Major	25	-1.6
Spica, Alpha (α) Virginis	Virgo	47	1.2
Suhail (Al Suhail), Lambda (λ) Velorum	Vela (Argo)	33	2.2
Theta (θ) Centauri, Menkent	Centaurus	50	2.3
Vega, Alpha (α) Lyrae	Lyra	64	0.1
Wezen, Delta (δ) Canis Majoris*	Canis Major	27	2.0
Zeta (ζ) Orionis, Alnitak*	Orion	21	2.0
Zebenelgenubi, Alpha (α) Librae**	Libra	53	2.9

Note. Sirius (magnitude −1.6) is the brightest star listed. Octantis (magnitude −3.7) is the dimmist star listed. Brightness of other stars listed is indicated by their magnitude.

Spelled out names in parentheses are names sometimes used but not recommended.

*Indicates star not on identifier 2012D.

**Indicates star not on identifier 2012C.

***Indicates star not on either identifier.

The constellation Argus has been replaced by its three modern divisions Carina, Puppis, and Vela.

Table 10a(1). Apparent places of stars, 1993 (degrees)

Star No.	Right Ascension (Hr Min) / Declination (° ′)		ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
			Seconds (time of RA or arc of declination)												
1	RA	00 08	2.4 22	2.0 18	1.8 14	1.9 09	2.4 08	3.3 09	4.4 14	5.4 22	6.0 29	6.3 36	6.2 40	6.0 42	5.5 41
	DEC	29 03													
2	RA	00 08	49.0 64	48.1 60	47.6 53	47.7 45	48.5 39	49.8 37	51.4 40	52.9 48	53.9 57	54.2 67	54.0 76	53.4 82	52.5 83
	DEC	59 06													
3	RA	00 25	23.3 51	20.7 46	19.2 37	18.8 26	19.8 15	22.1 06	25.0 01	28.1 01	30.5 07	31.3 16	30.4 25	28.2 31	25.5 32
	DEC	-77 17													
4	RA	00 25	57.1 47	56.6 45	56.2 40	56.2 32	56.7 23	57.3 14	58.6 08	59.8 05	60.6 07	61.0 13	60.8 20	60.4 26	59.8 28
	DEC	-42 20													
5	RA	00 40	7.8 80	6.9 77	6.4 71	6.3 63	6.9 57	8.0 54	9.5 56	11.0 63	12.1 72	12.6 81	12.6 90	12.2 96	11.4 98
	DEC	56 29													
6	RA	00 43	15.3 31	14.9 32	14.7 31	14.7 26	15.0 20	15.7 13	16.7 07	17.6 02	18.4 00	18.7 02	18.7 06	18.5 10	18.2 13
	DEC	-18 01													
7	RA	00 56	18.6 68	17.6 65	16.8 60	16.6 52	17.2 45	18.5 41	20.1 43	21.7 48	23.0 57	23.7 67	23.8 76	23.4 83	22.5 86
	DEC	60 40													
8	RA	01 25	23.3 79	22.3 78	21.5 73	21.2 66	21.5 59	22.7 54	24.2 54	25.9 59	27.3 67	28.2 76	28.5 85	28.2 92	27.5 96
	DEC	60 11													
9	RA	01 37	28.5 92	27.4 92	26.6 87	26.1 78	26.2 67	26.9 57	28.1 49	29.5 45	30.8 47	31.5 53	31.7 63	31.2 71	30.4 75
	DEC	-57 15													
10	See Table 11a. Apparent places of Polaris, 1993														
11	RA	02 06	48.4 58	48.0 56	47.6 53	47.4 51	47.5 49	48.1 49	49.0 52	50.0 57	50.9 63	51.6 67	51.9 70	52.0 72	51.8 72
	DEC	25 25													
12	RA	02 57	61.5 66	60.9 69	60.2 68	59.6 63	59.4 55	59.7 45	60.5 36	61.5 30	62.6 28	63.4 31	63.9 39	63.9 47	63.6 54
	DEC	-48 19													
13	RA	03 01	56.7 48	56.3 46	55.9 45	55.6 45	55.5 46	55.9 50	56.6 54	57.5 59	58.4 63	59.1 65	59.4 64	59.2 62	59.7 60
	DEC	04 03													
14	RA	03 23	52.2 26	51.6 28	50.9 27	50.3 22	50.1 17	50.5 12	51.5 09	52.9 10	54.2 14	55.3 19	56.2 25	56.6 31	56.5 36
	DEC	49 50													
15	RA	04 35	33.5 47	33.3 45	32.9 45	32.4 44	32.1 43	32.2 44	32.8 45	33.6 48	34.6 51	35.4 52	36.2 52	36.7 51	36.9 51
	DEC	16 29													
16	RA	05 14	14.4 37	14.2 41	13.8 44	13.2 44	12.6 41	12.8 37	13.2 32	13.9 26	14.7 23	15.6 22	16.3 25	16.9 30	17.2 36
	DEC	-08 12													
17	RA	05 16	13.7 33	13.5 37	12.9 38	12.2 37	11.6 33	11.6 29	12.2 25	13.2 22	14.4 22	15.6 23	16.8 25	17.6 29	18.0 33
	DEC	45 59													
18	RA	05 24	47.7 36	47.6 33	47.3 32	46.7 32	46.4 32	46.3 34	46.7 37	47.4 40	48.3 43	49.1 44	49.9 42	50.5 39	50.9 36
	DEC	06 20													
19	RA	05 25	53.7 08	53.7 09	53.2 09	52.6 09	52.2 07	52.2 05	52.6 04	53.4 04	54.4 05	55.4 06	56.3 06	57.1 07	57.5 08
	DEC	28 56													
20	RA	05 35	53.9 24	53.8 28	53.4 30	52.9 31	52.5 29	52.4 26	52.7 22	53.4 18	54.2 15	55.0 14	55.8 17	56.5 21	56.8 25
	DEC	-01 12													
21	RA	05 40	26.7 49	26.6 53	26.2 55	25.7 55	25.3 54	25.2 51	25.5 47	26.1 42	27.0 39	27.8 38	28.6 41	29.3 45	29.6 50
	DEC	-01 56													
22	RA	05 54	50.0 19	50.0 17	49.7 16	49.2 15	48.7 16	48.6 17	48.9 20	49.6 23	50.4 25	51.2 25	52.1 23	52.8 20	53.2 17
	DEC	07 24													
23	RA	06 23	50.5 35	50.2 45	49.5 51	48.4 53	47.4 50	46.8 43	46.7 34	47.2 24	48.2 17	49.3 15	50.6 20	51.5 28	51.9 40
	DEC	-52 41													
24	RA	06 37	21.1 16	21.2 15	20.9 15	20.4 15	19.9 15	19.7 15	19.9 16	20.5 17	21.2 17	22.1 17	23.0 15	23.9 12	24.5 10
	DEC	16 24													
25	RA	06 44	52.8 27	52.8 34	52.5 38	51.9 39	51.4 38	51.1 34	51.2 28	51.6 22	52.3 18	53.2 17	54.1 20	54.8 27	55.3 35
	DEC	-16 42													

Table 10a(1). Apparent places of stars, 1993 (degrees) - continued

Star No.	Right Ascension (Hr Min) Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58 DEC -28 57	23.4 48	23.5 57	23.1 62	22.5 65	21.9 65	21.5 58	21.5 52	21.9 44	22.6 38	23.4 36	24.4 39	25.2 47	25.8 56
27	RA 07 08 DEC -26 22	8.8 58	8.9 67	8.6 72	8.0 75	7.4 74	7.0 69	7.0 63	7.3 56	8.0 50	8.8 48	9.8 51	10.6 58	11.2 67
28	RA 07 34 DEC 31 53	12.1 67	12.4 68	12.2 70	11.7 72	11.2 73	10.8 71	10.8 69	11.3 67	12.0 64	12.9 61	13.9 58	14.9 56	15.8 56
29	RA 07 38 DEC 05 14	58.6 29	58.8 25	58.7 24	58.2 23	57.8 24	57.4 25	57.5 27	57.8 29	58.4 31	59.1 30	60.0 27	60.9 22	61.6 17
30	RA 07 44 DEC 28 02	56.0 28	56.4 28	56.2 30	55.8 32	55.2 32	54.8 32	54.8 30	55.2 28	55.9 26	56.7 23	57.7 20	58.7 18	59.6 16
31	RA 08 09 DEC -47 18	21.6 57	21.9 69	21.6 77	20.8 83	20.0 84	19.2 80	18.9 74	19.0 65	19.5 57	20.6 52	21.5 53	22.7 60	23.5 70
32	RA 08 22 DEC -59 29	25.3 11	25.5 23	25.1 33	24.1 40	22.9 42	21.8 39	21.1 33	21.0 24	21.6 15	22.7 09	24.1 09	25.6 15	26.6 25
33	RA 09 07 DEC -43 24	46.7 14	47.2 25	47.2 34	46.7 41	46.0 44	45.3 42	44.9 37	44.8 30	45.0 22	45.7 16	46.8 16	47.9 21	49.0 30
34	RA 09 13 DEC -69 41	11.1 13	11.8 25	11.5 35	10.3 45	8.6 49	6.8 49	5.5 44	4.9 36	5.1 26	6.3 19	8.3 17	10.4 20	12.1 29
35	RA 09 27 DEC -08 37	16.7 47	17.3 54	17.4 58	17.1 61	16.7 62	16.3 60	16.1 57	16.1 54	16.4 50	16.9 49	17.7 52	18.6 57	19.6 64
36	RA 10 08 DEC 11 59	1.9 54	2.6 50	2.9 49	2.8 49	2.4 51	2.0 53	1.8 54	1.7 54	1.9 54	2.3 51	3.0 47	4.0 41	5.0 35
37	RA 11 01 DEC 56 24	27.4 48	28.7 50	29.3 56	29.3 63	28.7 69	27.8 73	27.0 71	26.5 66	26.4 58	26.8 49	27.7 40	29.0 32	30.6 29
38	RA 11 03 DEC 61 46	20.2 55	21.7 58	22.4 63	22.3 71	21.6 78	20.5 81	19.5 80	18.9 74	18.7 65	19.1 56	20.1 46	21.6 38	23.4 35
39	RA 11 48 DEC 14 36	43.5 27	44.4 22	45.0 21	45.2 22	45.0 25	44.7 28	44.4 30	44.1 30	44.0 29	44.1 26	44.6 20	45.4 14	46.4 07
40	RA 11 53 DEC 53 43	29.3 37	30.6 37	31.4 41	31.6 48	31.3 56	30.5 61	29.8 61	29.1 58	28.8 51	28.8 42	29.4 32	30.5 23	32.0 18
41	RA 12 15 DEC -17 30	28.0 13	28.9 20	29.5 26	29.8 31	29.8 33	29.6 34	29.2 32	28.9 30	28.7 26	28.7 24	29.2 23	30.0 26	31.0 32
42	RA 12 26 DEC -63 08	13.9 26	15.6 33	16.7 42	17.2 53	17.0 62	16.4 69	15.4 71	14.4 68	13.6 61	13.6 53	14.2 46	15.6 43	17.5 45
43	RA 12 30 DEC -57 04	47.9 17	49.4 24	50.4 33	50.9 43	50.8 52	50.3 57	49.5 59	48.7 56	48.1 50	48.0 42	48.6 36	49.8 33	51.4 36
44	RA 12 47 DEC -59 38	19.8 51	21.5 58	22.6 66	23.2 77	23.2 86	22.7 92	22.0 94	21.1 92	20.3 86	20.0 79	20.6 71	21.8 68	23.6 70
45	RA 12 53 DEC 55 59	43.9 28	45.4 26	46.4 29	47.0 36	46.8 44	46.2 51	45.4 54	44.6 52	43.9 46	43.6 38	43.8 27	44.7 17	46.2 09
46	RA 13 23 DEC 54 57	38.9 19	40.3 16	41.4 18	42.1 25	42.1 34	41.6 41	40.9 45	40.0 45	39.2 40	38.8 32	38.9 21	39.6 10	40.9 02
47	RA 13 24 DEC -11 07	50.3 33	51.3 39	52.0 44	52.5 47	52.7 48	52.6 48	52.4 46	52.1 45	51.7 43	51.5 41	51.7 42	52.4 45	53.4 50
48	RA 13 47 DEC 49 20	16.0 32	17.3 28	18.3 29	19.0 35	19.2 43	18.9 51	18.3 55	17.5 56	16.8 52	16.3 45	16.3 35	16.9 25	18.1 16
49	RA 14 03 DEC -60 20	20.1 11	22.0 14	23.4 21	24.5 30	25.0 39	24.9 46	24.4 50	23.5 51	22.5 47	21.9 41	22.0 33	23.0 28	24.6 26
50	RA 14 06 DEC -36 20	16.8 04	18.0 08	19.0 14	19.7 21	20.1 26	20.1 30	19.9 31	19.4 31	18.9 28	18.5 23	18.6 19	19.3 17	20.4 19

Table 10a(1). Apparent places of stars, 1993 (degrees) - continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	20.9	21.9	22.7	23.3	23.6	23.6	23.3	22.9	22.5	22.1	22.1	22.6	23.4
	DEC 19 12	55	49	47	48	52	58	62	64	63	60	54	47	38
52	RA 14 39	7.5	9.4	10.9	12.1	12.8	12.8	12.4	11.5	10.4	9.6	9.5	10.3	11.8
	DEC -60 48	14	16	21	29	37	44	49	51	48	42	34	28	26
53	RA 14 50	29.8	30.8	31.7	32.5	32.9	33.1	33.0	32.7	32.2	31.9	31.8	32.2	33.1
	DEC -16 00	47	52	56	59	61	61	60	59	57	55	55	56	60
54	RA 14 59	40.1	42.6	44.9	46.8	47.5	46.9	45.3	43.0	40.6	38.7	37.6	37.8	39.4
	DEC 74 10	42	37	38	44	53	63	69	72	69	61	51	40	30
55	RA 15 34	23.2	24.2	25.1	26.0	26.5	26.7	26.6	26.2	25.6	25.1	24.8	25.0	25.6
	DEC 26 43	66	59	57	58	64	71	77	81	82	80	74	66	57
56	RA 15 59	55.2	56.2	57.2	58.1	58.8	59.1	59.2	59.0	58.5	58.0	57.8	58.0	58.7
	DEC -22 36	06	09	11	14	16	16	17	16	15	14	12	12	13
57	RA 16 28	58.6	59.6	60.6	61.6	62.3	62.8	63.0	62.8	62.4	61.8	61.5	61.6	62.2
	DEC -26 24	58	60	62	64	66	67	67	68	68	66	64	63	63
58	RA 16 47	54.0	56.0	58.2	60.6	62.5	63.6	63.9	63.3	61.9	60.4	59.3	59.2	60.4
	DEC -69 00	48	44	43	46	51	59	66	72	75	73	67	59	51
59	RA 17 09	58.4	59.3	60.1	61.1	61.9	62.5	62.7	62.7	62.3	61.7	61.3	61.3	61.8
	DEC -15 42	59	61	63	64	64	62	61	60	59	59	58	58	60
60	RA 17 33	7.7	8.6	9.7	10.8	11.8	12.6	13.0	13.0	12.5	11.9	11.3	11.2	11.7
	DEC -37 05	54	52	52	52	54	56	58	60	62	61	59	56	53
61	RA 17 34	36.2	36.8	37.6	38.6	39.3	39.9	40.2	40.1	39.7	39.1	38.7	38.5	38.9
	DEC 12 33	52	45	42	42	45	51	57	62	65	65	63	59	52
62	RA 17 56	24.9	25.6	26.6	27.8	28.9	29.7	29.9	29.6	28.7	27.7	26.7	26.2	26.2
	DEC 51 29	20	11	05	05	10	19	29	38	44	45	41	34	25
63	RA 18 23	42.1	42.9	43.8	44.9	45.9	46.8	47.4	47.5	47.3	46.5	45.9	45.7	46.0
	DEC -34 23	16	14	13	12	11	12	13	15	17	17	16	14	12
64	RA 18 36	41.0	41.5	42.3	43.4	44.3	45.1	45.5	45.5	45.0	44.2	43.5	43.0	43.0
	DEC 38 46	38	29	24	22	26	34	44	53	59	61	60	54	45
65	RA 18 54	49.6	50.2	51.0	52.0	53.0	53.8	54.4	54.7	54.4	53.9	53.3	53.1	53.2
	DEC -26 18	20	18	17	16	14	13	12	12	14	14	14	13	12
66	RA 19 50	26.2	26.5	27.0	27.9	28.7	29.6	30.2	30.5	30.4	30.0	29.4	29.1	29.0
	DEC 08 50	62	58	55	54	57	63	70	76	80	82	81	79	75
67	RA 20 25	5.1	5.4	6.2	7.5	9.0	10.5	11.7	12.4	12.3	11.6	10.6	9.8	9.5
	DEC -56 45	32	24	17	11	07	06	08	13	19	24	26	24	18
68	RA 20 41	10.7	10.7	11.1	12.0	13.1	14.2	15.1	15.5	15.4	14.8	14.0	13.3	12.8
	DEC 45 15	31	22	15	10	10	14	25	36	45	52	54	52	46
69	RA 21 40	40.4	39.6	40.3	42.4	45.4	48.8	51.8	54.0	54.5	53.3	50.7	48.0	46.0
	DEC -77 24	86	76	66	56	49	46	48	54	62	70	75	74	68
70	RA 21 43	50.6	50.6	50.8	51.3	52.1	53.1	53.9	54.6	54.8	54.6	54.2	53.8	53.5
	DEC 09 50	41	38	35	34	36	41	48	55	60	63	64	62	59
71	RA 22 07	47.6	47.4	47.6	48.3	49.3	50.5	51.7	52.7	53.1	52.9	52.3	51.6	51.1
	DEC -46 59	48	43	36	28	21	16	14	15	20	25	30	32	30
72	RA 22 57	16.3	16.1	16.1	16.5	17.2	18.1	19.2	20.1	20.6	20.6	20.2	19.8	19.4
	DEC -29 39	38	35	32	25	18	12	07	05	06	10	14	17	18
73	RA 23 04	25.2	25.0	25.0	25.3	25.9	26.8	27.8	28.6	29.1	29.1	28.9	28.5	28.2
	DEC 15 10	14	10	07	05	06	10	16	24	30	34	36	36	33

Table 10a(2). Apparent places of stars, 1994 (degrees)

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	5.5	5.1	4.9	5.0	5.5	6.4	7.4	8.4	9.0	9.3	9.2	8.9	8.5
	DEC 29 03	41	37	33	28	27	28	33	40	48	54	59	60	60
2	RA 00 08	52.5	51.6	51.0	51.1	51.9	53.2	54.8	56.2	57.2	57.6	57.3	56.7	55.8
	DEC 59 06	83	79	72	64	58	56	59	66	76	86	95	100	101
3	RA 00 25	25.5	22.9	21.4	20.9	21.9	24.2	27.2	30.3	32.6	33.5	32.6	30.5	27.6
	DEC -77 16	92	87	78	67	56	47	42	43	48	57	66	72	73
4	RA 00 25	59.8	59.3	58.9	58.9	59.3	60.2	61.3	62.4	63.2	63.6	63.5	63.0	62.4
	DEC -42 19	88	87	82	74	65	56	50	47	49	55	62	68	71
5	RA 00 40	11.4	10.5	9.9	9.8	10.4	11.6	13.0	14.5	15.6	16.1	16.1	15.6	14.9
	DEC 56 30	38	35	29	21	15	12	14	20	29	39	48	54	56
6	RA 00 43	18.2	17.8	17.5	17.5	17.8	18.5	19.4	20.4	21.1	21.5	21.5	21.3	20.9
	DEC -18 00	73	74	72	68	62	55	49	44	42	44	48	52	55
7	RA 00 56	22.5	21.4	20.7	20.5	21.0	22.3	23.8	25.5	26.7	27.4	27.5	27.1	26.2
	DEC 60 40	86	84	78	70	63	59	60	66	74	84	93	100	103
8	RA 01 25	27.5	26.4	25.6	25.2	25.6	26.8	28.3	29.9	31.3	32.2	32.5	32.2	31.5
	DEC 60 12	36	35	30	22	15	11	11	15	23	32	42	49	53
9	RA 01 37	30.4	29.3	28.5	28.0	28.0	28.8	29.9	31.3	32.6	33.4	33.5	33.1	32.2
	DEC -57 15	75	75	71	62	51	41	33	29	31	37	46	55	60
10	See Table 11b. Apparent places of Polaris, 1994													
11	RA 02 06	51.8	51.4	50.9	50.7	50.8	51.4	52.2	53.2	54.2	54.8	55.2	55.2	55.0
	DEC 23 26	12	11	08	05	04	04	07	12	17	22	25	26	27
12	RA 02 58	3.6	3.0	2.3	1.7	1.5	1.8	2.5	3.5	4.6	5.4	5.9	5.9	5.6
	DEC -40 19	54	57	56	51	43	33	25	18	16	19	27	35	42
13	RA 03 01	59.7	59.4	58.9	58.6	58.5	58.9	59.6	60.5	61.4	62.1	62.5	62.7	62.7
	DEC 04 03	60	58	56	56	58	61	66	71	74	76	76	73	71
14	RA 03 23	56.5	55.9	55.2	54.5	54.4	54.8	55.7	57.0	58.4	59.5	60.3	60.7	60.7
	DEC 49 50	36	38	36	32	27	22	19	20	23	29	35	41	46
15	RA 04 35	36.9	36.7	36.2	35.7	35.4	35.5	36.0	36.8	37.8	38.7	39.4	39.9	40.1
	DEC 16 29	51	50	49	48	47	48	49	52	54	56	56	56	55
16	RA 05 14	17.2	17.0	16.5	16.0	15.6	15.6	15.9	16.6	17.4	18.3	19.0	19.6	19.8
	DEC -08 12	36	40	42	43	40	36	31	25	22	21	24	29	35
17	RA 05 16	18.0	17.8	17.2	16.4	15.9	15.9	16.4	17.4	18.6	19.8	20.9	21.8	22.2
	DEC 45 59	33	37	38	37	34	29	26	23	22	23	26	30	34
18	RA 05 24	50.9	50.8	50.4	49.8	49.4	49.4	49.7	50.4	51.3	52.1	52.9	53.5	53.9
	DEC 06 20	36	33	32	32	32	34	37	41	43	44	42	39	36
19	RA 05 25	57.5	57.3	56.9	56.3	55.9	55.8	56.2	57.0	58.0	59.0	59.9	60.6	61.0
	DEC 28 36	08	09	09	08	07	05	04	04	05	06	06	07	08
20	RA 05 35	56.8	56.7	56.3	55.8	55.4	55.3	55.6	56.2	57.0	57.9	58.7	59.3	59.6
	DEC -01 12	25	29	31	31	30	27	23	18	15	15	17	21	26
21	RA 05 40	29.6	29.5	29.1	28.6	28.2	28.1	28.4	29.0	29.8	30.6	31.4	32.1	32.4
	DEC -01 56	50	54	56	57	55	52	48	43	40	40	42	46	51
22	RA 05 54	53.2	53.2	52.8	52.3	51.8	51.7	52.0	52.6	53.4	54.3	55.1	55.8	56.2
	DEC 07 24	17	14	13	13	13	15	18	20	23	23	21	18	15
23	RA 06 23	51.9	51.6	50.8	49.7	48.7	48.1	48.0	48.5	49.4	50.6	51.8	52.7	53.1
	DEC -52 41	40	50	56	58	55	48	38	29	22	20	24	33	44
24	RA 06 37	24.5	24.5	24.2	23.7	23.2	23.0	23.2	23.7	24.5	25.4	26.3	27.1	27.7
	DEC 16 24	10	09	09	09	09	09	10	11	11	11	09	07	04
25	RA 06 44	55.3	55.3	55.0	54.4	53.9	53.6	53.7	54.1	54.8	55.7	56.5	57.3	57.8
	DEC -16 42	35	42	46	47	46	42	36	30	26	25	28	34	42

Table 10a(2). Apparent places of stars, 1994 (degrees) - continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58 DEC -28 57	25.8 56	25.8 64	25.6 70	24.8 72	24.2 71	23.8 66	23.8 59	24.1 51	24.8 46	25.7 44	26.6 46	27.6 54	28.0 63
27	RA 07 08 DEC -26 22	11.2 67	11.3 75	10.9 81	10.3 83	9.7 82	9.3 78	9.3 71	9.6 64	10.3 58	11.1 56	12.1 59	12.9 66	13.5 75
28	RA 07 34 DEC 31 53	15.8 56	16.1 58	15.9 60	15.3 62	14.8 62	14.4 61	14.4 59	14.8 57	15.5 54	16.4 51	17.4 49	18.4 47	19.3 46
29	RA 07 39 DEC 05 14	1.6 17	1.9 14	1.7 12	1.2 11	0.7 12	0.4 14	0.4 16	0.7 18	1.3 19	2.1 19	3.0 18	3.8 11	4.5 06
30	RA 07 44 DEC 28 02	59.6 16	59.9 17	59.7 19	59.2 20	58.7 21	58.3 21	58.3 19	58.6 17	59.3 15	60.1 12	61.1 10	62.1 07	62.9 06
31	RA 08 09 DEC -47 19	23.5 10	23.8 21	23.4 30	22.7 35	21.8 37	21.1 33	20.7 26	20.8 18	21.3 09	22.2 05	23.6 06	24.5 12	25.3 22
32	RA 08 22 DEC -59 29	26.6 25	26.9 37	26.5 46	25.5 53	24.3 55	23.2 53	22.5 46	22.4 37	22.9 28	24.0 22	25.4 22	26.9 27	27.9 38
33	RA 09 07 DEC -43 24	49.0 30	49.5 41	49.4 50	48.9 57	48.2 60	47.5 58	47.1 53	46.9 45	47.2 37	47.9 32	49.0 31	50.1 36	51.1 45
34	RA 09 13 DEC -69 41	12.1 29	12.8 41	12.5 51	11.3 61	9.6 65	7.8 65	6.5 60	5.8 52	6.1 42	7.3 35	9.2 32	11.3 35	13.0 45
35	RA 09 27 DEC -08 38	19.6 04	20.1 11	20.2 15	20.0 18	19.6 18	19.2 17	18.9 14	18.9 10	19.2 07	19.7 06	20.5 08	21.4 13	22.3 20
36	RA 10 08 DEC 11 59	5.0 35	5.7 32	5.9 31	5.8 31	5.5 33	5.0 35	4.8 36	4.7 37	4.8 36	5.3 33	6.0 29	6.9 23	7.9 18
37	RA 11 01 DEC 56 24	30.6 29	31.9 31	32.5 36	32.4 44	31.8 50	31.0 53	30.2 52	29.6 48	29.5 39	29.9 30	30.8 21	32.1 14	33.7 10
38	RA 11 03 DEC 61 46	23.6 35	24.9 38	25.6 44	25.5 52	24.7 59	23.7 62	22.7 61	22.0 55	21.8 47	22.3 37	23.2 27	24.7 20	26.5 17
39	RA 11 48 DEC 14 35	46.4 67	47.3 63	47.9 61	48.0 63	47.9 65	47.6 68	47.2 71	46.9 71	46.8 70	46.9 67	47.4 61	48.2 55	49.2 48
40	RA 11 53 DEC 53 42	32.0 78	33.4 77	34.1 82	34.3 89	34.0 96	33.3 101	32.5 102	31.8 99	31.5 92	31.5 83	32.1 73	33.2 64	34.7 59
41	RA 12 15 DEC -17 30	31.0 32	32.0 39	32.6 45	32.9 50	32.8 52	32.6 53	32.2 51	31.9 48	31.7 45	31.7 42	32.1 42	32.9 45	33.9 51
42	RA 12 26 DEC -63 08	17.5 45	19.2 52	20.3 61	20.8 72	20.6 81	20.0 87	19.0 89	17.9 86	17.1 80	17.0 72	17.6 64	19.0 61	20.9 63
43	RA 12 30 DEC -57 04	51.4 36	52.9 43	53.9 52	54.3 62	54.3 70	53.8 76	53.0 78	52.2 75	51.5 69	51.4 61	51.9 54	53.2 51	54.8 54
44	RA 12 47 DEC -59 39	23.6 10	25.2 16	26.3 25	26.9 35	26.9 44	26.4 50	25.6 52	24.7 50	23.9 44	23.7 37	24.2 29	25.4 26	27.1 27
45	RA 12 53 DEC 55 58	46.2 69	47.6 68	48.7 71	49.2 78	49.1 86	48.5 93	47.6 96	46.8 95	46.1 89	45.8 80	46.1 69	46.9 59	48.3 52
46	RA 13 23 DEC 54 56	40.9 62	42.4 59	43.5 61	44.1 68	44.1 77	43.7 84	42.9 88	42.0 88	41.2 83	40.8 75	40.9 64	41.6 54	42.9 46
47	RA 13 24 DEC -11 07	53.6 50	54.4 56	55.1 61	55.6 64	55.8 65	55.7 65	55.4 63	55.0 61	54.7 59	54.5 58	54.7 58	55.3 61	56.3 66
48	RA 13 47 DEC 49 20	18.1 16	19.4 12	20.4 13	21.1 19	21.2 27	20.9 35	20.3 40	19.6 40	18.8 37	18.4 30	18.4 20	18.9 09	20.1 00
49	RA 14 03 DEC -60 20	24.6 26	26.3 30	27.8 36	28.9 45	29.4 53	29.3 61	28.7 65	27.8 66	26.8 62	26.2 56	26.3 48	27.2 42	28.8 41
50	RA 14 06 DEC -36 20	20.4 19	21.5 24	22.5 29	23.2 36	23.6 41	23.6 45	23.3 47	22.9 46	22.3 43	22.0 39	22.0 34	22.7 32	23.7 34

Table 10a(2). Apparent places of stars, 1994 (degrees) – continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	23.4	24.4	25.2	25.9	26.1	26.1	25.9	25.5	25.0	24.7	24.6	25.1	25.9
	DEC 19 12	38	32	30	32	36	41	45	48	47	44	38	31	22
52	RA 14 39	11.8	13.5	15.0	16.3	16.9	17.0	16.5	15.5	14.5	13.7	13.5	14.2	15.8
	DEC -60 48	26	28	33	41	49	57	61	63	60	54	47	40	38
53	RA 14 50	33.1	34.1	34.9	35.7	36.1	36.3	36.2	35.9	35.4	35.0	35.0	35.3	36.2
	DEC -16 01	00	04	08	11	13	13	12	11	09	08	07	08	11
54	RA 14 50	39.4	41.9	44.3	46.2	46.9	46.3	44.7	42.4	40.1	38.1	37.1	37.3	38.9
	DEC 74 10	30	24	25	32	41	51	57	60	57	50	39	28	18
55	RA 15 34	25.6	26.6	27.5	28.3	28.8	29.1	28.9	28.5	28.0	27.4	27.1	27.3	27.9
	DEC 26 43	57	50	47	49	55	62	68	72	73	71	65	57	48
56	RA 15 59	58.7	59.7	60.6	61.5	62.2	62.6	62.7	62.4	61.9	61.4	61.1	61.3	62.0
	DEC -22 36	13	16	19	21	23	24	24	23	23	21	19	19	20
57	RA 16 29	2.2	3.2	4.1	5.1	5.9	6.4	6.5	6.3	5.9	5.3	4.9	5.0	5.7
	DEC -26 25	03	05	07	09	10	12	12	13	12	11	09	08	08
58	RA 16 48	0.4	2.3	4.5	6.8	8.7	9.9	10.1	9.5	8.1	6.5	5.4	5.3	6.4
	DEC -69 00	51	47	46	49	55	62	69	75	78	76	70	62	55
59	RA 17 10	1.8	2.6	3.4	4.4	5.2	5.8	6.0	5.9	5.5	5.0	4.5	4.5	5.0
	DEC -15 45	00	03	04	05	05	04	02	01	00	00	00	00	02
60	RA 17 33	11.7	12.6	13.6	14.7	15.7	16.5	16.9	16.8	16.4	15.7	15.1	15.0	15.5
	DEC -37 05	53	52	51	52	53	55	57	60	61	61	59	56	53
61	RA 17 34	38.9	39.5	40.3	41.2	42.0	42.6	42.8	42.7	42.3	41.8	41.3	41.1	41.4
	DEC 12 33	52	46	42	42	46	51	57	63	66	66	63	59	53
62	RA 17 56	26.2	26.9	27.9	29.1	30.2	31.0	31.2	30.9	30.0	29.0	28.0	27.5	27.5
	DEC 51 29	23	13	08	07	12	23	31	40	46	47	43	36	25
63	RA 18 23	46.0	46.7	47.6	48.7	49.7	50.6	51.1	51.2	50.9	50.3	49.7	49.4	49.7
	DEC -34 23	12	09	08	07	06	07	08	10	12	13	12	10	07
64	RA 18 36	43.0	43.5	44.3	45.3	46.3	47.1	47.5	47.4	46.9	46.2	45.4	44.9	44.9
	DEC 38 46	45	36	30	28	32	40	50	59	65	67	65	59	51
65	RA 18 56	53.2	53.8	54.5	55.5	56.5	57.4	57.9	58.1	57.9	57.4	56.8	56.5	56.6
	DEC -26 18	12	11	10	08	07	05	05	05	06	07	07	07	05
66	RA 19 50	29.0	29.3	29.8	30.6	31.5	32.4	33.0	33.3	33.2	32.8	32.2	31.8	31.8
	DEC 08 51	15	10	07	06	09	15	21	27	31	33	33	30	26
67	RA 20 25	9.5	9.8	10.5	11.8	13.3	14.8	16.0	16.6	16.6	15.9	14.9	14.0	13.7
	DEC -56 44	78	71	64	57	53	52	54	59	65	70	73	71	65
68	RA 20 41	12.8	12.8	13.2	14.0	15.1	16.3	17.1	17.5	17.4	16.8	16.0	15.3	14.8
	DEC 45 15	46	37	29	24	25	31	39	50	59	66	68	66	60
69	RA 21 40	46.0	45.2	45.9	47.9	50.8	54.3	57.3	59.4	59.9	58.8	56.3	53.5	51.4
	DEC -77 24	68	59	49	39	32	29	31	37	45	53	58	58	52
70	RA 21 43	53.5	53.4	53.6	54.2	55.0	55.9	56.7	57.3	57.6	57.4	57.0	56.5	56.2
	DEC 09 50	59	55	52	51	54	59	65	72	77	80	81	79	76
71	RA 22 07	51.1	50.9	51.1	51.7	52.7	53.9	55.1	56.0	56.4	56.3	55.6	54.9	54.4
	DEC -46 58	90	85	78	70	63	58	56	57	62	68	73	75	73
72	RA 22 57	19.4	19.1	19.2	19.5	20.2	21.2	22.2	23.0	23.6	23.6	23.3	22.8	22.4
	DEC -29 38	78	76	72	66	59	53	48	46	48	51	56	59	60
73	RA 23 04	28.2	27.9	27.9	28.2	28.8	29.7	30.6	31.4	31.9	32.0	31.7	31.3	31.0
	DEC 15 10	33	29	26	24	25	29	35	42	49	53	55	54	52

Table 10a(3). Apparent places of stars, 1995 (degrees)

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	8.5 60	8.1 56	7.9 51	7.9 47	8.4 45	9.3 46	10.3 51	11.3 58	11.9 66	12.2 72	12.1 77	11.8 78	11.4 77
	DEC 29 03													
2	RA 00 08	55.8 41	54.9 37	54.3 31	54.3 22	55.0 16	56.4 14	58.0 17	59.4 24	60.3 34	60.7 44	60.5 53	59.8 58	58.9 59
	DEC 59 07													
3	RA 00 25	27.6 73	25.1 68	23.6 60	23.2 49	24.1 38	26.4 28	29.4 24	32.5 24	34.9 30	35.7 39	34.9 48	32.8 54	30.0 55
	DEC -77 16													
4	RA 00 26	2.4 71	1.9 69	1.5 64	1.5 56	1.9 47	2.7 39	3.8 32	5.0 30	5.8 32	6.1 37	6.0 44	5.6 50	5.0 53
	DEC -42 19													
5	RA 00 40	14.9 56	14.0 53	13.4 47	13.2 39	13.8 33	14.9 30	16.4 32	17.8 38	18.9 47	19.4 58	19.4 65	18.9 71	18.1 75
	DEC 56 30													
6	RA 00 43	20.9 55	20.5 56	20.3 54	20.2 51	20.5 45	21.2 38	22.2 31	23.1 26	23.8 25	24.2 26	24.2 30	24.0 34	23.6 37
	DEC -18 00													
7	RA 00 56	26.2 43	25.1 41	24.4 35	24.1 27	24.6 20	25.9 17	27.4 18	29.0 23	30.3 31	31.0 41	31.1 51	30.6 57	29.7 60
	DEC 60 41													
8	RA 01 25	31.5 53	30.4 52	29.6 47	29.1 39	29.5 32	30.6 27	32.1 27	33.8 32	35.1 39	36.0 48	36.3 58	36.0 65	35.2 69
	DEC 60 12													
9	RA 01 37	32.2 60	31.2 59	30.4 55	29.8 46	29.8 36	30.6 25	31.8 17	33.2 14	34.4 15	35.2 22	35.4 31	34.9 39	34.1 44
	DEC -57 15													
10	See Table 11c. Apparent places of Polaris, 1995													
11	RA 02 06	55.0 27	54.6 25	54.1 23	53.8 20	53.9 18	54.5 18	55.4 21	56.4 26	57.3 31	57.9 36	58.3 39	58.3 41	58.1 41
	DEC 23 26													
12	RA 02 58	5.6 42	5.0 46	4.3 45	3.7 40	3.5 32	3.8 22	4.5 13	5.5 07	6.6 05	7.4 08	7.9 15	7.9 23	7.6 31
	DEC -40 19													
13	RA 03 02	2.7 11	2.3 09	1.9 08	1.5 07	1.4 09	1.7 12	2.4 17	3.3 22	4.2 26	4.9 27	5.4 27	5.6 25	5.5 22
	DEC 04 04													
14	RA 03 23	60.7 46	60.1 48	59.3 44	58.6 42	58.4 36	58.8 31	59.8 29	61.1 30	62.4 33	63.5 38	64.4 45	64.7 51	64.6 56
	DEC 49 50													
15	RA 04 35	40.1 55	39.9 54	39.5 53	38.9 52	38.6 51	38.7 52	39.2 54	40.0 57	40.9 59	41.8 61	42.6 61	43.1 60	43.2 59
	DEC 16 29													
16	RA 05 14	19.8 35	19.7 39	19.2 41	18.6 41	18.2 39	18.2 35	18.5 29	19.2 24	20.0 20	20.9 19	21.6 22	22.2 27	22.4 33
	DEC -08 12													
17	RA 05 16	22.2 34	22.0 38	21.4 39	20.5 38	20.0 35	20.0 30	20.5 26	21.4 24	22.6 23	23.9 24	25.0 27	25.8 31	26.2 35
	DEC 45 59													
18	RA 05 26	53.9 36	53.8 34	53.4 33	52.8 32	52.4 33	52.3 35	52.7 38	53.3 41	54.2 44	55.0 45	55.9 43	56.5 41	56.8 37
	DEC 06 20													
19	RA 05 25	61.0 08	60.9 09	60.4 09	59.8 09	59.3 07	59.3 06	59.7 05	60.5 05	61.4 05	62.4 06	63.4 07	64.0 08	64.4 09
	DEC 28 36													
20	RA 05 35	59.6 26	59.6 30	59.2 31	58.6 32	58.2 30	58.1 27	58.4 23	59.0 18	59.8 15	60.6 15	61.5 17	62.1 21	62.4 26
	DEC -01 12													
21	RA 05 40	32.4 51	32.4 55	32.0 57	31.4 57	30.9 56	30.8 53	31.1 48	31.7 44	32.5 41	33.4 40	34.2 42	34.8 46	35.1 51
	DEC -01 56													
22	RA 05 54	56.2 15	56.2 12	55.8 11	55.2 11	54.8 12	54.7 13	55.0 16	55.5 19	56.3 21	57.2 21	58.1 20	58.7 17	59.1 14
	DEC 07 24													
23	RA 06 23	53.1 44	52.8 54	52.1 60	50.9 62	49.9 59	49.3 52	49.2 43	49.7 33	50.7 26	51.8 24	53.1 28	54.0 36	54.3 47
	DEC -52 41													
24	RA 06 37	27.7 04	27.8 03	27.5 03	26.9 03	26.4 04	26.2 04	26.4 05	26.9 06	27.6 06	28.5 06	29.4 04	30.2 02	30.8 00
	DEC 16 24													
25	RA 06 44	57.8 42	57.8 49	57.5 53	56.9 54	56.3 53	56.0 49	56.1 43	56.5 37	57.2 32	58.0 31	58.9 34	59.7 41	60.2 48
	DEC -16 42													

Table 10a(3). Apparent places of stars, 1995 (degrees) - continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	28.0	28.0	27.6	27.0	26.3	26.0	25.9	26.3	26.9	27.8	28.8	29.6	30.1
	DEC -28 57	63	72	77	79	78	73	66	58	52	50	53	60	69
27	RA 07 08	13.5	13.6	13.2	12.6	12.0	11.6	11.6	11.9	12.5	13.3	14.3	15.1	15.7
	DEC -26 23	15	23	28	31	30	25	19	11	05	03	06	13	22
28	RA 07 34	19.3	19.6	19.4	18.8	18.2	17.8	17.9	18.2	18.9	19.8	20.9	21.9	22.7
	DEC 31 55	46	48	50	52	53	52	50	47	45	42	39	38	38
29	RA 07 39	4.5	4.8	4.6	4.1	3.6	3.3	3.3	3.6	4.1	4.9	5.8	6.7	7.3
	DEC 05 13	66	63	61	61	61	63	65	67	69	68	65	61	56
30	RA 07 45	2.9	3.3	3.1	2.5	2.0	1.6	1.6	1.9	2.5	3.4	4.6	5.4	6.2
	DEC 28 01	66	67	68	70	71	70	69	68	65	65	60	57	56
31	RA 08 09	25.3	25.6	25.3	24.5	23.6	22.9	22.5	22.5	23.1	23.9	25.1	26.2	27.1
	DEC -47 19	22	33	42	47	48	45	38	29	21	16	17	23	33
32	RA 08 22	27.9	28.2	27.8	26.7	25.5	24.4	23.8	23.6	24.1	25.2	26.7	28.1	29.1
	DEC -59 29	38	50	59	66	68	65	59	49	40	34	34	39	50
33	RA 09 07	51.1	51.6	51.6	51.0	50.3	49.7	49.2	49.1	49.3	50.0	51.0	52.2	53.2
	DEC -43 24	45	56	65	72	74	73	68	60	52	47	46	50	59
34	RA 09 13	13.0	13.7	13.6	12.2	10.5	8.7	7.4	6.7	6.9	8.1	10.0	12.1	13.8
	DEC -69 41	45	56	67	76	80	80	75	67	57	50	47	50	59
35	RA 09 27	22.3	22.9	23.0	22.7	22.3	21.9	21.6	21.6	21.8	22.4	23.2	24.1	25.0
	DEC -08 38	20	27	31	34	34	32	29	26	22	21	23	28	35
36	RA 10 08	7.9	8.6	8.9	8.7	8.3	7.9	7.7	7.6	7.7	8.1	8.9	9.8	10.7
	DEC 11 59	18	14	13	14	16	17	19	20	19	16	12	07	01
37	RA 11 01	33.7	35.0	35.6	35.5	34.9	34.0	33.3	32.7	32.6	32.9	33.9	35.2	36.7
	DEC 56 23	70	72	78	85	92	95	94	89	82	72	63	56	52
38	RA 11 03	26.5	28.0	28.7	28.6	27.8	26.8	25.8	25.1	24.9	25.3	26.3	27.8	29.6
	DEC 61 45	77	79	85	94	100	103	102	97	88	79	69	62	59
39	RA 11 48	49.2	50.1	50.7	50.8	50.7	50.3	50.0	49.7	49.5	49.6	50.1	50.9	51.9
	DEC 14 35	48	44	43	44	47	50	52	53	52	48	43	37	30
40	RA 11 53	34.7	36.0	36.8	37.0	36.6	35.9	35.2	34.5	34.1	34.2	34.8	35.9	37.3
	DEC 53 42	59	59	63	71	78	83	84	81	74	65	55	46	41
41	RA 12 15	33.9	34.9	35.5	35.7	35.7	35.5	35.1	34.8	34.8	34.5	35.0	35.7	36.7
	DEC -17 30	51	58	63	68	70	71	69	66	63	60	60	63	68
42	RA 12 26	20.9	22.7	23.7	24.2	24.0	23.3	22.4	21.3	20.4	20.3	20.9	22.3	24.2
	DEC +63 04	03	10	19	30	39	45	47	44	38	30	22	19	21
43	RA 12 30	54.8	56.3	57.2	57.6	57.6	57.1	56.3	55.4	54.8	54.6	55.2	56.4	58.0
	DEC -57 04	54	61	70	80	88	94	96	93	87	79	72	70	72
44	RA 12 47	27.1	28.7	29.8	30.4	30.4	29.9	29.1	28.1	27.3	27.1	27.6	28.8	30.5
	DEC +59 39	27	34	42	52	61	68	70	68	62	54	47	43	45
45	RA 12 53	48.3	49.9	50.9	51.4	51.2	50.7	49.9	49.0	48.3	48.0	48.3	49.2	50.5
	DEC 55 58	52	50	53	61	69	76	79	77	72	63	52	42	35
46	RA 13 23	42.9	44.4	45.5	46.1	46.1	45.7	44.9	44.1	43.3	42.8	42.9	43.7	44.9
	DEC 54 56	46	42	45	52	60	68	72	72	67	59	48	38	30
47	RA 13 24	56.3	57.3	58.0	58.5	58.7	58.6	58.4	58.0	57.6	57.4	57.6	58.2	59.2
	DEC -11 08	06	13	17	20	21	21	20	18	15	14	15	17	23
48	RA 13 47	20.1	21.4	22.4	23.1	23.2	22.9	22.4	21.6	20.8	20.4	20.4	21.0	22.0
	DEC 49 19	60	56	57	63	72	79	84	85	82	74	64	54	45
49	RA 14 03	28.8	30.6	32.0	33.0	33.5	33.4	32.9	31.9	30.9	30.3	30.3	31.2	32.8
	DEC -60 20	41	44	51	59	68	75	80	80	77	70	63	57	56
50	RA 14 06	23.7	24.9	25.9	26.5	26.9	26.9	26.7	26.2	25.6	25.3	25.4	25.9	27.0
	DEC -36 20	34	39	45	51	56	60	62	61	58	54	49	48	49

Table 10a(3). Apparent places of stars, 1995 (degrees) – continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	25.9 22	26.9 16	27.7 14	28.3 16	28.6 20	28.6 25	28.3 29	27.9 31	27.4 31	27.1 28	27.1 22	27.5 14	28.3 06
	DEC -60 48													
52	RA 14 39	15.8 38	17.6 40	19.0 45	20.2 53	20.8 61	20.9 68	20.4 73	19.4 75	18.3 72	17.5 66	17.4 59	18.1 53	19.5 50
	DEC -16 01													
53	RA 14 50	36.2 11	37.2 16	38.1 20	38.8 23	39.2 25	39.4 25	39.1 24	38.9 23	38.4 21	38.1 20	38.0 19	38.4 20	39.2 24
	DEC 74 10													
54	RA 14 50	38.9 18	41.4 12	43.7 13	45.7 20	46.4 29	45.8 39	44.2 45	42.0 47	39.6 45	37.7 38	36.6 27	36.9 16	38.5 06
	DEC -26 25													
55	RA 15 34	27.9 48	28.9 41	29.8 38	30.6 40	31.1 45	31.3 53	31.2 59	30.8 63	30.2 64	29.7 61	29.6 55	29.6 47	30.2 39
	DEC 26 43													
56	RA 16 00	2.0 20	3.0 23	3.9 26	4.8 28	5.4 30	5.9 31	5.9 31	5.7 31	5.2 30	4.7 28	4.4 27	4.6 26	5.2 28
	DEC -22 36													
57	RA 16 29	5.7 08	6.6 10	7.6 12	8.5 14	9.3 15	9.8 17	9.9 18	9.7 18	9.2 17	8.7 16	8.3 14	8.4 13	9.0 13
	DEC -26 25													
58	RA 16 48	6.4 55	8.4 50	10.5 50	12.8 53	14.6 58	15.8 65	16.3 73	15.4 79	14.0 82	12.5 80	11.3 74	11.2 66	12.2 59
	DEC -69 00													
59	RA 17 10	5.0 02	5.8 04	6.6 06	7.5 07	8.3 06	8.9 05	9.2 04	9.1 03	8.6 02	8.1 02	7.7 02	7.7 02	8.1 04
	DEC -15 43													
60	RA 17 33	15.5 53	16.4 51	17.4 51	18.5 52	19.4 53	20.2 55	20.6 57	20.6 60	20.1 61	19.4 61	18.9 59	18.7 56	19.2 53
	DEC -37 05													
61	RA 17 34	41.4 53	42.1 46	42.9 42	43.8 42	44.5 46	45.1 51	45.4 57	45.3 62	44.8 65	44.3 66	43.8 63	43.6 58	43.9 52
	DEC 12 33													
62	RA 17 56	27.5 25	28.2 15	29.2 10	30.4 09	31.5 14	32.2 23	32.5 33	32.1 42	31.3 48	30.3 49	29.3 45	28.7 37	28.8 27
	DEC 51 29													
63	RA 18 23	49.7 07	50.4 05	51.2 04	52.3 03	53.3 02	54.2 03	54.8 04	54.8 06	54.5 08	53.9 09	53.3 08	53.0 06	53.2 04
	DEC -34 23													
64	RA 18 36	44.9 51	45.4 41	46.2 35	47.2 34	48.2 38	49.0 46	49.4 55	49.3 64	48.8 70	48.1 73	47.3 70	46.8 64	46.8 55
	DEC 38 46													
65	RA 18 54	56.6 65	57.2 64	57.9 63	58.9 62	59.8 60	60.7 59	61.3 58	61.5 59	61.3 60	60.7 61	60.2 61	59.8 61	60.0 60
	DEC -26 17													
66	RA 19 50	31.8 26	32.1 21	32.6 18	33.3 17	34.2 20	35.1 26	35.7 32	36.0 38	35.8 42	35.4 44	34.9 43	34.5 41	34.4 36
	DEC 08 51													
67	RA 20 25	13.7 65	14.0 58	14.8 51	16.0 45	17.4 41	19.0 40	20.2 42	20.8 47	20.8 53	20.1 58	19.1 60	18.2 59	17.8 53
	DEC -56 44													
68	RA 20 41	14.8 60	14.8 51	15.2 43	16.0 38	17.1 38	18.2 44	19.1 53	19.5 63	19.3 73	18.8 79	18.0 82	17.2 79	16.7 73
	DEC 45 15													
69	RA 21 40	51.4 52	50.7 42	51.3 33	53.3 23	56.2 16	59.6 13	62.7 15	64.8 21	65.3 29	64.2 37	61.7 42	59.0 42	56.8 37
	DEC -77 24													
70	RA 21 43	56.2 16	56.2 12	56.6 09	56.9 08	57.7 10	58.6 15	59.5 22	60.0 28	60.2 33	60.1 36	59.7 37	59.2 35	58.9 32
	DEC 09 51													
71	RA 22 07	54.4 73	54.2 67	54.4 61	55.0 53	56.0 46	57.2 41	58.4 39	59.4 40	59.7 45	59.6 51	59.0 56	58.2 58	57.7 56
	DEC -46 58													
72	RA 22 57	22.4 60	22.1 58	22.1 54	22.5 48	23.1 41	24.1 35	25.1 30	26.0 28	26.5 30	26.5 33	26.2 38	25.7 41	25.3 42
	DEC -29 38													
73	RA 23 04	31.0 52	30.7 48	30.7 45	31.0 42	31.6 43	32.5 47	33.4 54	34.2 60	34.6 67	34.7 71	34.5 73	34.1 72	33.7 70
	DEC 15 10													

Table 10a(4). Apparent places of stars, 1996 (degrees)

Star No.	Right Ascension (Hr Min) Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	11.4	11.0	10.7	10.8	11.3	12.1	13.2	14.1	14.7	15.0	14.9	14.6	14.2
	DEC 29 04	17	14	09	04	02	04	09	16	23	30	34	36	35
2	RA 00 08	58.9	58.0	57.4	57.4	58.1	59.5	61.0	62.4	63.3	63.7	63.5	62.8	61.8
	DEC 59 07	59	55	48	40	33	32	35	42	51	61	70	76	77
3	RA 00 25	30.0	27.5	26.0	25.6	26.6	28.9	31.9	35.1	37.4	38.3	37.4	35.4	32.6
	DEC -77 16	55	50	42	30	19	10	06	06	12	21	30	36	37
4	RA 00 26	5.0	4.4	4.1	4.0	4.5	5.3	6.4	7.6	8.4	8.7	8.6	8.2	7.6
	DEC -62 19	53	52	47	39	30	21	15	13	15	20	27	33	36
5	RA 00 40	18.1	17.2	16.6	16.4	17.0	18.2	19.6	21.0	22.0	22.5	22.5	22.1	21.2
	DEC 56 30	75	71	64	56	50	47	49	56	65	74	83	89	91
6	RA 00 43	23.6	23.2	22.9	22.9	23.2	23.9	24.8	25.8	26.5	26.8	26.9	26.6	26.2
	DEC -18 00	37	38	37	33	27	20	14	09	07	09	13	17	20
7	RA 00 56	29.7	28.6	27.8	27.5	28.0	29.3	30.9	32.5	33.7	34.3	34.4	33.9	33.0
	DEC 60 41	60	58	52	44	37	33	35	40	49	58	68	75	77
8	RA 01 25	35.2	34.2	33.3	32.9	33.2	34.3	35.9	37.5	38.8	39.6	39.9	39.6	38.8
	DEC 60 12	69	68	63	55	48	43	44	48	56	65	74	81	85
9	RA 01 37	34.1	33.0	32.2	31.7	31.7	32.5	33.7	35.1	36.4	37.1	37.3	36.8	36.0
	DEC -57 14	104	104	99	90	80	69	61	58	60	66	75	83	88
10	See Table 11d. Apparent places of Polaris, 1996													
11	RA 02 06	58.1	57.7	57.2	56.9	57.0	57.6	58.5	59.5	60.4	61.0	61.3	61.4	61.1
	DEC 23 26	41	39	37	34	32	33	36	41	46	50	54	56	56
12	RA 02 58	7.6	7.0	6.3	5.7	5.5	5.8	6.5	7.5	8.6	9.4	9.9	9.9	9.6
	DEC -40 18	99	94	93	88	80	70	61	55	53	56	63	71	79
13	RA 03 02	5.5	5.1	4.7	4.3	4.2	4.6	5.3	6.2	7.0	7.7	8.2	8.4	8.3
	DEC 04 04	22	20	19	19	20	24	29	34	38	39	39	37	34
14	RA 03 24	4.6	4.0	3.2	2.5	2.3	2.7	3.7	5.0	6.3	7.4	8.2	8.6	8.5
	DEC 49 50	56	58	56	52	46	42	39	40	44	49	55	61	66
15	RA 04 35	43.2	43.0	42.5	42.0	41.7	41.8	42.3	43.1	44.0	44.9	45.6	46.1	46.3
	DEC 16 29	59	59	58	57	57	57	59	62	64	66	66	66	65
16	RA 05 14	22.4	22.3	21.8	21.2	20.8	20.8	21.1	21.8	22.6	23.4	24.2	24.8	25.0
	DEC -08 12	33	37	39	39	37	32	27	21	17	17	20	24	30
17	RA 05 16	26.2	26.0	25.4	24.5	24.0	24.0	24.5	25.5	26.6	27.8	29.0	29.8	30.1
	DEC 45 59	35	39	41	40	36	32	28	26	25	27	29	33	38
18	RA 05 24	56.8	56.7	56.2	55.7	55.3	55.2	55.6	56.3	57.1	57.9	58.7	59.3	59.6
	DEC 06 20	37	35	34	34	34	36	39	43	46	46	45	42	39
19	RA 05 26	4.4	4.3	3.8	3.2	2.7	2.7	3.1	3.9	4.8	5.8	6.7	7.4	7.8
	DEC 28 36	09	10	10	10	08	07	06	06	07	08	08	09	11
20	RA 05 36	2.4	2.3	1.9	1.3	0.9	0.8	1.1	1.7	2.5	3.4	4.2	4.8	5.1
	DEC -09 12	26	29	31	31	30	27	22	18	14	14	16	20	25
21	RA 05 40	35.1	35.1	34.7	34.1	33.6	33.5	33.8	34.5	35.2	36.1	36.9	37.5	37.8
	DEC -01 56	51	55	57	57	55	52	48	43	40	39	42	46	50
22	RA 05 54	59.1	59.1	58.7	58.2	57.7	57.6	57.9	58.5	59.3	60.1	61.0	61.6	62.0
	DEC 07 24	14	11	10	10	11	12	15	18	20	21	19	16	13
23	RA 06 23	54.3	54.0	53.2	52.1	51.1	50.5	50.4	50.9	51.9	53.1	54.3	55.2	55.5
	DEC -52 41	47	57	63	65	62	55	46	36	29	27	31	39	50
24	RA 06 37	30.8	30.9	30.6	30.0	29.5	29.3	29.5	30.0	30.7	31.6	32.5	33.3	33.8
	DEC 16 23	60	59	59	59	59	60	60	62	62	62	60	58	56
25	RA 06 44	60.2	60.2	59.8	59.2	58.7	58.4	58.5	58.9	59.6	60.4	61.3	62.0	62.5
	DEC -16 42	48	55	59	60	59	54	49	42	38	37	40	46	54

Table 10a(4). Apparent places of stars, 1996 (degrees) - continued

Star No.	Right Ascension (Hr Min) Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	30.1	30.2	29.8	29.1	28.4	28.1	28.1	28.4	29.1	29.9	30.9	31.7	32.2
	DEC -28 57	69	78	83	85	83	79	71	64	57	56	58	65	74
27	RA 07 08	15.7	15.8	15.4	14.8	14.2	13.8	13.8	14.1	14.7	15.5	16.5	17.3	17.9
	DEC -26 23	22	30	35	37	36	32	25	17	11	09	12	19	28
28	RA 07 34	22.7	23.0	22.8	22.2	21.6	21.2	21.3	21.7	22.3	23.2	24.3	25.3	26.1
	DEC 31 53	38	39	42	44	44	43	41	39	37	34	31	30	30
29	RA 07 39	7.3	7.6	7.4	6.9	6.4	6.1	6.1	6.4	7.0	7.7	8.6	9.5	10.1
	DEC 05 13	56	53	51	51	52	53	55	58	59	59	56	52	47
30	RA 07 45	6.2	6.5	6.3	5.8	5.2	4.8	4.8	5.2	5.8	6.6	7.7	8.6	9.4
	DEC 28 01	56	57	59	61	62	61	60	58	56	54	51	49	48
31	RA 08 09	27.1	27.3	27.0	26.2	25.3	24.6	24.2	24.3	24.8	25.6	26.8	27.9	28.7
	DEC -47 19	33	44	53	58	59	55	49	39	31	27	27	33	43
32	RA 08 22	29.1	29.4	29.0	27.9	26.7	25.6	24.9	24.8	25.3	26.4	27.9	29.3	30.3
	DEC -59 29	50	61	71	78	79	77	71	60	51	45	45	51	61
33	RA 09 07	53.2	53.7	53.6	53.1	52.4	51.7	51.2	51.1	51.4	52.0	53.1	54.2	55.2
	DEC -43 24	59	70	79	86	88	87	82	74	65	60	59	64	73
34	RA 09 13	13.8	14.5	14.2	12.9	11.2	9.4	8.1	7.4	7.6	8.8	10.8	12.8	14.5
	DEC -69 41	59	71	81	90	95	94	89	80	71	63	61	64	73
35	RA 09 27	25.0	25.5	25.6	25.4	24.9	24.5	24.3	24.3	24.5	25.0	25.8	26.7	27.6
	DEC -08 38	35	42	47	49	49	47	44	40	37	36	38	43	50
36	RA 10 08	10.7	11.5	11.7	11.6	11.2	10.7	10.5	10.4	10.5	10.9	11.7	12.6	13.6
	DEC 11 58	61	57	56	57	59	61	62	63	63	60	56	50	45
37	RA 11 01	36.7	36.0	35.7	35.6	36.0	36.7	36.3	35.8	35.7	36.0	37.0	38.3	39.9
	DEC 56 23	52	54	60	68	74	78	76	72	64	55	45	38	35
38	RA 11 03	29.6	31.1	31.8	31.7	30.9	29.8	28.9	28.2	28.0	28.4	29.5	31.0	32.8
	DEC 61 45	59	61	67	76	83	86	84	79	71	61	51	44	41
39	RA 11 48	51.9	52.8	53.4	53.5	53.4	53.0	52.7	52.4	52.2	52.3	52.8	53.6	54.6
	DEC 14 35	30	26	24	26	29	32	34	35	33	30	25	18	12
40	RA 11 53	37.3	38.7	39.5	39.7	39.3	38.6	37.8	37.2	36.8	36.9	37.5	38.6	40.1
	DEC 53 42	41	41	45	53	60	65	66	63	56	47	37	28	23
41	RA 12 15	36.7	37.7	38.3	38.6	38.5	38.2	37.9	37.5	37.3	37.3	37.7	38.5	39.5
	DEC -17 31	08	15	21	26	28	28	27	24	21	18	18	20	26
42	RA 12 26	24.2	25.9	27.0	27.4	27.2	26.5	25.5	24.4	23.6	23.4	24.1	25.5	27.3
	DEC -68 04	21	28	37	48	57	63	65	62	55	47	40	36	38
43	RA 12 30	58.0	59.5	60.4	60.8	60.7	60.2	59.4	58.5	57.9	57.7	58.3	59.5	61.0
	DEC -57 05	12	19	28	38	46	52	54	51	44	37	30	27	30
44	RA 12 47	30.5	32.1	33.2	33.7	33.7	33.2	32.4	31.4	30.6	30.3	30.9	32.1	33.7
	DEC -59 39	45	51	60	70	79	85	87	85	79	71	64	60	62
45	RA 12 53	50.5	52.0	53.1	53.6	53.5	52.8	52.0	51.2	50.5	50.2	50.5	51.4	52.8
	DEC 55 58	35	33	36	44	52	59	62	60	54	46	35	25	18
46	RA 13 23	44.9	46.4	47.5	48.2	48.2	47.7	46.9	46.1	45.3	44.9	45.0	45.8	47.1
	DEC 54 56	30	26	29	36	44	52	56	55	50	42	32	21	13
47	RA 13 24	59.2	60.2	60.9	61.4	61.5	61.4	61.2	60.8	60.4	60.3	60.5	61.1	62.0
	DEC -11 08	23	29	34	37	38	37	36	34	32	30	31	34	39
48	RA 13 47	22.0	23.4	24.4	25.1	25.2	24.9	24.3	23.6	22.9	22.4	22.4	23.0	24.1
	DEC 49 19	45	41	42	48	56	64	69	69	66	59	49	38	29
49	RA 14 03	32.8	34.6	36.0	37.0	37.4	37.4	36.8	35.8	34.8	34.2	34.2	35.1	36.7
	DEC -60 20	56	59	65	74	83	90	95	95	91	86	77	72	71
50	RA 14 06	27.0	28.2	29.1	29.8	30.1	30.1	29.9	29.4	28.8	28.5	28.5	29.1	30.2
	DEC -36 20	49	54	60	66	71	75	77	76	73	69	65	63	64

Table 10a(4). Apparent places of stars, 1996 (degrees) – continued

Star No.	Right Ascension (Hr Min) / Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	28.3	29.3	30.2	30.8	31.0	31.0	30.7	30.3	29.8	29.5	29.5	29.9	30.8
	DEC 19 11	66	60	58	60	64	69	73	75	75	72	66	58	50
52	RA 14 39	19.5	21.3	22.8	24.0	24.6	24.6	24.1	23.1	22.0	21.2	21.1	21.8	23.2
	DEC -60 48	50	52	57	65	73	81	86	87	84	78	71	65	62
53	RA 14 50	39.2	40.2	41.1	41.8	42.2	42.4	42.3	41.9	41.4	41.0	41.0	41.4	42.2
	DEC -16 01	24	28	33	36	37	37	37	35	34	32	32	33	36
54	RA 14 50	38.5	40.9	43.4	45.3	46.0	45.4	43.8	41.6	39.3	37.4	36.4	36.6	38.3
	DEC 74 09	66	60	61	68	77	87	93	95	92	85	74	63	53
55	RA 15 34	30.2	31.1	32.1	32.9	33.4	33.6	33.5	33.1	32.5	31.9	31.6	31.8	32.5
	DEC 26 43	39	32	29	30	36	43	49	53	54	51	45	37	28
56	RA 16 00	5.2	6.2	7.2	8.0	8.7	9.0	9.1	8.9	8.3	7.8	7.6	7.8	8.4
	DEC -22 36	28	30	34	36	38	39	39	39	38	36	35	35	36
57	RA 16 29	9.0	10.0	10.9	11.9	12.6	13.1	13.2	13.0	12.5	11.9	11.6	11.7	12.3
	DEC -26 25	13	15	17	19	21	22	23	24	23	22	20	19	20
58	RA 16 48	12.2	14.2	16.4	18.7	20.5	21.6	21.9	21.2	19.7	18.1	17.0	16.9	18.0
	DEC -69 00	59	54	54	57	63	70	77	84	86	84	79	71	64
59	RA 17 10	8.1	8.9	9.8	10.7	11.4	12.0	12.2	12.1	11.7	11.1	10.7	10.7	11.2
	DEC -15 43	04	06	08	09	09	08	07	06	05	05	04	05	07
60	RA 17 33	19.2	20.1	21.1	22.2	23.1	23.9	24.3	24.2	23.7	23.0	22.5	22.4	22.8
	DEC -37 05	53	52	52	53	54	56	58	61	62	62	60	57	55
61	RA 17 34	43.9	44.6	45.4	46.3	47.0	47.6	47.9	47.8	47.3	46.7	46.3	46.1	46.4
	DEC -12 33	52	48	42	41	45	51	56	61	64	64	62	57	50
62	RA 17 56	28.8	29.4	30.5	31.7	32.8	33.5	33.7	33.4	32.5	31.5	30.5	30.0	30.0
	DEC 51 29	27	17	11	10	15	24	34	43	48	49	46	38	27
63	RA 18 23	53.2	53.9	54.8	55.9	56.9	57.8	58.3	58.4	58.0	57.4	56.8	56.5	56.8
	DEC -34 22	64	62	60	60	59	60	61	64	66	66	66	64	61
64	RA 18 36	46.8	47.3	48.0	49.1	50.0	50.8	51.2	51.1	50.6	49.8	49.1	48.6	48.6
	DEC 38 46	55	46	40	38	42	50	60	68	74	77	74	68	59
65	RA 18 55	0.0	0.5	1.3	2.2	3.2	4.0	4.6	4.8	4.6	4.0	3.4	3.1	3.3
	DEC -26 17	60	59	58	56	55	53	53	54	55	56	56	56	55
66	RA 19 50	34.4	34.7	35.2	36.0	36.9	37.7	38.3	38.6	38.5	38.0	37.5	37.1	37.0
	DEC 08 51	36	31	28	27	30	36	42	48	51	53	53	50	45
67	RA 20 25	17.8	18.1	18.9	20.2	21.6	23.1	24.3	25.0	24.9	24.2	23.2	22.4	22.0
	DEC -56 44	53	46	39	33	29	28	30	36	42	47	49	47	42
68	RA 20 41	16.7	16.7	17.1	17.9	19.0	20.1	21.0	21.4	21.2	20.6	19.8	19.1	18.6
	DEC 45 15	73	64	56	51	51	57	66	76	85	91	94	91	86
69	RA 21 40	56.8	56.1	56.8	58.8	61.7	65.1	68.2	70.4	70.9	69.8	67.2	64.5	62.4
	DEC -77 23	97	87	77	67	61	58	60	66	75	83	88	87	82
70	RA 21 43	58.9	58.9	59.1	59.6	60.3	61.3	62.1	62.7	62.9	62.7	62.3	61.8	61.5
	DEC 09 51	32	28	25	24	26	31	37	44	49	51	52	51	47
71	RA 22 07	57.7	57.5	57.7	58.3	59.3	60.5	61.7	62.7	63.0	62.8	62.2	61.5	61.0
	DEC -46 58	56	51	44	36	30	24	22	24	29	35	40	42	40
72	RA 22 57	25.3	25.0	25.1	25.4	26.1	27.0	28.1	28.9	29.4	29.4	29.1	28.6	28.2
	DEC -29 38	42	40	36	30	24	17	13	11	13	16	21	24	25
73	RA 23 04	33.7	33.5	33.4	33.7	34.3	35.2	36.1	36.9	37.3	37.4	37.1	36.8	36.4
	DEC 15 11	10	06	02	00	01	05	11	18	24	28	30	30	27

Table 10a(5). Apparent places of stars, 1997 (degrees)

Star No.	Right Ascension (Hr Min) / Declination (° ′)		ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
			Seconds (time of RA or arc of declination)												
1	RA	00 08	14.2	13.7	13.5	13.6	14.0	14.9	15.9	16.9	17.5	17.7	17.7	17.3	16.9
	DEC	29 04	35	31	26	22	20	21	26	33	41	47	52	53	52
2	RA	00 09	1.8	0.8	0.3	0.3	1.0	2.3	3.9	5.3	6.2	6.3	6.3	5.6	4.7
	DEC	59 07	77	72	66	57	51	49	52	59	69	79	88	93	94
3	RA	00 25	32.6	30.1	28.6	28.3	29.3	31.6	34.6	37.8	40.2	41.1	40.3	38.2	35.5
	DEC	-77 15	97	92	84	73	61	53	48	48	54	63	72	78	79
4	RA	00 26	7.6	7.0	6.6	6.6	7.1	7.9	9.0	10.1	11.0	11.3	11.2	10.8	10.2
	DEC	-42 18	96	95	90	82	73	64	58	55	57	63	70	76	79
5	RA	00 40	21.2	20.3	19.7	19.5	20.1	21.2	22.6	24.1	25.1	25.6	25.5	25.1	24.2
	DEC	56 31	31	28	22	14	07	05	07	13	22	31	40	46	48
6	RA	00 43	26.2	25.8	25.6	25.5	25.9	26.6	27.5	28.4	29.1	29.5	29.5	29.3	28.9
	DEC	-17 59	80	81	80	76	70	63	56	51	50	52	56	60	63
7	RA	00 56	33.0	31.9	31.1	30.8	31.3	32.5	34.1	35.7	36.9	37.5	37.6	37.1	36.2
	DEC	60 41	77	75	69	61	54	51	52	57	66	75	85	92	95
8	RA	01 25	38.8	37.7	36.8	36.4	36.8	37.8	39.3	41.0	42.3	43.1	43.4	43.1	42.3
	DEC	60 13	25	24	19	11	04	00	00	04	12	21	30	38	42
9	RA	01 37	36.0	34.9	34.1	33.6	33.7	34.4	35.6	37.0	38.3	39.1	39.2	38.8	38.0
	DEC	-57 14	88	88	83	74	64	53	46	42	43	50	59	67	72
10	See Table 11a. Apparent places of Polaris, 1997														
11	RA	02 06	61.1	60.7	60.2	59.9	60.0	60.6	61.5	62.5	63.4	64.0	64.3	64.3	64.1
	DEC	23 26	56	54	51	49	47	48	50	55	61	65	69	70	71
12	RA	02 58	9.6	8.9	8.2	7.7	7.5	7.8	8.5	9.5	10.6	11.4	11.9	11.9	11.6
	DEC	-40 18	79	82	81	76	67	58	49	42	40	43	50	59	66
13	RA	03 02	8.3	7.9	7.4	7.1	7.0	7.3	8.0	8.9	9.8	10.5	11.0	11.1	11.1
	DEC	04 04	34	32	31	31	32	36	41	46	50	52	51	49	47
14	RA	03 24	8.5	7.8	7.1	6.6	6.2	6.6	7.5	8.8	10.1	11.2	12.0	12.4	12.3
	DEC	49 50	66	68	67	63	57	53	50	51	55	60	66	73	78
15	RA	04 35	46.3	46.0	45.6	45.0	44.7	44.8	45.3	46.2	47.1	47.9	48.7	49.2	49.4
	DEC	16 30	05	04	03	03	02	03	05	08	11	12	13	12	11
16	RA	05 14	25.0	24.8	24.3	23.8	23.4	23.3	23.6	24.3	25.2	26.0	26.7	27.3	27.5
	DEC	-08 12	30	34	36	36	33	29	23	18	14	13	16	21	26
17	RA	05 16	30.1	29.9	29.5	28.5	27.9	27.9	28.4	29.4	30.6	31.7	32.9	33.7	34.1
	DEC	45 59	38	41	43	42	39	35	31	29	28	30	32	36	41
18	RA	05 24	59.6	59.5	59.1	58.5	58.1	58.1	58.4	59.1	59.9	60.8	61.5	62.2	62.5
	DEC	06 20	39	37	34	30	37	39	42	46	48	49	48	45	42
19	RA	05 26	7.8	7.6	7.2	6.6	6.1	6.1	6.5	7.2	8.2	9.1	10.1	10.8	11.1
	DEC	28 36	11	12	12	12	11	09	08	08	09	10	11	12	13
20	RA	05 36	5.1	5.0	4.6	4.0	3.6	3.5	3.8	4.4	5.2	6.0	6.8	7.5	7.8
	DEC	-01 12	25	28	30	30	28	25	21	16	13	12	14	18	22
21	RA	05 40	37.8	37.7	37.3	36.8	36.3	36.2	36.5	37.1	37.9	38.7	39.5	40.2	40.5
	DEC	+01 56	50	54	56	56	54	51	47	42	39	38	40	44	49
22	RA	05 55	2.0	2.0	1.6	1.0	0.6	0.5	0.7	1.3	2.1	3.0	3.8	4.5	4.9
	DEC	07 24	13	11	10	10	11	13	15	18	21	21	20	17	14
23	RA	06 23	55.5	55.2	54.4	53.3	52.3	51.7	51.6	52.1	53.1	54.2	55.4	56.3	56.7
	DEC	-52 41	50	60	66	67	64	57	48	38	30	28	32	41	52
24	RA	06 37	33.8	33.9	33.6	33.1	32.6	32.3	32.5	33.0	33.8	34.6	35.5	36.3	36.9
	DEC	16 23	56	55	55	56	56	57	57	59	59	59	58	55	54
25	RA	06 45	2.5	2.5	2.2	1.6	1.0	0.7	0.8	1.2	1.9	2.7	3.6	4.4	4.8
	DEC	-16 42	54	61	64	66	64	59	53	47	43	41	44	51	58

Table 10a(5). Apparent places of stars, 1997 (degrees) - continued

Star No.	Right Ascension (Hr Min) Declination (° ′)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	32.2	32.2	31.8	31.2	30.6	30.1	30.1	30.5	31.2	32.0	32.9	33.8	34.3
	DEC -28 58	14	23	28	30	28	23	16	08	02	00	03	09	19
27	RA 07 08	17.9	17.9	17.6	16.9	16.3	15.9	15.9	16.2	16.9	17.7	18.6	19.5	20.0
	DEC -26 23	28	36	41	43	42	37	30	23	17	14	17	24	32
28	RA 07 34	26.1	26.3	26.1	25.6	25.0	24.6	24.6	25.0	25.7	26.6	27.6	28.6	29.5
	DEC 31 53	30	32	34	36	37	36	34	32	29	27	24	23	23
29	RA 07 39	10.1	10.3	10.2	9.7	9.2	8.8	8.8	9.1	9.7	10.5	11.3	12.2	12.9
	DEC 05 13	47	44	42	42	43	45	47	49	51	53	68	44	39
30	RA 07 45	9.4	9.7	9.5	9.0	8.5	8.1	8.0	8.6	9.0	9.9	10.9	11.8	12.7
	DEC 28 01	48	49	51	53	54	53	52	50	48	46	63	41	40
31	RA 08 09	28.7	29.0	28.6	27.9	27.0	26.2	25.8	25.9	26.4	27.3	28.4	29.5	30.4
	DEC -47 19	43	54	63	68	69	65	58	49	41	36	36	43	53
32	RA 08 22	30.3	30.5	30.1	29.0	27.6	26.7	26.0	25.9	26.4	27.6	28.9	30.3	31.4
	DEC -59 29	41	72	82	88	90	87	80	71	61	56	55	61	71
33	RA 09 07	55.2	55.7	55.6	55.1	54.4	53.6	53.2	53.0	53.3	54.0	55.0	56.1	57.1
	DEC -43 25	13	24	32	39	42	40	35	27	18	13	12	17	26
34	RA 09 13	14.5	15.2	14.8	13.6	11.8	10.0	8.7	8.0	8.2	9.3	11.3	13.4	15.0
	DEC -69 42	13	24	35	44	48	47	42	34	24	16	13	17	26
35	RA 09 27	27.6	28.1	28.2	28.0	27.5	27.1	26.9	26.8	27.1	27.6	28.4	29.3	30.2
	DEC -08 38	50	56	61	63	63	61	58	54	51	50	52	57	64
36	RA 10 08	13.6	14.3	14.5	14.4	14.0	13.6	13.3	13.2	13.3	13.8	14.5	15.4	16.4
	DEC 11 58	45	42	41	41	43	45	47	47	47	45	40	35	29
37	RA 11 01	39.9	41.2	41.8	41.7	41.1	40.3	39.5	39.0	38.9	39.2	40.1	41.5	43.1
	DEC 56 23	35	37	43	50	57	60	59	55	47	38	28	21	18
38	RA 11 03	32.8	34.3	34.9	34.9	34.1	33.1	32.1	31.4	31.3	31.7	32.7	34.2	36.1
	DEC 61 45	41	44	50	58	65	69	67	62	53	44	34	27	24
39	RA 11 48	56.6	55.5	56.0	56.2	56.1	55.7	55.4	55.1	54.9	55.0	55.5	56.3	57.3
	DEC 14 34	72	68	67	68	71	74	76	77	76	73	67	61	54
40	RA 11 53	40.7	41.4	42.2	42.4	42.1	41.4	40.6	40.0	39.6	39.7	40.3	41.4	42.9
	DEC 53 42	23	23	27	35	42	47	48	45	38	29	19	11	05
41	RA 12 15	39.5	40.5	41.0	41.3	41.2	41.0	40.6	40.3	40.0	40.0	40.4	41.2	42.3
	DEC -17 31	26	33	39	43	46	46	44	42	38	36	35	38	44
42	RA 12 26	27.3	29.0	30.0	30.4	30.2	29.5	28.5	27.4	26.6	26.3	27.0	28.4	30.2
	DEC +63 04	38	46	55	65	74	80	82	80	73	65	57	54	56
43	RA 12 31	1.0	2.5	3.4	3.8	3.7	3.2	2.4	1.5	0.8	0.7	1.2	2.4	4.0
	DEC -57 05	30	37	46	56	64	70	71	69	62	55	48	45	48
44	RA 12 47	33.7	35.3	36.3	36.9	36.9	36.3	35.5	34.6	33.7	33.4	33.9	35.1	36.8
	DEC +59 40	02	08	17	27	36	42	44	42	36	29	21	18	19
45	RA 12 53	52.8	54.3	55.3	55.9	55.8	55.2	54.4	53.5	52.9	52.6	52.8	53.8	55.2
	DEC 55 58	18	16	19	26	35	42	45	43	37	28	18	08	08
46	RA 13 23	47.1	48.5	49.6	50.2	50.3	49.8	49.1	48.2	47.5	47.0	47.1	47.9	49.2
	DEC 54 55	73	70	72	79	88	95	99	99	94	86	75	65	56
47	RA 13 25	2.0	3.0	3.7	4.2	4.3	4.2	4.0	3.6	3.2	3.1	3.2	3.8	4.8
	DEC -11 08	39	45	50	53	54	54	52	50	48	47	47	50	56
48	RA 13 47	24.1	25.4	26.5	27.1	27.3	27.0	26.4	25.7	25.0	24.5	24.5	25.1	26.2
	DEC 49 19	29	25	26	32	40	48	53	54	50	43	33	23	13
49	RA 14 03	36.7	38.4	39.8	40.8	41.3	41.2	40.6	39.6	38.6	37.9	38.0	38.8	40.4
	DEC -60 21	11	14	20	29	38	45	50	50	47	40	33	27	26
50	RA 14 06	30.2	31.3	32.2	33.0	33.3	33.3	33.0	32.5	32.0	31.6	31.6	32.2	33.3
	DEC +36 21	04	09	15	21	27	31	32	32	29	24	20	18	20

Table 10a(5). Apparent places of stars, 1997 (degrees) - continued

Star No.	Right Ascension (Hr Min) Declination (° ′)		ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
			Seconds (time of RA or arc of declination)												
51	RA	14 15	30.8	31.7	32.5	33.2	33.4	33.4	33.1	32.7	32.3	31.9	31.9	32.3	33.2
	DEC	19 11	50	44	42	43	47	53	57	59	58	55	49	41	53
52	RA	14 39	23.2	25.0	26.4	27.6	28.2	28.2	27.7	26.7	25.6	24.8	24.6	25.3	26.8
	DEC	-60 49	02	04	10	18	26	34	38	40	37	32	24	18	16
53	RA	14 50	42.2	43.2	44.0	44.7	45.2	45.3	45.2	44.9	44.6	44.0	43.9	44.3	45.1
	DEC	-16 01	36	41	45	48	50	50	50	48	47	45	45	46	50
54	RA	14 50	38.3	40.8	43.2	45.1	45.8	45.3	43.7	41.5	39.2	37.3	36.3	36.6	38.2
	DEC	74 09	53	48	49	55	64	74	80	82	79	72	61	50	40
55	RA	15 34	32.5	33.4	34.3	35.1	35.6	35.8	35.7	35.3	34.7	34.2	33.9	34.0	34.7
	DEC	26 43	28	21	19	20	25	33	39	43	43	41	35	27	17
56	RA	16 00	8.4	9.4	10.3	11.2	11.8	12.2	12.3	12.0	11.5	11.0	10.7	10.9	11.6
	DEC	-22 36	38	39	42	45	46	47	48	48	47	45	44	44	45
57	RA	16 29	12.3	13.2	14.2	15.1	15.9	16.3	16.5	16.3	15.8	15.2	14.8	14.9	15.6
	DEC	-26 25	20	21	23	26	28	29	30	31	30	29	27	26	27
58	RA	16 48	18.0	19.9	22.0	24.3	26.2	27.3	27.5	26.9	25.4	23.8	22.6	22.5	23.6
	DEC	-69 00	64	59	59	62	68	75	83	89	92	90	84	77	69
59	RA	17 10	11.2	11.9	12.8	13.7	14.5	15.0	15.3	15.2	14.8	14.2	13.8	13.7	14.2
	DEC	-15 43	07	09	11	12	12	11	10	09	09	09	08	09	11
60	RA	17 33	22.8	23.7	24.6	25.8	26.7	27.5	27.9	27.8	27.3	26.6	26.1	26.0	26.4
	DEC	-37 05	55	53	53	54	56	58	60	63	64	64	62	60	57
61	RA	17 34	46.4	47.1	47.8	48.7	49.5	50.1	50.3	50.2	49.8	49.2	48.7	48.6	48.9
	DEC	12 33	50	44	40	40	43	48	54	59	62	62	60	55	48
62	RA	17 56	30.0	30.7	31.7	32.9	34.0	34.7	34.9	34.6	33.8	32.7	31.7	31.2	31.3
	DEC	51 29	27	17	11	10	15	24	34	43	48	49	45	37	26
63	RA	18 23	56.8	57.5	58.3	59.4	60.4	61.3	61.8	61.9	61.6	60.9	60.3	60.0	60.3
	DEC	-34 22	61	59	58	57	57	58	59	62	64	65	64	62	60
64	RA	18 36	48.6	49.1	49.8	50.8	51.8	52.6	53.0	52.9	52.4	51.6	50.9	50.4	50.4
	DEC	38 46	59	50	44	42	46	54	63	72	77	79	77	71	62
65	RA	18 55	3.3	3.8	4.5	5.5	6.5	7.3	7.9	8.1	7.9	7.3	6.7	6.4	6.6
	DEC	-26 17	55	54	53	52	50	49	49	49	51	52	52	52	51
66	RA	19 50	37.0	37.3	37.8	38.6	39.5	40.3	40.9	41.2	41.1	40.6	40.0	39.7	39.6
	DEC	08 51	45	40	37	36	39	44	50	56	60	62	61	58	56
67	RA	20 25	22.0	22.3	23.0	24.3	25.8	27.3	28.5	29.1	29.1	28.4	27.3	26.5	26.2
	DEC	-56 44	42	35	28	22	18	18	20	25	31	37	39	37	32
68	RA	20 41	18.6	18.5	18.9	19.8	20.8	21.9	22.8	23.2	23.0	22.4	21.6	20.8	20.4
	DEC	45 16	25	15	08	03	03	08	17	27	37	43	45	43	36
69	RA	21 41	2.4	1.7	2.3	4.4	7.4	10.8	13.9	16.1	16.6	15.5	13.0	10.3	8.3
	DEC	-77 23	82	72	63	53	46	43	45	51	60	68	73	73	68
70	RA	21 44	1.5	1.5	1.7	2.2	3.0	3.9	4.7	5.3	5.5	5.3	4.9	4.4	4.1
	DEC	09 51	47	43	40	39	41	46	52	58	63	66	67	65	62
71	RA	22 08	1.0	0.8	1.0	1.6	2.6	3.8	5.0	6.0	6.4	6.2	5.5	4.8	4.3
	DEC	-46 58	40	35	29	21	14	09	07	09	13	19	25	27	25
72	RA	22 57	28.2	27.9	27.9	28.3	29.0	29.9	30.9	31.8	32.3	32.3	32.0	31.5	31.1
	DEC	-29 37	85	83	79	73	67	60	56	54	56	59	64	67	68
73	RA	23 04	36.4	36.1	36.1	36.3	37.0	37.8	38.8	39.6	40.0	40.0	39.8	39.4	39.0
	DEC	15 11	27	23	19	17	18	22	28	35	41	45	47	47	44

Table 10b(1). Apparent places of stars, 1993 (mils of declination)

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	2.4	2.0	1.8	1.9	2.4	3.3	4.4	5.4	6.0	6.3	6.2	6.0	5.5
	DEC 516	0.55	0.53	0.51	0.49	0.48	0.49	0.51	0.55	0.59	0.62	0.64	0.65	0.65
2	RA 00 08	49.0	48.1	47.6	47.7	48.5	49.8	51.4	52.9	53.9	54.2	54.0	53.4	52.5
	DEC 1050	0.98	0.96	0.93	0.89	0.86	0.85	0.86	0.90	0.95	1.00	1.04	1.07	1.08
3	RA 00 25	23.3	20.7	19.2	18.8	19.8	22.1	25.0	28.1	30.5	31.3	30.4	28.2	25.5
	DEC - 1373	1.18	1.15	1.11	1.05	1.00	0.96	0.93	0.93	0.96	1.00	1.05	1.08	1.08
4	RA 00 25	57.1	56.6	56.2	56.2	56.7	57.5	58.6	59.8	60.6	61.0	60.8	60.4	59.8
	DEC - 752	0.82	0.81	0.79	0.75	0.71	0.66	0.63	0.62	0.63	0.66	0.69	0.72	0.73
5	RA 00 40	7.8	6.9	6.4	6.3	6.9	8.0	9.5	11.0	12.1	12.6	12.6	12.2	11.4
	DEC 1004	0.54	0.53	0.50	0.46	0.43	0.41	0.42	0.46	0.50	0.55	0.59	0.62	0.63
6	RA 00 43	15.3	14.9	14.7	14.7	15.0	15.7	16.7	17.6	18.6	18.7	18.7	18.5	18.2
	DEC - 320	0.48	0.45	0.45	0.42	0.40	0.36	0.33	0.31	0.30	0.31	0.33	0.35	0.36
7	RA 00 56	18.6	17.6	16.8	16.6	17.2	18.5	20.1	21.7	23.0	23.7	23.8	23.4	22.5
	DEC 1078	0.85	0.84	0.81	0.78	0.74	0.72	0.73	0.76	0.80	0.85	0.89	0.93	0.94
8	RA 01 25	23.3	22.3	21.5	21.2	21.5	22.7	24.2	25.9	27.3	28.2	28.5	28.2	27.5
	DEC 1070	0.32	0.31	0.29	0.25	0.22	0.19	0.19	0.22	0.26	0.30	0.35	0.38	0.40
9	RA 01 37	28.5	27.4	26.6	26.1	26.2	26.9	28.1	29.5	30.8	31.5	31.7	31.2	30.4
	DEC - 1018	0.23	0.23	0.21	0.16	0.11	0.06	0.02	0.00	0.01	0.04	0.09	0.13	0.15
10	See Table 11a. Apparent places of Polaris, 1993													
11	RA 02 06	48.4	48.0	47.6	47.6	47.5	48.1	49.0	50.0	50.9	51.6	51.9	52.0	51.8
	DEC 416	0.58	0.57	0.56	0.55	0.54	0.54	0.55	0.58	0.61	0.63	0.64	0.65	0.65
12	RA 02 57	61.5	60.9	60.2	59.6	59.4	59.7	60.5	61.5	62.6	63.4	63.9	63.9	63.6
	DEC - 716	1.07	1.08	1.08	1.05	1.01	0.96	0.92	0.89	0.88	0.89	0.93	0.97	1.01
13	RA 03 01	56.7	56.3	55.9	55.6	55.5	55.9	56.6	57.5	58.4	59.1	59.6	59.8	59.7
	DEC 72	0.24	0.23	0.22	0.22	0.23	0.25	0.27	0.29	0.31	0.32	0.32	0.31	0.30
14	RA 03 23	52.2	51.6	50.9	50.3	50.1	50.5	51.5	52.9	54.2	55.3	56.2	56.6	56.5
	DEC 885	1.05	1.06	1.06	1.03	1.01	0.99	0.97	0.98	1.00	1.02	1.05	1.08	1.10
15	RA 04 35	33.5	33.3	32.9	32.4	32.1	32.2	32.8	33.6	34.6	35.4	36.2	36.7	36.9
	DEC 293	0.27	0.26	0.26	0.25	0.25	0.25	0.26	0.27	0.29	0.29	0.29	0.29	0.29
16	RA 05 14	14.4	14.2	13.8	13.2	12.9	12.8	13.2	13.9	14.7	15.6	16.3	16.9	17.2
	DEC - 145	0.96	0.98	1.00	1.00	0.98	0.96	0.94	0.91	0.89	0.89	0.90	0.93	0.96
17	RA 05 16	13.7	13.5	12.9	12.2	11.6	11.6	12.2	13.2	14.6	15.6	16.8	17.6	18.0
	DEC 817	0.64	0.66	0.67	0.66	0.64	0.62	0.60	0.59	0.59	0.60	0.60	0.62	0.64
18	RA 05 26	47.7	47.6	47.3	46.7	46.4	46.3	46.7	47.4	48.3	49.1	49.9	50.5	50.9
	DEC 112	0.77	0.76	0.75	0.75	0.75	0.76	0.78	0.79	0.80	0.81	0.80	0.79	0.77
19	RA 05 25	53.7	53.7	53.2	52.6	52.2	52.3	52.6	53.4	54.4	55.4	56.3	57.1	57.5
	DEC 508	0.48	0.49	0.49	0.49	0.48	0.47	0.46	0.46	0.47	0.47	0.47	0.48	0.48
20	RA 05 35	53.9	53.8	53.4	52.9	52.5	52.4	52.7	53.4	54.2	55.0	55.8	56.5	56.8
	DEC - 21	0.45	0.47	0.48	0.49	0.48	0.46	0.44	0.42	0.41	0.40	0.42	0.44	0.46
21	RA 05 40	26.7	26.6	26.2	25.7	25.3	25.2	25.5	26.1	27.0	27.8	28.6	29.3	29.6
	DEC - 34	0.61	0.63	0.64	0.64	0.64	0.62	0.60	0.58	0.56	0.56	0.57	0.59	0.62
22	RA 05 54	50.0	50.0	49.7	49.2	48.7	48.6	48.9	49.6	50.4	51.2	52.1	52.8	53.2
	DEC 131	0.65	0.64	0.63	0.63	0.63	0.64	0.65	0.67	0.68	0.68	0.67	0.65	0.64
23	RA 06 23	50.5	50.2	49.5	48.4	47.4	46.8	46.7	47.2	48.2	49.3	50.6	51.5	51.9
	DEC - 936	0.77	0.81	0.84	0.85	0.84	0.80	0.76	0.71	0.68	0.67	0.69	0.73	0.79
24	RA 06 37	21.1	21.2	20.9	20.4	19.9	19.7	19.9	20.5	21.2	22.1	23.0	23.9	24.5
	DEC 291	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.63	0.61	0.60
25	RA 06 44	52.8	52.8	52.5	51.9	51.4	51.1	51.2	51.6	52.3	53.2	54.1	54.8	55.3
	DEC - 296	1.02	1.06	1.08	1.08	1.08	1.06	1.03	1.00	0.98	0.97	0.99	1.02	1.06

Table 10b(1). Apparent places of stars, 1993 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	23.4	23.5	23.1	22.5	21.9	21.5	21.5	21.9	22.6	23.4	24.4	25.2	25.8
	DEC - 514	0.90	0.95	0.97	0.99	0.98	0.95	0.92	0.88	0.85	0.84	0.86	0.90	0.94
27	RA 07 08	8.8	8.9	8.6	8.0	7.4	7.0	7.0	7.3	8.0	8.8	9.8	10.6	11.2
	DEC - 468	1.03	1.07	1.10	1.11	1.11	1.08	1.05	1.02	0.99	0.98	0.99	1.03	1.07
28	RA 07 34	12.1	12.4	12.2	11.7	11.2	10.8	10.8	11.3	12.0	12.9	13.9	14.9	15.8
	DEC 567	0.15	0.15	0.16	0.17	0.18	0.17	0.16	0.15	0.13	0.12	0.10	0.09	0.09
29	RA 07 38	58.6	58.8	58.7	58.2	57.8	57.4	57.5	57.8	58.4	59.1	60.0	60.9	61.6
	DEC 93	0.18	0.16	0.16	0.15	0.16	0.16	0.17	0.18	0.19	0.19	0.17	0.15	0.12
30	RA 07 44	56.0	56.4	56.2	55.8	55.2	54.8	54.8	55.2	55.9	56.7	57.7	58.7	59.6
	DEC 498	0.51	0.51	0.52	0.53	0.53	0.53	0.52	0.51	0.50	0.48	0.47	0.46	0.45
31	RA 08 09	21.6	21.9	21.6	20.8	20.0	19.2	18.9	19.0	19.5	20.4	21.5	22.7	23.5
	DEC - 841	0.17	0.23	0.27	0.30	0.30	0.28	0.25	0.21	0.17	0.15	0.15	0.19	0.23
32	RA 08 22	25.3	25.5	25.1	24.1	22.9	21.8	21.1	21.0	21.6	22.7	24.1	25.6	26.6
	DEC - 1057	0.54	0.60	0.64	0.68	0.69	0.67	0.64	0.60	0.56	0.53	0.53	0.56	0.60
33	RA 09 07	46.7	47.2	47.2	46.7	46.0	45.3	44.9	44.8	45.0	45.7	46.8	47.9	49.0
	DEC - 771	0.62	0.68	0.72	0.76	0.77	0.76	0.74	0.70	0.66	0.63	0.63	0.66	0.70
34	RA 09 13	11.1	11.8	11.5	10.3	8.6	6.8	5.5	4.9	5.1	6.3	8.3	10.4	12.1
	DEC - 1238	0.88	0.96	0.99	1.04	1.06	1.06	1.03	0.99	0.94	0.91	0.90	0.91	0.96
35	RA 09 27	16.7	17.3	17.4	17.1	16.7	16.3	16.1	16.1	16.4	16.9	17.7	18.6	19.6
	DEC - 153	0.42	0.45	0.47	0.49	0.49	0.48	0.47	0.45	0.43	0.43	0.44	0.47	0.50
36	RA 10 08	1.9	2.6	2.9	2.8	2.4	2.0	1.8	1.7	1.9	2.3	3.0	4.0	5.0
	DEC 213	0.30	0.28	0.28	0.28	0.29	0.30	0.30	0.30	0.30	0.29	0.27	0.24	0.21
37	RA 11 01	27.4	28.7	29.3	29.3	28.7	27.8	27.0	26.5	26.4	26.8	27.7	29.0	30.6
	DEC 1002	0.90	0.91	0.94	0.98	1.01	1.03	1.02	0.99	0.95	0.91	0.86	0.82	0.81
38	RA 11 05	20.2	21.7	22.4	22.3	21.6	20.5	19.5	18.9	18.7	19.1	20.1	21.6	23.4
	DEC 1098	0.35	0.36	0.39	0.42	0.46	0.47	0.47	0.44	0.40	0.35	0.30	0.26	0.25
39	RA 11 48	43.5	44.4	45.0	45.2	45.0	44.7	44.4	44.1	44.0	44.1	44.6	45.4	46.4
	DEC 259	0.69	0.66	0.66	0.66	0.68	0.69	0.70	0.70	0.70	0.68	0.65	0.62	0.59
40	RA 11 53	29.3	30.6	31.4	31.6	31.3	30.5	29.8	29.1	28.8	28.8	29.4	30.5	32.0
	DEC 955	0.15	0.15	0.17	0.20	0.24	0.26	0.26	0.25	0.21	0.17	0.12	0.08	0.05
41	RA 12 15	28.0	28.9	29.5	29.8	29.8	29.6	29.2	28.9	28.7	28.7	29.2	30.0	31.0
	DEC - 311	0.18	0.21	0.24	0.26	0.27	0.28	0.27	0.26	0.24	0.23	0.22	0.24	0.27
42	RA 12 26	13.9	15.6	16.7	17.2	17.0	16.4	15.4	14.4	13.6	13.6	14.2	15.6	17.5
	DEC - 1121	0.02	0.05	0.10	0.15	0.20	0.23	0.24	0.22	0.19	0.15	0.12	0.10	0.11
43	RA 12 30	47.9	49.4	50.4	50.9	50.8	50.3	49.5	48.7	48.1	48.0	48.6	49.8	51.4
	DEC - 1014	0.60	0.64	0.68	0.73	0.78	0.80	0.81	0.80	0.77	0.73	0.70	0.68	0.70
44	RA 12 47	19.8	21.5	22.6	23.2	23.2	22.7	22.0	21.1	20.3	20.0	20.6	21.8	23.6
	DEC - 1060	0.40	0.43	0.47	0.53	0.57	0.60	0.61	0.60	0.57	0.54	0.50	0.48	0.49
45	RA 12 53	43.9	45.4	46.4	47.0	46.8	46.2	45.4	44.6	43.9	43.6	43.8	44.7	46.2
	DEC 995	0.40	0.39	0.40	0.44	0.48	0.51	0.53	0.52	0.49	0.45	0.39	0.34	0.30
46	RA 13 23	38.9	40.3	41.4	42.1	42.1	41.6	40.9	40.0	39.2	38.8	38.9	39.6	40.9
	DEC 976	0.98	0.97	0.98	1.01	1.06	1.09	1.11	1.11	1.09	1.05	0.99	0.94	0.90
47	RA 13 24	50.3	51.3	52.0	52.5	52.7	52.6	52.4	52.1	51.7	51.5	51.7	52.6	53.4
	DEC - 197	0.79	0.82	0.85	0.86	0.87	0.87	0.86	0.85	0.84	0.83	0.84	0.85	0.88
48	RA 13 47	16.0	17.3	18.3	19.0	19.2	18.9	18.3	17.5	16.8	16.3	16.3	16.9	18.1
	DEC 877	0.20	0.18	0.18	0.21	0.25	0.29	0.31	0.31	0.29	0.26	0.21	0.16	0.12
49	RA 14 03	20.1	22.0	23.4	24.5	25.0	24.9	24.4	23.5	22.5	21.9	22.0	23.0	24.6
	DEC - 1072	0.65	0.66	0.70	0.74	0.79	0.82	0.84	0.84	0.82	0.80	0.76	0.73	0.72
50	RA 14 06	16.8	18.0	19.0	19.7	20.1	20.1	19.9	19.4	18.9	18.5	18.6	19.3	20.4
	DEC - 645	0.95	0.97	1.00	1.03	1.05	1.07	1.08	1.08	1.06	1.04	1.02	1.01	1.02

Table 10b(1). Apparent places of stars, 1993 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	20.9	21.9	22.7	23.3	23.6	23.6	23.3	22.9	22.5	22.1	22.1	22.6	23.6
	DEC 341	0.60	0.58	0.57	0.57	0.59	0.62	0.64	0.65	0.64	0.63	0.60	0.57	0.52
52	RA 14 30	7.5	9.4	10.9	12.1	12.8	12.8	12.4	11.5	10.4	9.6	9.5	10.3	11.8
	DEC - 1080	0.96	0.97	0.99	1.05	1.07	1.11	1.13	1.14	1.13	1.10	1.06	1.03	1.02
53	RA 14 50	29.8	30.8	31.7	32.5	32.9	33.1	33.0	32.7	32.2	31.9	31.8	32.2	33.1
	DEC - 284	0.68	0.70	0.72	0.74	0.75	0.75	0.74	0.74	0.73	0.72	0.72	0.72	0.74
54	RA 14 50	40.1	42.6	44.9	46.8	47.5	46.9	45.3	43.0	40.6	38.7	37.6	37.8	39.4
	DEC 1318	0.73	0.70	0.71	0.74	0.78	0.83	0.86	0.87	0.86	0.82	0.77	0.72	0.67
55	RA 15 34	23.2	24.2	25.1	26.0	26.5	26.7	26.6	26.2	25.6	25.1	24.8	25.0	25.6
	DEC 475	0.29	0.25	0.24	0.25	0.28	0.31	0.34	0.36	0.37	0.36	0.33	0.29	0.24
56	RA 15 59	55.2	56.2	57.2	58.1	58.8	59.1	59.2	59.0	58.5	58.0	57.8	58.0	58.7
	DEC - 401	0.81	0.82	0.83	0.85	0.86	0.86	0.86	0.86	0.85	0.85	0.84	0.84	0.84
57	RA 16 28	58.6	59.6	60.6	61.6	62.3	62.8	63.0	62.8	62.4	61.8	61.5	61.6	62.2
	DEC - 469	0.62	0.63	0.64	0.65	0.66	0.66	0.66	0.67	0.67	0.66	0.65	0.64	0.64
58	RA 16 47	54.0	56.0	58.2	60.6	62.5	63.6	63.9	63.3	61.9	60.4	59.3	59.2	60.4
	DEC - 1226	0.90	0.88	0.88	0.89	0.92	0.96	0.99	1.02	1.04	1.03	1.00	0.96	0.92
59	RA 17 09	58.4	59.3	60.1	61.1	61.9	62.5	62.7	62.7	62.3	61.7	61.3	61.3	61.8
	DEC - 279	0.40	0.41	0.42	0.43	0.43	0.42	0.41	0.41	0.40	0.40	0.40	0.40	0.41
60	RA 17 33	7.7	8.6	9.7	10.8	11.8	12.6	13.0	13.0	12.5	11.9	11.3	11.2	11.7
	DEC - 659	0.53	0.52	0.52	0.52	0.53	0.54	0.55	0.56	0.57	0.56	0.55	0.54	0.52
61	RA 17 34	36.2	36.8	37.6	38.6	39.3	39.9	40.2	40.1	39.7	39.1	38.7	38.5	38.9
	DEC 223	0.37	0.33	0.32	0.32	0.33	0.36	0.39	0.42	0.43	0.43	0.42	0.40	0.37
62	RA 17 56	24.9	25.6	26.6	27.8	28.9	29.7	29.9	29.6	28.7	27.7	26.7	26.2	26.2
	DEC 915	0.36	0.31	0.28	0.28	0.31	0.35	0.40	0.45	0.48	0.48	0.46	0.43	0.37
63	RA 18 23	42.1	42.9	43.8	44.9	45.9	46.8	47.4	47.5	47.2	46.5	45.9	45.7	46.0
	DEC - 611	0.34	0.33	0.32	0.32	0.31	0.32	0.32	0.33	0.34	0.34	0.34	0.33	0.32
64	RA 18 36	41.0	41.5	42.3	43.4	44.3	45.1	45.5	45.5	45.0	44.2	43.5	43.0	43.0
	DEC 689	0.37	0.33	0.30	0.29	0.31	0.35	0.40	0.45	0.48	0.49	0.48	0.45	0.41
65	RA 18 54	49.8	50.2	51.0	52.0	53.0	53.8	54.4	54.7	54.4	53.9	53.3	53.1	53.2
	DEC - 467	0.65	0.64	0.64	0.63	0.62	0.62	0.61	0.61	0.62	0.62	0.62	0.62	0.61
66	RA 19 50	26.2	26.5	27.0	27.9	28.7	29.6	30.2	30.5	30.4	30.0	29.4	29.1	29.0
	DEC 157	0.34	0.32	0.31	0.30	0.32	0.35	0.38	0.41	0.43	0.44	0.44	0.43	0.41
67	RA 20 25	5.1	5.4	6.2	7.5	9.0	10.5	11.7	12.4	12.3	11.6	10.6	9.8	9.5
	DEC - 1008	1.05	1.01	0.97	0.94	0.92	0.92	0.93	0.95	0.98	1.01	1.02	1.01	0.98
68	RA 20 41	10.7	10.7	11.1	12.0	13.1	14.2	15.1	15.5	15.4	14.8	14.0	13.3	12.8
	DEC 804	0.60	0.55	0.52	0.49	0.49	0.52	0.57	0.62	0.67	0.70	0.71	0.70	0.67
69	RA 21 40	40.6	39.6	40.3	42.4	45.4	48.8	51.8	54.0	54.5	53.3	50.7	48.0	46.0
	DEC - 1376	0.42	0.38	0.33	0.28	0.24	0.23	0.24	0.27	0.31	0.35	0.37	0.37	0.34
70	RA 21 43	50.6	50.6	50.8	51.3	52.1	53.1	53.9	54.6	54.8	54.6	54.2	53.8	53.5
	DEC 174	1.02	1.00	0.99	0.98	0.99	1.02	1.05	1.09	1.11	1.13	1.13	1.12	1.11
71	RA 22 07	47.6	47.4	47.6	48.3	49.3	50.5	51.7	52.7	53.1	52.9	52.3	51.6	51.1
	DEC - 835	0.50	0.47	0.44	0.40	0.36	0.34	0.33	0.33	0.36	0.38	0.41	0.42	0.41
72	RA 22 57	16.3	16.1	16.1	16.5	17.2	18.1	19.2	20.1	20.6	20.6	20.2	19.8	19.4
	DEC - 527	0.30	0.28	0.27	0.23	0.20	0.17	0.15	0.14	0.14	0.16	0.18	0.20	0.20
73	RA 23 04	25.2	25.0	25.0	25.3	25.9	26.8	27.8	28.6	29.1	29.1	28.9	28.5	28.2
	DEC 269	0.70	0.68	0.66	0.65	0.66	0.68	0.71	0.75	0.78	0.80	0.81	0.81	0.79

Table 10b(2). Apparent places of stars, 1994 (mils of declination)

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	5.5	5.1	4.9	5.0	5.5	6.4	7.4	8.4	9.0	9.3	9.2	8.9	8.5
	DEC 516	0.65	0.63	0.61	0.58	0.58	0.58	0.61	0.64	0.68	0.71	0.74	0.74	0.74
2	RA 00 08	52.5	51.6	51.0	51.1	51.8	53.2	54.8	56.2	57.2	57.6	57.3	56.7	55.8
	DEC 1050	1.08	1.06	1.02	0.98	0.95	0.94	0.96	0.99	1.04	1.09	1.14	1.16	1.17
3	RA 00 25	25.5	22.9	21.4	20.9	21.9	24.2	27.2	30.3	32.6	33.5	32.6	30.5	27.6
	DEC - 1373	1.08	1.06	1.01	0.96	0.91	0.86	0.84	0.84	0.87	0.91	0.96	0.99	0.99
4	RA 00 25	59.8	59.3	58.9	58.9	59.3	60.2	61.3	62.4	63.2	63.6	63.5	63.0	62.4
	DEC - 752	0.73	0.73	0.70	0.66	0.62	0.57	0.54	0.53	0.54	0.57	0.60	0.63	0.65
5	RA 00 40	11.4	10.5	9.9	9.8	10.4	11.6	13.0	14.5	15.6	16.1	16.1	15.6	14.9
	DEC 1004	0.63	0.62	0.59	0.55	0.52	0.50	0.51	0.54	0.59	0.64	0.68	0.71	0.72
6	RA 00 43	18.2	17.8	17.5	17.5	17.8	18.5	19.4	20.4	21.1	21.5	21.5	21.3	20.9
	DEC - 320	0.36	0.37	0.36	0.34	0.31	0.27	0.24	0.22	0.21	0.22	0.24	0.26	0.27
7	RA 00 56	22.5	21.4	20.7	20.5	21.0	22.3	23.8	25.5	26.7	27.4	27.5	27.1	26.2
	DEC 1078	0.94	0.93	0.90	0.86	0.83	0.81	0.81	0.84	0.88	0.93	0.98	1.01	1.03
8	RA 01 25	27.5	26.4	25.6	25.2	25.6	26.8	28.3	29.9	31.3	32.2	32.5	32.2	31.5
	DEC 1070	0.40	0.40	0.37	0.33	0.30	0.28	0.28	0.30	0.34	0.38	0.43	0.46	0.48
9	RA 01 37	30.4	29.3	28.5	28.0	28.0	28.8	29.9	31.3	32.6	33.4	33.5	33.1	32.2
	DEC - 1017	1.15	1.15	1.13	1.08	1.03	0.98	0.94	0.92	0.93	0.96	1.00	1.05	1.07
10	See Table 11b. Apparent places of Polaris, 1994													
11	RA 02 06	51.8	51.4	50.9	50.7	50.8	51.4	52.2	53.2	54.2	54.8	55.2	55.2	55.0
	DEC 416	0.65	0.65	0.63	0.62	0.61	0.61	0.63	0.65	0.68	0.70	0.72	0.72	0.73
12	RA 02 58	3.6	3.0	2.3	1.7	1.5	1.8	2.5	3.5	4.6	5.4	5.9	5.9	5.6
	DEC - 716	1.01	1.02	1.02	0.99	0.95	0.90	0.86	0.83	0.82	0.83	0.87	0.91	0.95
13	RA 03 01	59.7	59.4	58.9	58.6	58.5	58.9	59.6	60.5	61.4	62.1	62.5	62.7	62.7
	DEC 72	0.30	0.29	0.28	0.28	0.29	0.30	0.33	0.35	0.37	0.38	0.38	0.36	0.35
14	RA 03 23	56.5	55.9	55.2	54.5	54.4	54.8	55.7	57.0	58.4	59.5	60.3	60.7	60.7
	DEC 886	0.10	0.11	0.10	0.08	0.06	0.03	0.02	0.02	0.04	0.07	0.10	0.13	0.15
15	RA 04 35	36.9	36.7	36.2	35.7	35.6	35.5	36.0	36.8	37.8	38.7	39.4	39.9	40.1
	DEC 293	0.29	0.28	0.28	0.27	0.27	0.27	0.28	0.29	0.30	0.31	0.31	0.31	0.31
16	RA 05 14	17.2	17.0	16.5	16.0	15.6	15.6	15.9	16.6	17.4	18.3	19.0	19.6	19.8
	DEC - 145	0.98	0.98	0.99	0.99	0.98	0.96	0.93	0.90	0.89	0.88	0.90	0.92	0.95
17	RA 05 16	18.0	17.8	17.2	16.4	15.9	15.9	16.4	17.4	18.6	19.8	20.9	21.8	22.2
	DEC 817	0.64	0.66	0.67	0.66	0.65	0.62	0.61	0.60	0.59	0.60	0.61	0.63	0.65
18	RA 05 24	50.9	50.8	50.4	49.8	49.4	49.4	49.7	50.4	51.3	52.1	52.9	53.5	53.9
	DEC 112	0.77	0.76	0.75	0.75	0.75	0.76	0.78	0.80	0.80	0.80	0.80	0.79	0.77
19	RA 05 25	57.5	57.3	56.9	56.3	55.9	55.8	56.2	57.0	58.0	59.0	59.9	60.6	61.0
	DEC 508	0.48	0.49	0.49	0.48	0.48	0.47	0.46	0.46	0.47	0.47	0.47	0.48	0.48
20	RA 05 35	56.8	56.7	56.3	55.8	55.4	55.3	55.6	56.2	57.0	57.9	58.7	59.3	59.6
	DEC - 21	0.46	0.48	0.49	0.49	0.48	0.47	0.45	0.42	0.41	0.41	0.42	0.44	0.46
21	RA 05 40	29.6	29.5	29.1	28.6	28.2	28.1	28.4	29.0	29.8	30.6	31.4	32.1	32.4
	DEC - 34	0.62	0.64	0.65	0.65	0.64	0.63	0.61	0.58	0.57	0.57	0.58	0.60	0.62
22	RA 05 54	53.2	53.2	52.8	52.3	51.8	51.7	52.0	52.6	53.4	54.3	55.1	55.8	56.2
	DEC 131	0.64	0.62	0.62	0.62	0.62	0.63	0.64	0.65	0.67	0.67	0.66	0.64	0.63
23	RA 06 23	51.9	51.6	50.8	49.7	48.7	48.1	48.0	48.5	49.4	50.6	51.8	52.7	53.1
	DEC - 936	0.79	0.84	0.87	0.88	0.86	0.83	0.78	0.74	0.70	0.69	0.71	0.76	0.81
24	RA 06 37	24.5	24.5	24.2	23.7	23.2	23.0	23.2	23.7	24.5	25.4	26.3	27.1	27.7
	DEC 291	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.60	0.59	0.58
25	RA 06 44	55.3	55.3	55.0	54.4	53.9	53.6	53.7	54.1	54.8	55.7	56.5	57.3	57.8
	DEC - 297	0.06	0.10	0.12	0.12	0.12	0.10	0.07	0.04	0.02	0.01	0.03	0.06	0.10

Table 10b(2). Apparent places of stars, 1994 (mils of declination) – continued

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	25.8	25.8	25.4	24.8	24.2	23.8	23.8	24.1	24.8	25.7	26.6	27.4	28.0
	DEC - 514	0.94	0.98	1.01	1.02	1.02	0.99	0.96	0.92	0.89	0.88	0.89	0.93	0.98
27	RA 07 08	11.2	11.3	10.9	10.3	9.7	9.3	9.3	9.6	10.3	11.1	12.1	12.9	13.5
	DEC - 469	0.07	0.11	0.14	0.15	0.15	0.13	0.09	0.06	0.03	0.02	0.03	0.07	0.11
28	RA 07 34	15.8	16.1	15.9	15.3	14.8	14.4	14.4	14.8	15.5	16.4	17.4	18.4	19.3
	DEC 567	0.09	0.10	0.11	0.12	0.12	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.04
29	RA 07 39	1.6	1.9	1.7	1.2	0.7	0.4	0.4	0.7	1.3	2.1	3.0	3.8	4.5
	DEC 93	0.12	0.11	0.10	0.09	0.10	0.11	0.12	0.13	0.13	0.13	0.12	0.09	0.07
30	RA 07 44	59.6	59.9	59.7	59.2	58.7	58.3	58.3	58.6	59.3	60.1	61.1	62.1	62.9
	DEC 498	0.45	0.45	0.46	0.47	0.47	0.47	0.46	0.45	0.44	0.43	0.42	0.40	0.40
31	RA 08 09	23.5	23.8	23.4	22.7	21.8	21.1	20.7	20.8	21.3	22.2	23.4	24.5	25.3
	DEC - 841	0.25	0.29	0.33	0.36	0.37	0.35	0.31	0.27	0.25	0.21	0.21	0.24	0.29
32	RA 08 22	26.6	26.9	26.5	25.5	24.3	23.2	22.5	22.4	22.9	24.0	25.4	26.9	27.9
	DEC - 1057	0.60	0.66	0.71	0.74	0.75	0.74	0.71	0.66	0.62	0.59	0.59	0.61	0.67
33	RA 09 07	49.0	49.5	49.4	48.9	48.2	47.5	47.1	46.9	47.2	47.9	49.0	50.1	51.1
	DEC - 771	0.70	0.76	0.80	0.84	0.85	0.84	0.82	0.78	0.74	0.71	0.73	0.73	0.78
34	RA 09 33	12.1	12.8	12.5	11.3	9.6	7.8	6.5	5.8	6.1	7.3	9.2	11.3	13.0
	DEC - 1238	0.96	1.02	1.07	1.12	1.14	1.14	1.11	1.07	1.02	0.99	0.97	0.99	1.04
35	RA 09 27	19.6	20.4	20.2	20.0	19.6	19.2	18.9	18.9	19.2	19.7	20.5	21.4	22.3
	DEC - 153	0.50	0.54	0.56	0.57	0.57	0.57	0.55	0.53	0.52	0.51	0.52	0.55	0.58
36	RA 10 08	5.0	5.7	5.9	5.8	5.5	5.0	4.8	4.7	4.8	5.3	6.0	6.9	7.9
	DEC 213	0.21	0.20	0.19	0.19	0.20	0.21	0.21	0.22	0.21	0.20	0.18	0.15	0.13
37	RA 11 01	30.6	31.9	32.5	32.4	31.8	31.0	30.2	29.6	29.5	29.9	30.8	32.1	33.7
	DEC 1002	0.81	0.82	0.84	0.88	0.91	0.93	0.92	0.90	0.86	0.81	0.77	0.74	0.72
38	RA 11 03	23.4	24.9	25.6	25.5	24.7	23.7	22.7	22.0	21.8	22.2	23.2	24.7	26.5
	DEC 1098	0.25	0.26	0.29	0.33	0.37	0.38	0.38	0.35	0.31	0.26	0.21	0.17	0.16
39	RA 11 48	46.4	47.3	47.9	48.0	47.9	47.6	47.2	46.9	46.8	46.9	47.4	48.2	49.2
	DEC 259	0.59	0.57	0.56	0.57	0.58	0.60	0.61	0.61	0.60	0.59	0.56	0.53	0.50
40	RA 11 53	32.0	33.4	34.1	34.3	34.0	33.3	32.5	31.8	31.5	31.5	32.1	33.2	34.7
	DEC 954	1.05	1.05	1.07	1.11	1.14	1.17	1.17	1.16	1.12	1.08	1.03	0.98	0.96
41	RA 12 15	31.0	32.0	32.6	32.9	32.8	32.6	32.2	31.9	31.7	31.7	32.1	32.9	33.9
	DEC - 311	0.27	0.30	0.33	0.36	0.37	0.37	0.36	0.35	0.33	0.32	0.32	0.33	0.36
42	RA 12 26	17.5	19.2	20.3	20.8	20.6	20.0	19.0	17.9	17.1	17.0	17.6	19.0	20.9
	DEC - 1121	0.11	0.15	0.19	0.24	0.29	0.32	0.33	0.31	0.28	0.24	0.20	0.19	0.20
43	RA 12 30	51.4	52.9	53.9	54.3	54.3	53.8	53.0	52.2	51.5	51.4	51.9	53.2	54.8
	DEC - 1014	0.70	0.73	0.78	0.82	0.86	0.89	0.90	0.89	0.86	0.82	0.79	0.77	0.79
44	RA 12 47	23.6	25.2	26.3	26.9	26.9	26.4	25.6	24.7	23.9	23.7	24.2	25.4	27.1
	DEC - 1060	0.49	0.52	0.57	0.62	0.66	0.69	0.70	0.69	0.66	0.63	0.59	0.57	0.58
45	RA 12 53	46.2	47.6	48.7	49.2	49.1	48.5	47.6	46.8	46.1	45.8	46.1	46.9	48.3
	DEC 995	0.30	0.30	0.31	0.35	0.39	0.42	0.44	0.43	0.40	0.36	0.30	0.25	0.22
46	RA 13 23	48.9	42.4	43.5	44.1	44.1	43.7	42.9	42.0	41.2	40.8	40.9	41.6	42.9
	DEC 976	0.90	0.88	0.89	0.93	0.97	1.01	1.03	1.03	1.00	0.96	0.91	0.86	0.82
47	RA 13 24	53.4	54.4	55.1	55.6	55.8	55.7	55.4	55.0	54.7	54.5	54.7	55.3	56.3
	DEC - 197	0.88	0.91	0.93	0.95	0.95	0.95	0.94	0.93	0.92	0.92	0.92	0.93	0.96
48	RA 13 47	18.1	19.4	20.4	21.1	21.2	20.9	20.3	19.6	18.8	18.4	18.4	18.9	20.1
	DEC 877	0.12	0.10	0.10	0.13	0.17	0.21	0.23	0.23	0.22	0.19	0.14	0.08	0.04
49	RA 14 03	24.6	26.3	27.8	28.9	29.4	29.3	28.7	27.9	26.8	26.2	26.3	27.2	28.8
	DEC - 1072	0.72	0.74	0.77	0.81	0.85	0.89	0.91	0.92	0.90	0.87	0.83	0.80	0.80
50	RA 14 06	20.4	21.5	22.5	23.2	23.6	23.6	23.3	22.9	22.3	22.0	22.0	22.7	23.7
	DEC - 646	0.02	0.04	0.07	0.10	0.13	0.15	0.16	0.15	0.14	0.12	0.09	0.08	0.09

Table 10b(2). Apparent places of stars, 1994 (mile of declination) - continued

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	23.4	24.4	25.2	25.9	26.1	26.1	25.9	25.5	25.0	24.7	24.6	25.1	25.9
	DEC 341	0.52	0.49	0.48	0.49	0.51	0.54	0.56	0.57	0.57	0.55	0.52	0.49	0.44
52	RA 14 39	11.8	13.5	15.0	16.3	16.9	17.0	16.5	15.5	14.5	13.7	13.5	14.2	15.8
	DEC - 1081	0.02	0.03	0.05	0.09	0.13	0.17	0.19	0.20	0.19	0.16	0.12	0.09	0.08
53	RA 14 50	33.1	34.1	34.9	35.7	36.1	36.3	36.2	35.9	35.4	35.0	35.0	35.3	36.2
	DEC - 284	0.74	0.76	0.78	0.80	0.80	0.80	0.80	0.80	0.79	0.78	0.78	0.78	0.80
54	RA 14 50	39.4	41.9	44.3	46.2	46.9	46.3	44.7	42.4	40.1	38.1	37.1	37.3	38.9
	DEC 1318	0.67	0.64	0.64	0.68	0.72	0.77	0.80	0.81	0.80	0.77	0.71	0.66	0.61
55	RA 15 34	25.6	26.6	27.5	28.3	28.8	29.1	28.9	28.5	28.0	27.4	27.1	27.3	27.9
	DEC 475	0.24	0.21	0.20	0.20	0.23	0.27	0.30	0.32	0.32	0.31	0.28	0.24	0.20
56	RA 15 59	58.7	59.7	60.6	61.5	62.2	62.6	62.7	62.4	61.9	61.4	61.1	61.3	62.0
	DEC - 401	0.84	0.86	0.87	0.88	0.89	0.90	0.90	0.89	0.89	0.88	0.87	0.87	0.88
57	RA 16 29	2.2	3.2	4.1	5.1	5.9	6.4	6.5	6.3	5.9	5.3	4.9	5.0	5.7
	DEC - 469	0.64	0.65	0.66	0.67	0.68	0.69	0.69	0.69	0.69	0.68	0.67	0.67	0.67
58	RA 16 48	0.4	2.3	4.5	6.8	8.7	9.9	10.1	9.5	8.1	6.5	5.4	5.3	6.4
	DEC - 1226	0.92	0.90	0.89	0.91	0.94	0.97	1.01	1.04	1.05	1.04	1.01	0.97	0.94
59	RA 17 10	1.8	2.6	3.4	4.4	5.2	5.8	6.0	5.9	5.5	5.0	4.5	4.5	5.0
	DEC - 279	0.41	0.42	0.43	0.43	0.43	0.43	0.42	0.41	0.41	0.41	0.41	0.41	0.42
60	RA 17 33	11.7	12.6	13.6	14.7	15.7	16.5	16.9	16.8	16.4	15.7	15.1	15.0	15.5
	DEC - 659	0.52	0.52	0.51	0.52	0.52	0.53	0.54	0.56	0.56	0.56	0.55	0.54	0.52
61	RA 17 36	38.9	39.5	40.3	41.2	42.0	42.6	42.8	42.7	42.3	41.8	41.3	41.1	41.4
	DEC 223	0.37	0.34	0.32	0.32	0.34	0.36	0.39	0.42	0.44	0.44	0.42	0.40	0.37
62	RA 17 56	26.2	26.9	27.9	29.1	30.2	31.0	31.2	30.9	30.0	29.0	28.0	27.5	27.5
	DEC 915	0.37	0.32	0.30	0.29	0.32	0.36	0.41	0.46	0.49	0.49	0.47	0.44	0.38
63	RA 18 23	46.8	46.7	47.6	48.7	49.7	50.6	51.1	51.2	50.9	50.3	49.7	49.4	49.7
	DEC - 611	0.32	0.30	0.30	0.29	0.29	0.29	0.30	0.31	0.32	0.32	0.32	0.31	0.29
64	RA 18 36	43.0	43.5	44.3	45.3	46.3	47.1	47.5	47.4	46.9	46.2	45.4	44.9	44.9
	DEC 689	0.41	0.36	0.33	0.32	0.34	0.38	0.43	0.48	0.51	0.52	0.51	0.48	0.44
65	RA 18 54	53.2	53.8	54.5	55.5	56.5	57.4	57.9	58.1	57.9	57.4	56.8	56.5	56.6
	DEC - 467	0.61	0.61	0.60	0.60	0.59	0.58	0.58	0.58	0.59	0.59	0.59	0.59	0.58
66	RA 19 50	29.0	29.3	29.8	30.6	31.5	32.4	33.0	33.3	33.2	32.8	32.2	31.8	31.8
	DEC 157	0.41	0.38	0.37	0.36	0.38	0.41	0.44	0.47	0.49	0.50	0.50	0.48	0.46
67	RA 20 25	9.5	9.8	10.5	11.8	13.3	14.8	16.0	16.6	16.6	15.9	14.9	14.0	13.7
	DEC - 1008	0.98	0.94	0.91	0.87	0.85	0.85	0.86	0.88	0.91	0.94	0.95	0.94	0.91
68	RA 20 41	12.8	12.8	13.2	14.0	15.1	16.3	17.1	17.5	17.4	16.8	16.0	15.3	14.8
	DEC 804	0.67	0.63	0.59	0.56	0.57	0.60	0.64	0.69	0.74	0.77	0.78	0.77	0.74
69	RA 21 40	46.0	45.2	45.9	47.9	50.8	54.3	57.3	59.4	59.9	58.8	56.3	53.5	51.4
	DEC - 1376	0.34	0.29	0.24	0.19	0.16	0.14	0.15	0.18	0.22	0.26	0.29	0.29	0.26
70	RA 21 43	53.5	53.6	53.6	54.2	55.0	55.9	56.7	57.3	57.6	57.4	57.0	56.5	56.2
	DEC 175	0.11	0.09	0.07	0.07	0.08	0.11	0.14	0.17	0.20	0.21	0.21	0.20	0.19
71	RA 22 07	51.1	50.9	51.1	51.7	52.7	53.9	55.1	56.0	56.4	56.3	55.6	54.9	54.4
	DEC - 835	0.41	0.38	0.35	0.31	0.27	0.25	0.24	0.24	0.27	0.30	0.32	0.33	0.32
72	RA 22 57	19.4	19.1	19.2	19.5	20.2	21.2	22.2	23.0	23.6	23.6	23.3	22.8	22.4
	DEC - 527	0.20	0.19	0.17	0.14	0.11	0.08	0.05	0.04	0.05	0.07	0.09	0.11	0.11
73	RA 23 04	28.2	27.9	27.9	28.2	28.8	29.7	30.6	31.4	31.9	32.0	31.7	31.3	31.0
	DEC 269	0.79	0.77	0.76	0.75	0.75	0.77	0.80	0.84	0.87	0.89	0.90	0.90	0.89

Table 10b(3). Apparent places of stars, 1995 (mils of declination)

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	8.5	8.1	7.9	7.9	8.4	9.3	10.3	11.3	11.9	12.2	12.1	11.8	11.4
	DEC 516	0.74	0.72	0.70	0.68	0.67	0.67	0.70	0.73	0.77	0.80	0.82	0.83	0.82
2	RA 00 08	55.8	54.9	54.3	54.3	55.0	56.4	58.0	59.4	60.3	60.7	60.5	59.8	58.9
	DEC 1051	0.17	0.15	0.12	0.07	0.04	0.03	0.05	0.08	0.13	0.18	0.22	0.25	0.25
3	RA 00 25	27.6	25.1	23.6	23.2	24.1	26.4	29.4	32.5	34.9	35.7	34.9	32.8	30.0
	DEC - 1373	0.99	0.97	0.93	0.87	0.82	0.77	0.73	0.75	0.78	0.82	0.87	0.90	0.90
4	RA 00 26	2.4	1.9	1.5	1.5	1.9	2.7	3.8	5.0	5.8	6.1	6.0	5.6	5.0
	DEC - 752	0.65	0.64	0.61	0.57	0.53	0.49	0.45	0.44	0.45	0.48	0.51	0.54	0.56
5	RA 00 40	14.9	14.0	13.4	13.2	13.8	14.9	16.4	17.8	18.9	19.4	19.4	18.9	18.1
	DEC 1084	0.72	0.71	0.68	0.64	0.61	0.59	0.60	0.63	0.68	0.72	0.77	0.80	0.80
6	RA 00 43	20.9	20.5	20.3	20.3	20.5	21.2	22.2	23.1	23.8	24.2	24.2	24.0	23.6
	DEC - 320	0.27	0.28	0.27	0.25	0.22	0.19	0.15	0.13	0.12	0.13	0.15	0.17	0.18
7	RA 00 56	26.2	25.1	24.4	24.1	24.6	25.9	27.4	29.0	30.3	31.0	31.1	30.6	29.7
	DEC 1078	1.03	1.02	0.99	0.95	0.91	0.90	0.90	0.93	0.97	1.02	1.07	1.10	1.11
8	RA 01 25	31.5	30.4	29.6	29.1	29.5	30.6	32.1	33.8	35.1	36.0	36.3	36.0	35.2
	DEC 1070	0.48	0.48	0.45	0.41	0.38	0.36	0.36	0.38	0.41	0.46	0.51	0.54	0.56
9	RA 01 37	32.2	31.2	30.4	29.8	29.8	30.6	31.8	33.2	34.4	35.2	35.4	34.9	34.1
	DEC - 1017	1.07	1.07	1.05	1.00	0.96	0.90	0.86	0.85	0.85	0.89	0.93	0.97	1.00
10	See Table 11c. Apparent places of Polaris, 1995													
11	RA 02 06	55.0	54.6	54.1	53.8	53.9	54.5	55.4	56.4	57.3	57.9	58.3	58.3	58.1
	DEC 416	0.73	0.72	0.71	0.69	0.68	0.68	0.70	0.72	0.75	0.77	0.79	0.80	0.80
12	RA 02 58	5.6	5.0	4.3	3.7	3.5	3.8	4.5	5.5	6.6	7.4	7.9	7.9	7.6
	DEC - 716	0.95	0.97	0.96	0.94	0.90	0.85	0.80	0.78	0.77	0.78	0.81	0.85	0.89
13	RA 03 02	2.7	2.3	1.9	1.5	1.4	1.7	2.4	3.3	4.2	4.9	5.4	5.6	5.5
	DEC 72	0.35	0.34	0.34	0.33	0.34	0.36	0.38	0.40	0.42	0.43	0.43	0.42	0.40
14	RA 03 23	60.7	60.1	59.3	58.6	58.4	58.8	59.8	61.1	62.4	63.5	64.4	64.7	64.6
	DEC 886	0.15	0.16	0.15	0.13	0.10	0.08	0.07	0.07	0.09	0.11	0.15	0.18	0.20
15	RA 04 33	40.1	39.9	39.5	38.9	38.6	38.7	39.2	40.0	40.9	41.8	42.6	43.1	43.2
	DEC 293	0.31	0.30	0.30	0.29	0.29	0.29	0.30	0.32	0.33	0.34	0.34	0.33	0.33
16	RA 05 14	19.8	19.7	19.2	18.6	18.2	18.2	18.5	19.2	20.0	20.9	21.6	22.2	22.4
	DEC - 145	0.95	0.97	0.98	0.98	0.97	0.95	0.92	0.90	0.88	0.87	0.89	0.91	0.94
17	RA 05 16	22.2	22.0	21.4	20.5	20.0	20.0	20.5	21.4	22.6	23.9	25.0	25.8	26.2
	DEC 817	0.65	0.67	0.67	0.67	0.65	0.63	0.61	0.60	0.60	0.60	0.61	0.63	0.65
18	RA 05 24	53.9	53.8	53.4	52.8	52.4	52.3	52.7	53.3	54.2	55.0	55.9	56.5	56.8
	DEC 112	0.77	0.76	0.76	0.75	0.76	0.77	0.78	0.80	0.81	0.81	0.80	0.80	0.78
19	RA 05 25	61.0	60.9	60.4	59.8	59.3	59.3	59.7	60.5	61.4	62.4	63.4	64.0	64.4
	DEC 508	0.48	0.49	0.49	0.49	0.48	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.49
20	RA 05 35	59.6	59.6	59.2	58.6	58.2	58.1	58.4	59.0	59.8	60.6	61.5	62.1	62.4
	DEC - 21	0.46	0.48	0.49	0.49	0.48	0.47	0.45	0.42	0.41	0.41	0.42	0.44	0.46
21	RA 05 40	32.4	32.4	32.0	31.4	30.9	30.8	31.1	31.7	32.5	33.4	34.2	34.8	35.1
	DEC - 34	0.62	0.64	0.65	0.65	0.65	0.63	0.61	0.59	0.57	0.57	0.58	0.60	0.62
22	RA 05 54	56.2	56.2	55.8	55.2	54.8	54.7	55.0	55.5	56.3	57.2	58.1	58.7	59.1
	DEC 131	0.63	0.61	0.61	0.61	0.61	0.62	0.63	0.65	0.66	0.66	0.65	0.64	0.62
23	RA 06 23	53.1	52.6	52.1	50.9	49.9	49.3	49.2	49.7	50.7	51.8	53.3	54.0	54.3
	DEC - 936	0.81	0.86	0.89	0.90	0.88	0.85	0.80	0.76	0.72	0.71	0.73	0.77	0.82
24	RA 06 37	27.7	27.8	27.5	26.9	26.4	26.2	26.4	26.9	27.6	28.5	29.4	30.2	30.8
	DEC 291	0.58	0.57	0.57	0.57	0.58	0.58	0.58	0.59	0.59	0.59	0.58	0.57	0.56
25	RA 06 44	57.8	57.8	57.5	56.9	56.3	56.0	56.1	56.5	57.2	58.0	58.9	59.7	60.2
	DEC - 297	0.10	0.13	0.15	0.16	0.15	0.13	0.10	0.07	0.05	0.04	0.06	0.09	0.13

Table 10b(J). Apparent places of stars, 1995 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	28.0	28.0	27.6	27.0	26.3	26.0	25.9	26.3	26.9	27.8	28.8	29.6	30.1
	DEC - 514	0.98	1.02	1.06	1.06	1.05	1.03	0.99	0.95	0.92	0.91	0.93	0.96	1.01
27	RA 07 08	13.5	13.6	13.2	12.6	12.0	11.6	11.6	11.9	12.5	13.3	14.3	15.1	15.7
	DEC - 469	0.11	0.15	0.18	0.19	0.19	0.16	0.13	0.09	0.06	0.05	0.07	0.10	0.15
28	RA 07 34	19.3	19.6	19.4	18.8	18.2	17.8	17.9	18.2	18.9	19.8	20.9	21.9	22.7
	DEC 567	0.04	0.05	0.06	0.07	0.08	0.07	0.06	0.05	0.04	0.02	0.01	0.00	0.00
29	RA 07 39	4.5	4.8	4.6	4.1	3.6	3.3	3.3	3.6	4.1	4.9	5.8	6.7	7.3
	DEC 93	0.07	0.05	0.04	0.04	0.04	0.05	0.06	0.07	0.08	0.08	0.06	0.04	0.02
30	RA 07 45	2.9	3.3	3.1	2.5	2.0	1.6	1.6	1.9	2.5	3.6	4.4	5.4	6.2
	DEC 498	0.40	0.40	0.41	0.42	0.42	0.42	0.41	0.41	0.40	0.39	0.37	0.36	0.35
31	RA 08 09	25.3	25.6	25.3	24.5	23.6	22.9	22.5	22.5	23.1	23.9	25.1	26.2	27.1
	DEC - 841	0.29	0.35	0.39	0.42	0.42	0.41	0.37	0.33	0.29	0.26	0.27	0.30	0.35
32	RA 08 22	27.9	28.2	27.8	26.7	25.5	24.4	23.8	23.6	24.1	25.2	26.7	28.1	29.1
	DEC - 1057	0.67	0.73	0.77	0.81	0.82	0.80	0.77	0.72	0.68	0.65	0.65	0.67	0.73
33	RA 09 07	51.1	51.6	51.6	51.0	50.3	49.7	49.2	49.1	49.3	50.0	51.0	52.2	53.2
	DEC - 771	0.78	0.83	0.88	0.91	0.92	0.92	0.89	0.85	0.81	0.79	0.78	0.80	0.85
34	RA 09 13	13.0	13.7	13.4	12.2	10.5	8.7	7.4	6.7	6.9	8.1	10.0	12.1	13.8
	DEC - 1239	0.04	0.09	0.15	0.19	0.21	0.21	0.19	0.15	0.10	0.06	0.05	0.06	0.11
35	RA 09 27	22.3	22.9	23.0	22.7	22.3	21.9	21.6	21.6	21.8	22.4	23.2	24.1	25.0
	DEC - 153	0.58	0.61	0.63	0.65	0.65	0.64	0.62	0.61	0.59	0.59	0.60	0.62	0.65
36	RA 10 08	7.9	8.6	8.9	8.7	8.3	7.9	7.7	7.6	7.7	8.1	8.9	9.8	10.7
	DEC 213	0.13	0.11	0.10	0.11	0.12	0.12	0.13	0.14	0.13	0.12	0.10	0.07	0.04
37	RA 11 01	33.7	35.0	35.6	35.5	34.9	34.0	33.3	32.7	32.6	32.9	33.9	35.2	36.7
	DEC 1002	0.72	0.73	0.76	0.79	0.82	0.84	0.83	0.81	0.78	0.73	0.68	0.65	0.63
38	RA 11 03	26.5	28.0	28.7	28.6	27.8	26.8	25.8	25.1	24.9	25.3	26.3	27.8	29.6
	DEC 1098	0.16	0.17	0.20	0.24	0.27	0.29	0.28	0.26	0.21	0.17	0.12	0.08	0.07
39	RA 11 48	49.2	50.1	50.7	50.8	50.7	50.3	50.0	49.7	49.6	49.6	50.1	50.9	51.9
	DEC 259	0.50	0.48	0.47	0.48	0.49	0.51	0.52	0.52	0.52	0.50	0.47	0.44	0.41
40	RA 11 53	34.7	36.0	36.8	37.0	36.6	35.9	35.2	34.5	34.1	34.2	34.8	35.9	37.3
	DEC 954	0.96	0.96	0.98	1.02	1.05	1.08	1.08	1.07	1.03	0.99	0.94	0.89	0.87
41	RA 12 15	33.9	34.9	35.5	35.7	35.7	35.5	35.1	34.8	34.5	34.5	35.0	35.7	36.7
	DEC - 311	0.36	0.41	0.42	0.45	0.46	0.46	0.45	0.44	0.42	0.41	0.41	0.42	0.45
42	RA 12 26	20.9	22.7	23.7	24.2	24.0	23.3	22.4	21.3	20.6	20.3	20.9	22.3	24.2
	DEC - 1121	0.20	0.23	0.28	0.33	0.38	0.41	0.42	0.40	0.37	0.33	0.29	0.28	0.29
43	RA 12 30	54.8	56.3	57.2	57.6	57.6	57.1	56.3	55.4	54.8	54.6	55.2	56.4	58.0
	DEC - 1014	0.79	0.82	0.86	0.91	0.95	0.98	0.99	0.98	0.95	0.91	0.87	0.86	0.87
44	RA 12 47	27.1	28.7	29.8	30.4	30.4	29.9	29.1	28.1	27.3	27.1	27.6	28.8	30.5
	DEC - 1060	0.58	0.61	0.65	0.70	0.75	0.78	0.79	0.78	0.75	0.71	0.68	0.66	0.67
45	RA 12 53	48.3	49.9	50.9	51.4	51.2	50.7	49.9	49.0	48.3	48.0	48.3	49.2	50.5
	DEC 995	0.22	0.21	0.22	0.26	0.30	0.34	0.35	0.34	0.32	0.27	0.22	0.17	0.14
46	RA 13 23	42.9	44.4	45.5	46.1	46.1	45.7	44.9	44.1	43.3	42.8	42.9	43.7	44.9
	DEC 976	0.82	0.88	0.81	0.85	0.89	0.93	0.95	0.95	0.92	0.88	0.83	0.78	0.74
47	RA 13 26	56.3	57.3	58.0	58.5	58.7	58.6	58.4	58.0	57.6	57.4	57.6	58.2	59.2
	DEC - 197	0.96	0.99	1.01	1.02	1.03	1.03	1.02	1.01	1.00	1.00	1.00	1.01	1.04
48	RA 13 47	20.1	21.4	22.4	23.1	23.2	22.9	22.4	21.6	20.8	20.4	20.4	21.0	22.0
	DEC 876	1.04	1.02	1.02	1.05	1.10	1.13	1.16	1.16	1.15	1.11	1.06	1.01	0.96
49	RA 14 03	28.8	30.6	32.0	33.0	33.5	33.4	32.9	31.9	30.9	30.3	30.3	31.2	32.8
	DEC - 1072	0.80	0.81	0.84	0.88	0.93	0.96	0.99	0.99	0.97	0.94	0.90	0.87	0.87
50	RA 14 06	23.7	24.9	25.9	26.5	26.9	26.9	26.7	26.2	25.6	25.3	25.4	25.9	27.0
	DEC - 646	0.09	0.12	0.15	0.18	0.20	0.22	0.23	0.23	0.21	0.19	0.17	0.16	0.17

Table 10b(3). Apparent places of stars, 1995 (mils of declination) – continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 35	25.9	26.9	27.7	28.3	28.6	28.6	28.3	27.9	27.4	27.1	27.1	27.5	28.3
	DEC 341	0.44	0.41	0.40	0.41	0.43	0.46	0.48	0.49	0.49	0.47	0.44	0.40	0.36
52	RA 14 39	15.8	17.6	19.0	20.2	20.8	20.9	20.4	19.4	18.3	17.5	17.4	18.1	19.5
	DEC - 1081	0.08	0.09	0.11	0.15	0.19	0.22	0.25	0.26	0.24	0.21	0.18	0.15	0.14
53	RA 14 50	36.2	37.2	38.1	38.8	39.2	39.4	39.3	38.9	38.4	38.1	38.0	38.4	39.2
	DEC - 284	0.80	0.82	0.84	0.85	0.86	0.86	0.86	0.85	0.84	0.84	0.83	0.84	0.86
54	RA 14 50	38.9	41.4	43.7	45.7	46.4	45.8	44.2	42.0	39.6	37.7	36.6	36.9	38.5
	DEC 1318	0.61	0.58	0.58	0.62	0.66	0.71	0.74	0.75	0.74	0.71	0.65	0.60	0.55
55	RA 15 34	27.9	28.9	29.8	30.6	31.1	31.3	31.2	30.8	30.2	29.7	29.4	29.6	30.2
	DEC 475	0.20	0.17	0.15	0.16	0.19	0.22	0.25	0.27	0.28	0.26	0.23	0.20	0.16
56	RA 16 00	2.0	3.0	3.9	4.8	5.4	5.9	5.9	5.7	5.3	4.7	4.4	4.6	5.2
	DEC - 401	0.88	0.89	0.91	0.92	0.93	0.93	0.93	0.93	0.93	0.92	0.91	0.91	0.92
57	RA 16 29	5.7	6.6	7.6	8.5	9.3	9.8	9.9	9.7	9.2	8.7	8.3	8.4	9.0
	DEC - 469	0.67	0.68	0.69	0.70	0.70	0.71	0.72	0.72	0.71	0.71	0.70	0.69	0.69
58	RA 16 48	6.4	8.4	10.5	12.8	14.6	15.8	16.1	15.4	14.0	12.5	11.3	11.2	12.2
	DEC - 1226	0.94	0.91	0.91	0.93	0.95	0.99	1.03	1.06	1.07	1.06	1.03	0.99	0.96
59	RA 17 10	5.0	5.8	6.6	7.5	8.3	8.9	9.2	9.1	8.6	8.1	7.7	7.7	8.1
	DEC - 279	0.42	0.43	0.44	0.44	0.44	0.43	0.43	0.42	0.42	0.42	0.42	0.42	0.43
60	RA 17 33	15.5	16.4	17.4	18.5	19.4	20.2	20.6	20.6	20.1	19.4	18.9	18.7	19.2
	DEC - 659	0.52	0.51	0.51	0.52	0.52	0.53	0.54	0.56	0.56	0.56	0.55	0.54	0.52
61	RA 17 34	41.4	42.1	42.9	43.8	44.5	45.1	45.4	45.3	44.8	44.3	43.8	43.6	43.9
	DEC 223	0.37	0.34	0.32	0.32	0.34	0.36	0.39	0.42	0.43	0.44	0.42	0.40	0.37
62	RA 17 56	27.5	28.2	29.2	30.4	31.5	32.2	32.5	32.1	31.3	30.3	29.3	28.7	28.8
	DEC 915	0.38	0.33	0.31	0.30	0.33	0.37	0.42	0.47	0.50	0.50	0.48	0.44	0.39
63	RA 18 23	49.7	50.4	51.2	52.1	53.3	54.2	54.8	54.8	54.5	53.9	53.3	53.0	53.2
	DEC - 611	0.29	0.28	0.28	0.27	0.27	0.27	0.28	0.29	0.30	0.30	0.30	0.29	0.28
64	RA 18 36	44.9	45.4	46.2	47.2	48.2	49.0	49.4	49.3	48.8	48.1	47.3	46.8	46.8
	DEC 689	0.44	0.39	0.36	0.35	0.37	0.41	0.46	0.50	0.53	0.55	0.53	0.50	0.46
65	RA 18 54	56.6	57.2	57.9	58.9	59.8	60.7	61.3	61.5	61.3	60.7	60.2	59.8	60.0
	DEC - 467	0.58	0.58	0.57	0.57	0.56	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.56
66	RA 19 50	31.8	32.1	32.6	33.3	34.2	35.1	35.7	36.0	35.8	35.4	34.9	34.5	34.4
	DEC 157	0.46	0.44	0.42	0.42	0.43	0.46	0.49	0.52	0.54	0.55	0.55	0.54	0.51
67	RA 20 25	13.7	14.0	14.8	16.0	17.4	19.0	20.2	20.8	20.8	20.1	19.1	18.2	17.8
	DEC - 1008	0.91	0.88	0.84	0.81	0.80	0.79	0.80	0.82	0.85	0.88	0.89	0.88	0.85
68	RA 20 41	14.8	14.8	15.2	16.0	17.1	18.2	19.1	19.5	19.3	18.8	18.0	17.2	16.7
	DEC 804	0.74	0.70	0.66	0.63	0.63	0.66	0.71	0.76	0.80	0.83	0.85	0.83	0.80
69	RA 21 40	51.4	50.7	51.3	53.3	56.2	59.6	62.7	64.8	65.3	64.2	61.7	59.0	56.8
	DEC - 1376	0.26	0.21	0.16	0.11	0.08	0.06	0.07	0.10	0.14	0.18	0.21	0.21	0.18
70	RA 21 43	56.2	56.2	56.4	56.9	57.7	58.6	59.5	60.0	60.2	60.1	59.7	59.2	58.9
	DEC 175	0.19	0.17	0.16	0.15	0.16	0.19	0.22	0.25	0.27	0.29	0.29	0.28	0.27
71	RA 22 07	54.6	54.2	54.4	55.0	56.0	57.2	58.4	59.4	59.7	59.6	59.0	58.2	57.7
	DEC - 835	0.32	0.29	0.26	0.22	0.19	0.17	0.16	0.16	0.19	0.21	0.24	0.25	0.24
72	RA 22 37	22.4	22.1	22.1	22.5	23.1	24.1	25.1	26.0	26.5	26.5	26.2	25.7	25.3
	DEC - 526	1.11	1.10	1.08	1.05	1.02	0.99	0.96	0.95	0.96	0.98	1.00	1.02	1.02
73	RA 23 04	31.0	30.7	30.7	31.0	31.6	32.5	33.4	34.2	34.6	34.7	34.5	34.1	33.7
	DEC 269	0.89	0.87	0.85	0.84	0.84	0.86	0.90	0.93	0.96	0.98	0.99	0.99	0.98

Table 10b(4). Apparent places of stars, 1996 (mils of declination)

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 08	11.4	11.0	10.7	10.8	11.3	12.1	13.2	14.1	14.7	15.0	14.9	14.6	14.2
	DEC 516	0.82	0.81	0.79	0.76	0.75	0.76	0.79	0.82	0.85	0.89	0.91	0.92	0.91
2	RA 00 08	58.9	58.0	57.4	57.4	58.1	59.5	61.0	62.4	63.3	63.7	63.5	62.8	61.8
	DEC 1051	0.25	0.23	0.20	0.16	0.13	0.12	0.14	0.17	0.21	0.26	0.31	0.34	0.34
3	RA 00 25	30.0	27.5	26.0	25.6	26.6	28.9	31.9	35.1	37.4	38.3	37.4	35.4	32.6
	DEC - 1373	0.90	0.88	0.84	0.78	0.72	0.68	0.66	0.66	0.69	0.73	0.78	0.87	0.81
4	RA 00 26	5.0	4.4	4.1	4.0	4.5	5.3	6.4	7.6	8.4	8.7	8.6	8.2	7.6
	DEC - 752	0.56	0.55	0.53	0.49	0.44	0.40	0.37	0.36	0.37	0.40	0.43	0.46	0.47
5	RA 00 40	18.1	17.2	16.6	16.4	17.0	18.2	19.6	21.0	22.0	22.5	22.5	22.1	21.2
	DEC 1004	0.80	0.80	0.76	0.72	0.69	0.68	0.69	0.72	0.77	0.81	0.85	0.88	0.89
6	RA 00 43	23.6	23.2	22.9	22.9	23.2	23.9	24.8	25.8	26.5	26.8	26.9	26.6	26.2
	DEC - 320	0.18	0.19	0.18	0.16	0.13	0.10	0.07	0.04	0.03	0.04	0.06	0.08	0.10
7	RA 00 56	29.7	28.6	27.8	27.5	28.0	29.3	30.9	32.5	33.7	34.3	34.4	33.9	33.0
	DEC 1078	1.11	1.10	1.07	1.03	1.00	0.98	0.99	1.01	1.06	1.10	1.15	1.19	1.20
8	RA 01 25	35.2	34.2	33.3	32.9	33.2	34.3	35.9	37.5	38.8	39.6	39.9	39.6	38.8
	DEC 1070	0.56	0.56	0.53	0.49	0.46	0.43	0.44	0.46	0.50	0.54	0.59	0.62	0.64
9	RA 01 37	34.1	33.0	32.2	31.7	31.7	32.5	33.7	35.1	36.4	37.1	37.3	36.8	36.0
	DEC - 1017	1.00	1.00	0.97	0.93	0.88	0.82	0.78	0.77	0.78	0.81	0.85	0.89	0.92
10	See Table 11d. Apparent places of Polaris, 1996													
11	RA 02 06	58.1	57.7	57.2	56.9	57.0	57.6	58.5	59.5	60.4	61.0	61.3	61.4	61.1
	DEC 416	0.80	0.79	0.78	0.76	0.75	0.76	0.77	0.80	0.82	0.84	0.86	0.87	0.87
12	RA 02 58	7.6	7.0	6.3	5.7	5.5	5.8	6.5	7.5	8.6	9.4	9.9	9.9	9.6
	DEC - 716	0.89	0.91	0.90	0.88	0.84	0.79	0.75	0.72	0.71	0.72	0.76	0.80	0.83
13	RA 03 02	5.5	5.1	4.7	4.3	4.2	4.6	5.3	6.2	7.0	7.7	8.2	8.4	8.3
	DEC 72	0.40	0.40	0.39	0.39	0.40	0.41	0.44	0.46	0.48	0.49	0.49	0.48	0.46
14	RA 03 24	4.6	4.0	3.2	2.5	2.3	2.7	3.7	5.0	6.3	7.4	8.2	8.6	8.5
	DEC 886	0.20	0.21	0.20	0.18	0.15	0.13	0.12	0.12	0.14	0.17	0.20	0.23	0.25
15	RA 04 35	43.2	43.0	42.5	42.0	41.7	41.8	42.3	43.1	44.0	44.9	45.6	46.1	46.3
	DEC 293	0.33	0.33	0.32	0.32	0.32	0.32	0.33	0.34	0.35	0.36	0.36	0.36	0.36
16	RA 05 14	22.4	22.3	21.8	21.2	20.8	20.8	21.1	21.8	22.6	23.4	24.2	24.8	25.0
	DEC - 145	0.94	0.96	0.97	0.97	0.96	0.96	0.91	0.88	0.86	0.86	0.88	0.90	0.93
17	RA 05 16	26.2	26.0	25.4	24.5	24.0	24.0	24.5	25.5	26.6	27.8	29.0	29.8	30.1
	DEC 817	0.65	0.67	0.68	0.68	0.66	0.64	0.62	0.61	0.60	0.61	0.62	0.64	0.67
18	RA 05 24	56.8	56.7	56.2	55.7	55.3	55.2	55.6	56.3	57.1	57.9	58.7	59.3	59.6
	DEC 112	0.78	0.77	0.76	0.76	0.76	0.77	0.79	0.80	0.82	0.82	0.81	0.80	0.79
19	RA 05 26	4.6	4.3	3.8	3.2	2.7	2.7	3.1	3.9	4.8	5.8	6.7	7.4	7.8
	DEC 508	0.49	0.49	0.49	0.49	0.48	0.48	0.47	0.47	0.48	0.48	0.48	0.49	0.50
20	RA 05 36	2.4	2.3	1.9	1.3	0.9	0.8	1.1	1.7	2.5	3.4	4.2	4.8	5.1
	DEC - 21	0.46	0.48	0.49	0.49	0.48	0.47	0.44	0.42	0.40	0.40	0.41	0.43	0.46
21	RA 05 40	35.1	35.1	34.7	34.1	33.6	33.5	33.8	34.5	35.2	36.1	36.9	37.5	37.8
	DEC - 34	0.62	0.64	0.65	0.65	0.64	0.63	0.61	0.58	0.57	0.56	0.58	0.60	0.62
22	RA 05 54	59.1	59.1	58.7	58.2	57.7	57.6	57.9	58.5	59.3	60.1	61.0	61.6	62.0
	DEC 131	0.62	0.61	0.60	0.60	0.61	0.61	0.63	0.64	0.65	0.66	0.65	0.63	0.62
23	RA 06 23	54.3	54.0	53.2	52.1	51.1	50.5	50.4	50.9	51.9	53.1	54.3	55.2	55.5
	DEC - 936	0.82	0.87	0.90	0.91	0.90	0.86	0.82	0.77	0.74	0.73	0.75	0.79	0.84
24	RA 06 37	30.8	30.9	30.6	30.0	29.5	29.3	29.5	30.0	30.7	31.6	32.5	33.3	33.8
	DEC 291	0.56	0.55	0.55	0.55	0.55	0.56	0.56	0.57	0.57	0.57	0.56	0.55	0.54
25	RA 06 44	60.2	60.2	59.8	59.2	58.7	58.4	58.5	58.9	59.6	60.4	61.3	62.0	62.5
	DEC - 297	0.13	0.16	0.18	0.19	0.18	0.16	0.13	0.10	0.08	0.07	0.09	0.12	0.16

Table 10b(4). Apparent places of stars, 1996 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	30.1	30.2	29.8	29.1	28.4	28.1	28.1	28.4	29.1	29.9	30.9	31.7	32.2
	DEC + 514	1.01	1.05	1.08	1.09	1.08	1.06	1.02	0.98	0.95	0.94	0.95	0.99	1.05
27	RA 07 08	15.7	15.8	15.4	14.8	14.2	13.8	13.8	14.1	14.7	15.5	16.5	17.3	17.9
	DEC + 469	0.15	0.19	0.21	0.22	0.21	0.20	0.16	0.12	0.09	0.08	0.10	0.13	0.18
28	RA 07 34	22.7	23.0	22.8	22.2	21.6	21.2	21.3	21.7	22.3	23.2	24.3	25.3	26.1
	DEC 566	1.00	1.01	1.02	1.03	1.03	1.03	1.02	1.01	1.00	0.98	0.97	0.96	0.96
29	RA 07 39	7.3	7.6	7.4	6.9	6.4	6.1	6.1	6.4	7.0	7.7	8.6	9.5	10.1
	DEC 92	1.02	1.00	0.99	0.99	1.00	1.00	1.01	1.03	1.03	1.03	1.02	1.00	0.97
30	RA 07 45	6.2	6.5	6.3	5.8	5.2	4.8	4.8	5.2	5.8	6.6	7.7	8.6	9.4
	DEC 498	0.35	0.36	0.37	0.38	0.38	0.38	0.37	0.36	0.35	0.34	0.33	0.32	0.31
31	RA 08 09	27.1	27.3	27.0	26.2	25.3	24.6	24.2	24.3	24.8	25.6	26.8	27.9	28.7
	DEC - 841	0.35	0.40	0.45	0.47	0.48	0.46	0.43	0.38	0.34	0.32	0.32	0.35	0.40
32	RA 08 22	29.1	29.4	29.0	27.9	26.7	25.6	24.9	24.8	25.3	26.4	27.9	29.3	30.3
	DEC - 1057	0.73	0.78	0.83	0.87	0.87	0.86	0.83	0.78	0.73	0.70	0.70	0.73	0.78
33	RA 09 07	53.2	53.7	53.6	53.1	52.4	51.7	51.2	51.1	51.4	52.0	53.1	54.2	55.2
	DEC - 771	0.85	0.90	0.95	0.98	0.99	0.99	0.96	0.92	0.88	0.85	0.85	0.87	0.92
34	RA 09 13	13.8	14.5	14.2	12.9	11.2	9.4	8.1	7.4	7.6	8.8	10.8	12.8	14.5
	DEC - 1239	0.11	0.17	0.21	0.26	0.28	0.28	0.25	0.21	0.17	0.13	0.12	0.13	0.18
35	RA 09 27	25.0	25.5	25.6	25.4	24.9	24.5	24.3	24.3	24.5	25.0	25.8	26.7	27.6
	DEC - 153	0.65	0.69	0.71	0.72	0.72	0.71	0.70	0.68	0.66	0.65	0.67	0.69	0.73
36	RA 10 08	10.7	11.5	11.7	11.6	11.2	10.7	10.5	10.4	10.5	10.9	11.7	12.6	13.6
	DEC 212	1.04	1.02	1.02	1.02	1.03	1.04	1.05	1.05	1.05	1.04	1.02	0.99	0.96
37	RA 11 01	36.7	38.0	38.7	38.6	38.0	37.1	36.3	35.8	35.7	36.0	37.0	38.3	39.9
	DEC 1002	0.63	0.64	0.67	0.71	0.74	0.76	0.75	0.73	0.69	0.64	0.59	0.56	0.54
38	RA 11 08	29.6	31.1	31.8	31.7	30.9	29.8	28.9	28.2	28.0	28.4	29.5	31.0	32.8
	DEC 1097	1.07	1.08	1.11	1.15	1.19	1.20	1.19	1.17	1.13	1.08	1.03	1.00	0.98
39	RA 11 48	51.9	52.8	53.4	53.5	53.4	53.0	52.7	52.4	52.2	52.3	52.8	53.6	54.6
	DEC 259	0.41	0.39	0.38	0.39	0.40	0.42	0.43	0.43	0.42	0.41	0.38	0.35	0.32
40	RA 11 53	37.3	38.7	39.5	39.7	39.3	38.6	37.8	37.2	36.8	36.9	37.5	38.6	40.1
	DEC 954	0.87	0.87	0.89	0.93	0.96	0.99	0.99	0.98	0.94	0.90	0.85	0.80	0.78
41	RA 12 15	36.7	37.7	38.3	38.6	38.5	38.2	37.9	37.5	37.3	37.3	37.7	38.5	39.5
	DEC + 311	0.45	0.48	0.51	0.54	0.55	0.55	0.54	0.53	0.51	0.50	0.50	0.51	0.54
42	RA 12 26	24.2	25.9	27.0	27.4	27.2	26.5	25.5	24.6	23.6	23.4	24.1	25.5	27.3
	DEC + 1121	0.29	0.32	0.37	0.42	0.47	0.50	0.51	0.49	0.46	0.42	0.38	0.36	0.37
43	RA 12 30	58.0	59.5	60.4	60.8	60.7	60.2	59.4	58.5	57.9	57.7	58.3	59.5	61.0
	DEC - 1014	0.87	0.91	0.95	1.00	1.04	1.07	1.08	1.07	1.03	1.00	0.96	0.95	0.96
44	RA 12 47	30.5	32.1	33.2	33.7	33.7	33.2	32.4	31.4	30.6	30.3	30.9	32.1	33.7
	DEC - 1060	0.67	0.70	0.74	0.79	0.83	0.86	0.87	0.86	0.83	0.80	0.76	0.74	0.75
45	RA 12 53	50.5	52.0	53.1	53.6	53.5	52.8	52.0	51.2	50.5	50.2	50.5	51.6	52.8
	DEC 995	0.14	0.13	0.14	0.18	0.22	0.25	0.27	0.26	0.23	0.19	0.14	0.09	0.05
46	RA 13 23	44.9	46.6	47.5	48.2	48.2	47.7	46.9	46.1	45.3	44.9	45.0	45.8	47.1
	DEC 976	0.74	0.72	0.74	0.77	0.81	0.85	0.87	0.86	0.84	0.80	0.75	0.70	0.66
47	RA 13 24	59.2	60.2	60.9	61.4	61.5	61.4	61.2	60.8	60.4	60.3	60.5	61.1	62.0
	DEC - 198	0.04	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.08	0.09	0.12
48	RA 13 47	22.0	23.4	24.4	25.1	25.2	24.9	24.3	23.6	22.9	22.4	22.4	23.0	24.1
	DEC 876	0.96	0.94	0.95	0.98	1.02	1.06	1.08	1.08	1.07	1.03	0.98	0.93	0.88
49	RA 14 03	32.8	34.6	36.0	37.0	37.4	37.4	36.8	35.8	34.8	34.2	34.2	35.1	36.7
	DEC - 1072	0.87	0.88	0.91	0.96	1.00	1.04	1.06	1.06	1.04	1.01	0.97	0.95	0.94
50	RA 14 06	27.0	28.2	29.1	29.8	30.1	30.1	29.9	29.4	28.8	28.5	28.5	29.1	30.2
	DEC - 646	0.17	0.19	0.22	0.25	0.28	0.30	0.31	0.30	0.29	0.27	0.25	0.24	0.24

Table 10b(4). Apparent places of stars, 1996 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	28.3	29.3	30.2	30.8	31.0	31.0	30.7	30.3	29.8	29.5	29.5	29.9	30.8
	DEC 341	0.36	0.33	0.32	0.33	0.35	0.38	0.40	0.41	0.41	0.39	0.36	0.32	0.28
52	RA 14 39	19.5	21.3	22.8	24.0	24.6	24.6	24.1	23.1	22.0	21.2	21.1	21.8	23.2
	DEC - 1081	0.14	0.15	0.17	0.21	0.25	0.29	0.31	0.32	0.30	0.27	0.24	0.21	0.20
53	RA 14 50	39.2	40.2	41.1	41.8	42.2	42.4	42.3	41.9	41.4	41.0	41.0	41.4	42.2
	DEC - 284	0.86	0.88	0.90	0.92	0.92	0.92	0.92	0.91	0.91	0.90	0.90	0.90	0.92
54	RA 14 50	38.5	40.9	43.4	45.3	46.0	45.4	43.8	41.6	39.3	37.6	36.4	36.6	38.3
	DEC 1318	0.55	0.52	0.52	0.56	0.60	0.65	0.68	0.69	0.68	0.64	0.59	0.53	0.48
55	RA 15 36	30.2	31.1	32.1	32.9	33.4	33.6	33.5	33.1	32.5	31.9	31.6	31.8	32.5
	DEC 475	0.16	0.12	0.11	0.13	0.14	0.18	0.20	0.22	0.23	0.21	0.19	0.15	0.10
56	RA 16 00	5.2	6.2	7.2	8.0	8.7	9.0	9.1	8.9	8.3	7.8	7.6	7.8	8.4
	DEC - 401	0.92	0.93	0.95	0.96	0.97	0.97	0.97	0.97	0.97	0.96	0.95	0.95	0.96
57	RA 16 29	9.0	10.0	10.9	11.9	12.6	13.1	13.2	13.0	12.5	11.9	11.6	11.7	12.3
	DEC - 469	0.69	0.70	0.71	0.72	0.73	0.74	0.74	0.75	0.74	0.74	0.73	0.72	0.73
58	RA 16 48	12.2	14.2	16.4	18.7	20.5	21.6	21.9	21.2	19.7	18.1	17.0	16.9	18.0
	DEC - 1226	0.96	0.93	0.93	0.95	0.98	1.01	1.05	1.08	1.09	1.08	1.05	1.02	0.98
59	RA 17 10	8.1	8.9	9.8	10.7	11.4	12.0	12.2	12.1	11.7	11.1	10.7	10.7	11.2
	DEC - 279	0.43	0.44	0.45	0.45	0.45	0.45	0.44	0.44	0.43	0.43	0.43	0.43	0.44
60	RA 17 33	19.2	20.1	21.1	22.2	23.1	23.9	24.3	24.2	23.7	23.0	22.5	22.4	22.8
	DEC - 659	0.52	0.52	0.52	0.52	0.53	0.54	0.55	0.56	0.57	0.57	0.56	0.54	0.53
61	RA 17 34	43.9	44.6	45.4	46.3	47.0	47.6	47.9	47.8	47.3	46.7	46.3	46.1	46.4
	DEC 223	0.37	0.34	0.32	0.31	0.33	0.36	0.39	0.41	0.43	0.43	0.42	0.39	0.36
62	RA 17 56	28.8	29.4	30.5	31.7	32.8	33.5	33.7	33.4	32.5	31.5	30.5	30.0	30.0
	DEC 915	0.39	0.34	0.31	0.31	0.33	0.38	0.43	0.47	0.50	0.50	0.49	0.45	0.39
63	RA 18 25	53.2	53.9	54.8	55.9	56.9	57.8	58.3	58.4	58.0	57.4	56.8	56.5	56.8
	DEC - 611	0.28	0.27	0.26	0.26	0.25	0.26	0.26	0.28	0.29	0.29	0.29	0.28	0.26
64	RA 18 36	46.8	47.3	48.0	49.1	50.0	50.5	51.2	51.1	50.6	49.8	49.1	48.6	48.6
	DEC 689	0.46	0.41	0.38	0.37	0.39	0.43	0.48	0.52	0.55	0.57	0.55	0.52	0.48
65	RA 18 55	0.0	0.5	1.3	2.3	3.2	4.0	4.6	4.8	4.6	4.0	3.4	3.1	3.3
	DEC - 467	0.56	0.55	0.55	0.54	0.53	0.52	0.52	0.53	0.53	0.54	0.54	0.54	0.53
66	RA 19 50	34.4	34.7	35.2	36.0	36.9	37.7	38.3	38.6	38.5	38.0	37.5	37.1	37.0
	DEC 157	0.51	0.49	0.47	0.47	0.48	0.51	0.54	0.57	0.59	0.60	0.60	0.58	0.56
67	RA 20 25	17.8	18.1	18.9	20.2	21.6	23.1	24.3	25.0	24.9	24.2	23.2	22.4	22.0
	DEC - 1008	0.85	0.82	0.79	0.76	0.74	0.73	0.74	0.77	0.80	0.82	0.83	0.82	0.80
68	RA 20 41	16.7	16.7	17.1	17.9	19.0	20.1	21.0	21.4	21.2	20.6	19.8	19.1	18.6
	DEC 804	0.80	0.76	0.72	0.70	0.70	0.73	0.77	0.82	0.86	0.89	0.91	0.89	0.86
69	RA 21 40	56.8	56.1	56.8	58.8	61.7	65.1	68.2	70.4	70.9	69.6	67.2	64.5	62.4
	DEC - 1375	1.18	1.13	1.08	1.03	1.00	0.99	1.00	1.03	1.07	1.11	1.14	1.13	1.11
70	RA 21 43	58.9	58.9	59.1	59.6	60.3	61.3	62.1	62.7	62.9	62.7	62.3	61.8	61.5
	DEC 175	0.27	0.25	0.23	0.23	0.24	0.26	0.29	0.33	0.35	0.36	0.37	0.36	0.34
71	RA 22 07	57.7	57.5	57.7	58.3	59.3	60.5	61.7	62.7	63.0	62.8	62.2	61.5	61.0
	DEC - 835	0.24	0.21	0.18	0.14	0.11	0.08	0.07	0.08	0.11	0.14	0.16	0.17	0.16
72	RA 22 57	25.3	25.0	25.1	25.4	26.1	27.0	28.1	28.9	29.4	29.4	29.1	28.6	28.2
	DEC - 526	1.02	1.01	0.99	0.96	0.93	0.90	0.88	0.87	0.88	0.89	0.92	0.93	0.94
73	RA 23 04	33.7	33.5	33.4	33.7	34.3	35.2	36.1	36.9	37.3	37.4	37.1	36.8	36.4
	DEC 269	0.98	0.96	0.94	0.93	0.93	0.95	0.98	1.01	1.04	1.06	1.07	1.07	1.06

Table 10b(5). Apparent places of stars, 1997 (mils of declination)

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
1	RA 00 09	14.2	13.7	13.5	13.6	14.0	14.9	15.9	16.9	17.5	17.7	17.7	17.3	16.9
	DEC 516	0.91	0.89	0.87	0.85	0.84	0.84	0.87	0.90	0.94	0.97	1.00	1.00	1.00
2	RA 00 09	1.8	0.8	0.3	0.3	1.0	2.3	3.9	5.3	6.2	6.5	6.3	5.6	4.7
	DEC 1051	0.34	0.32	0.29	0.24	0.21	0.20	0.22	0.25	0.30	0.35	0.40	0.42	0.43
3	RA 00 25	32.6	30.1	28.6	28.3	29.3	31.6	34.6	37.8	40.2	41.1	40.3	38.2	35.5
	DEC -1373	0.81	0.79	0.75	0.69	0.63	0.60	0.57	0.57	0.60	0.64	0.69	0.72	0.72
4	RA 00 26	7.6	7.0	6.6	6.6	7.1	7.9	9.0	10.1	11.0	11.3	11.2	10.8	10.2
	DEC - 752	0.47	0.47	0.44	0.40	0.36	0.32	0.29	0.27	0.28	0.31	0.35	0.38	0.39
5	RA 00 40	21.2	20.3	19.7	19.5	20.1	21.2	22.6	24.1	25.1	25.6	25.5	25.1	24.2
	DEC 1004	0.89	0.88	0.85	0.81	0.78	0.77	0.78	0.80	0.85	0.89	0.94	0.97	0.98
6	RA 00 43	26.2	25.8	25.6	25.5	25.9	26.6	27.5	28.4	29.1	29.5	29.5	29.3	28.9
	DEC - 319	1.10	1.10	1.10	1.08	1.05	1.01	0.98	0.96	0.95	0.96	0.98	1.00	1.01
7	RA 00 56	33.0	31.9	31.1	30.8	31.3	32.5	34.1	35.7	36.9	37.5	37.6	37.1	36.2
	DEC 1079	0.20	0.19	0.16	0.12	0.08	0.07	0.07	0.10	0.14	0.19	0.23	0.27	0.28
8	RA 01 25	38.8	37.7	36.8	36.4	36.8	37.8	39.3	41.0	42.3	43.1	43.4	43.1	42.3
	DEC 1070	0.64	0.64	0.64	0.57	0.54	0.52	0.52	0.54	0.58	0.62	0.67	0.71	0.73
9	RA 01 37	36.0	34.9	34.1	33.6	33.7	34.4	35.6	37.0	38.3	39.1	39.2	38.8	38.0
	DEC - 1017	0.92	0.92	0.89	0.85	0.80	0.74	0.71	0.69	0.69	0.73	0.77	0.81	0.84
10	See Table 11e. Apparent places of Polaris, 1997													
11	RA 02 06	61.1	60.7	60.2	59.9	60.0	60.6	61.5	62.5	63.4	64.0	64.3	64.3	64.1
	DEC 416	0.87	0.86	0.84	0.83	0.82	0.83	0.84	0.86	0.89	0.91	0.93	0.94	0.94
12	RA 02 58	9.6	8.9	8.2	7.7	7.5	7.8	8.5	9.5	10.6	11.4	11.9	11.9	11.6
	DEC - 716	0.83	0.85	0.84	0.82	0.78	0.73	0.69	0.65	0.64	0.66	0.69	0.74	0.77
13	RA 03 02	8.3	7.9	7.4	7.1	7.0	7.3	8.0	8.9	9.8	10.5	11.0	11.1	10.1
	DEC 72	0.46	0.45	0.45	0.45	0.45	0.47	0.50	0.52	0.54	0.55	0.55	0.54	0.53
14	RA 03 24	8.5	7.8	7.1	6.4	6.2	6.6	7.5	8.8	10.1	11.2	12.0	12.4	12.3
	DEC 886	0.25	0.26	0.26	0.24	0.21	0.19	0.17	0.18	0.20	0.22	0.25	0.29	0.31
15	RA 04 35	46.3	46.0	45.6	45.0	44.7	44.8	45.3	46.2	47.1	47.9	48.7	49.2	49.4
	DEC 293	0.36	0.35	0.35	0.35	0.34	0.35	0.36	0.37	0.39	0.39	0.40	0.39	0.39
16	RA 05 14	25.0	24.8	24.3	23.8	23.4	23.3	23.6	24.3	25.2	26.0	26.7	27.3	27.5
	DEC - 145	0.93	0.95	0.96	0.96	0.94	0.92	0.89	0.87	0.85	0.84	0.86	0.88	0.91
17	RA 05 16	30.1	29.9	29.3	28.5	27.9	27.9	28.4	29.4	30.6	31.7	32.9	33.7	34.1
	DEC 817	0.67	0.68	0.69	0.69	0.67	0.65	0.63	0.62	0.62	0.63	0.64	0.66	0.68
18	RA 05 24	59.6	59.5	59.1	58.5	58.1	58.1	58.4	59.1	59.9	60.8	61.5	62.2	62.5
	DEC 112	0.79	0.78	0.77	0.77	0.78	0.79	0.80	0.82	0.83	0.83	0.83	0.81	0.80
19	RA 05 26	7.8	7.6	7.2	6.6	6.1	6.1	6.5	7.2	8.2	9.1	10.1	10.8	11.1
	DEC 508	0.50	0.50	0.50	0.50	0.50	0.49	0.48	0.48	0.49	0.49	0.50	0.50	0.51
20	RA 05 36	5.1	5.0	4.6	4.0	3.6	3.5	3.8	4.4	5.2	6.0	6.8	7.5	7.8
	DEC - 21	0.46	0.47	0.48	0.48	0.47	0.46	0.44	0.41	0.40	0.39	0.40	0.42	0.44
21	RA 05 40	37.8	37.7	37.3	36.8	36.3	36.2	36.5	37.1	37.9	38.7	39.5	40.2	40.5
	DEC - 34	0.62	0.64	0.65	0.65	0.64	0.62	0.60	0.58	0.56	0.56	0.57	0.59	0.61
22	RA 05 55	2.0	2.0	1.6	1.0	0.6	0.5	0.7	1.3	2.1	3.0	3.8	4.5	4.9
	DEC 131	0.62	0.61	0.60	0.60	0.61	0.62	0.63	0.64	0.66	0.66	0.65	0.64	0.62
23	RA 06 23	55.5	55.2	54.4	53.3	52.3	51.7	51.6	52.1	53.1	54.2	55.4	56.3	56.7
	DEC - 936	0.84	0.89	0.92	0.92	0.91	0.87	0.83	0.78	0.74	0.73	0.75	0.80	0.85
24	RA 06 37	33.8	33.9	33.6	33.1	32.6	32.3	32.5	33.0	33.8	34.6	35.5	36.3	36.9
	DEC 291	0.54	0.53	0.53	0.54	0.54	0.54	0.54	0.55	0.55	0.55	0.55	0.53	0.53
25	RA 06 45	2.5	2.5	2.2	1.6	1.0	0.7	0.8	1.2	1.9	2.7	3.6	4.4	4.8
	DEC - 297	0.16	0.19	0.20	0.21	0.20	0.18	0.15	0.12	0.10	0.09	0.11	0.14	0.18

Table 10b(5). Apparent places of stars, 1997 (mile of declination) – continued

Star No.	Right Ascension (Hr Min) Declination (Mile)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
26	RA 06 58	32.2	32.2	31.8	31.2	30.6	30.1	30.1	30.5	31.2	32.0	32.9	33.8	34.3
	DEC - 514	1.05	1.08	1.10	1.11	1.10	1.08	1.04	1.00	0.97	0.96	0.98	1.01	1.06
27	RA 07 08	17.9	17.9	17.6	16.9	16.3	15.9	15.9	16.2	16.9	17.7	18.6	19.5	20.0
	DEC - 469	0.18	0.21	0.24	0.25	0.24	0.22	0.19	0.15	0.12	0.11	0.12	0.16	0.20
28	RA 07 34	26.1	26.3	26.1	25.6	25.0	24.6	24.6	25.0	25.7	26.6	27.6	28.6	29.5
	DEC 566	0.96	0.97	0.98	0.99	1.00	0.99	0.98	0.97	0.96	0.95	0.93	0.93	0.93
29	RA 07 39	10.1	10.3	10.2	9.7	9.2	8.8	8.8	9.1	9.7	10.5	11.3	12.2	12.9
	DEC 92	0.97	0.96	0.95	0.95	0.95	0.96	0.97	0.98	0.99	0.99	0.98	0.96	0.95
30	RA 07 45	9.4	9.7	9.5	9.0	8.5	8.1	8.0	8.4	9.0	9.9	10.9	11.8	12.7
	DEC 498	0.31	0.32	0.33	0.34	0.34	0.34	0.33	0.32	0.31	0.30	0.29	0.28	0.27
31	RA 08 09	28.7	29.0	28.6	27.9	27.0	26.2	25.8	25.9	26.4	27.3	28.4	29.5	30.4
	DEC - 841	0.40	0.45	0.50	0.52	0.53	0.51	0.47	0.43	0.39	0.36	0.36	0.40	0.45
32	RA 08 22	30.3	30.5	30.1	29.0	27.8	26.7	26.0	25.9	26.4	27.4	28.9	30.3	31.4
	DEC - 1057	0.78	0.84	0.89	0.92	0.93	0.91	0.86	0.83	0.78	0.76	0.75	0.78	0.83
33	RA 09 07	55.2	55.7	55.6	55.1	54.4	53.6	53.2	53.0	53.3	54.0	55.0	56.1	57.1
	DEC - 771	0.92	0.97	1.01	1.04	1.06	1.05	1.02	0.99	0.94	0.92	0.91	0.94	0.98
34	RA 09 13	14.5	15.2	14.8	13.6	11.8	10.0	8.7	8.0	8.2	9.3	11.3	13.4	15.0
	DEC - 1239	0.18	0.23	0.28	0.33	0.35	0.34	0.32	0.28	0.23	0.19	0.18	0.20	0.24
35	RA 09 27	27.6	28.1	28.2	28.0	27.5	27.1	26.9	26.8	27.1	27.6	28.4	29.3	30.2
	DEC - 153	0.73	0.76	0.78	0.79	0.79	0.78	0.77	0.75	0.73	0.73	0.74	0.76	0.80
36	RA 10 08	13.6	14.3	14.5	14.4	14.0	13.6	13.3	13.2	13.3	13.8	14.5	15.4	16.4
	DEC 212	0.96	0.95	0.94	0.94	0.95	0.96	0.97	0.97	0.97	0.96	0.94	0.91	0.88
37	RA 11 01	39.9	41.2	41.8	41.7	41.1	40.3	39.5	39.0	38.9	39.2	40.1	41.5	43.1
	DEC 1002	0.54	0.55	0.58	0.62	0.65	0.67	0.66	0.64	0.60	0.56	0.51	0.47	0.46
38	RA 11 03	32.8	34.3	34.9	34.9	34.1	33.1	32.1	31.4	31.3	31.7	32.7	34.2	36.1
	DEC 1097	0.98	1.00	1.02	1.06	1.10	1.12	1.11	1.08	1.04	1.00	0.95	0.91	0.90
39	RA 11 48	54.6	55.5	56.0	56.2	56.1	55.7	55.4	55.1	54.9	55.0	55.5	56.3	57.3
	DEC 259	0.32	0.30	0.29	0.30	0.31	0.33	0.34	0.34	0.34	0.32	0.29	0.26	0.23
40	RA 11 53	40.1	41.4	42.2	42.4	42.1	41.4	40.6	40.0	39.6	39.7	40.3	41.4	42.9
	DEC 954	0.78	0.78	0.80	0.84	0.87	0.90	0.90	0.89	0.85	0.81	0.76	0.72	0.69
41	RA 12 15	39.5	40.5	41.0	41.3	41.2	41.0	40.6	40.3	40.0	40.0	40.4	41.2	42.3
	DEC - 311	0.54	0.57	0.60	0.62	0.63	0.63	0.62	0.61	0.60	0.59	0.58	0.60	0.62
42	RA 12 26	27.3	29.0	30.0	30.4	30.2	29.5	28.5	27.6	26.6	26.3	27.0	28.4	30.2
	DEC - 1121	0.37	0.41	0.46	0.51	0.55	0.58	0.59	0.58	0.55	0.51	0.47	0.45	0.46
43	RA 12 31	1.0	2.5	3.4	3.8	3.7	3.2	2.4	1.5	0.8	0.7	1.2	2.4	4.0
	DEC - 1014	0.96	1.00	1.04	1.09	1.13	1.16	1.17	1.16	1.12	1.09	1.05	1.04	1.05
44	RA 12 47	33.7	35.3	36.3	36.9	36.9	36.3	35.5	34.6	33.7	33.4	33.9	35.1	36.8
	DEC - 1060	0.75	0.78	0.82	0.87	0.92	0.95	0.96	0.95	0.92	0.88	0.84	0.83	0.83
45	RA 12 53	52.8	54.3	55.3	55.9	55.8	55.2	54.4	53.5	52.9	52.6	52.8	53.8	55.2
	DEC 994	1.05	1.04	1.06	1.09	1.14	1.17	1.19	1.18	1.15	1.10	1.05	1.00	0.96
46	RA 13 23	47.1	48.5	49.6	50.2	50.3	49.8	49.1	48.2	47.5	47.0	47.1	47.9	49.2
	DEC 976	0.66	0.64	0.65	0.69	0.73	0.77	0.79	0.79	0.78	0.72	0.67	0.62	0.57
47	RA 13 25	2.0	3.0	3.7	4.2	4.3	4.2	4.0	3.6	3.2	3.1	3.2	3.8	4.8
	DEC - 198	0.12	0.15	0.17	0.19	0.19	0.19	0.18	0.17	0.16	0.16	0.16	0.17	0.20
48	RA 13 47	24.1	25.4	26.5	27.1	27.3	27.0	26.4	25.7	25.0	24.5	24.5	25.1	26.2
	DEC 876	0.88	0.86	0.87	0.90	0.94	0.98	1.00	1.01	0.99	0.95	0.90	0.85	0.80
49	RA 14 03	36.7	38.4	39.8	40.8	41.3	41.2	40.6	39.6	38.8	37.9	38.0	38.8	40.4
	DEC - 1072	0.94	0.96	0.99	1.03	1.08	1.11	1.14	1.14	1.12	1.09	1.05	1.02	1.02
50	RA 14 06	30.2	31.3	32.2	33.0	33.3	33.3	33.0	32.5	32.0	31.6	31.6	32.2	33.3
	DEC - 646	0.24	0.27	0.30	0.33	0.36	0.38	0.38	0.38	0.37	0.34	0.32	0.31	0.32

Table 10b(5). Apparent places of stars, 1997 (mils of declination) - continued

Star No.	Right Ascension (Hr Min) / Declination (Mils)	ZERO HOURS UNIVERSAL TIME (GMT) OF FIRST DAY OF MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Seconds (time of RA or arc of declination)												
51	RA 14 15	30.8	31.7	32.5	33.2	33.6	33.6	33.1	32.7	32.3	31.9	31.9	32.3	33.2
	DEC 341	0.28	0.25	0.24	0.25	0.27	0.30	0.32	0.33	0.32	0.31	0.28	0.24	0.20
52	RA 14 39	23.2	25.0	26.4	27.6	28.2	28.2	27.7	26.7	25.6	24.8	24.6	25.3	26.8
	DEC - 1081	0.28	0.20	0.23	0.27	0.31	0.35	0.37	0.38	0.37	0.34	0.30	0.27	0.26
53	RA 14 50	42.2	43.2	44.0	44.7	45.2	45.3	45.2	44.9	44.4	44.0	43.9	44.3	45.1
	DEC - 284	0.92	0.94	0.96	0.98	0.99	0.99	0.99	0.98	0.97	0.96	0.96	0.97	0.99
54	RA 14 50	38.3	40.8	43.2	45.1	45.8	45.3	43.7	41.5	39.2	37.3	36.3	36.6	38.2
	DEC 1318	0.48	0.46	0.46	0.49	0.54	0.59	0.62	0.63	0.61	0.58	0.52	0.47	0.42
55	RA 15 34	32.5	33.4	34.3	35.1	35.6	35.8	35.7	35.3	34.7	34.2	33.9	34.0	34.7
	DEC 475	0.10	0.07	0.06	0.06	0.09	0.13	0.16	0.18	0.18	0.17	0.14	0.10	0.05
56	RA 16 00	8.4	9.4	10.3	11.2	11.8	12.2	12.3	12.0	11.5	11.0	10.7	10.9	11.6
	DEC - 401	0.96	0.97	0.99	1.00	1.00	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00
57	RA 16 29	12.3	13.2	14.2	15.1	15.9	16.3	16.5	16.3	15.8	15.2	14.8	14.9	15.6
	DEC - 469	0.73	0.73	0.74	0.76	0.77	0.77	0.78	0.78	0.78	0.77	0.76	0.76	0.76
58	RA 16 48	18.0	19.9	22.0	24.3	26.2	27.3	27.5	26.9	25.4	23.8	22.6	22.5	23.6
	DEC - 1226	0.98	0.96	0.96	0.97	1.00	1.04	1.08	1.11	1.12	1.11	1.08	1.05	1.01
59	RA 17 10	11.2	11.9	12.8	13.7	14.5	15.0	15.3	15.2	14.8	14.2	13.8	13.7	14.2
	DEC - 279	0.44	0.45	0.46	0.47	0.47	0.46	0.46	0.45	0.45	0.45	0.45	0.45	0.46
60	RA 17 33	22.8	23.7	24.6	25.8	26.7	27.5	27.9	27.8	27.3	26.6	26.1	26.0	26.4
	DEC - 659	0.53	0.52	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.58	0.57	0.56	0.54
61	RA 17 34	46.4	47.1	47.8	48.7	49.5	50.1	50.3	50.2	49.8	49.2	48.7	48.6	48.9
	DEC 223	0.36	0.33	0.31	0.31	0.32	0.35	0.38	0.40	0.42	0.42	0.41	0.38	0.35
62	RA 17 56	30.0	30.7	31.7	32.9	34.0	34.7	34.9	34.6	33.8	32.7	31.7	31.2	31.3
	DEC 915	0.39	0.34	0.31	0.31	0.33	0.38	0.43	0.47	0.50	0.50	0.48	0.44	0.39
63	RA 18 23	56.8	57.5	58.3	59.4	60.4	61.3	61.8	61.9	61.6	60.9	60.3	60.0	60.3
	DEC - 611	0.26	0.25	0.25	0.24	0.24	0.25	0.25	0.27	0.28	0.28	0.28	0.27	0.26
64	RA 18 36	48.6	49.1	49.8	50.8	51.8	52.6	53.0	52.9	52.4	51.6	50.9	50.4	50.4
	DEC 689	0.48	0.43	0.40	0.39	0.41	0.45	0.50	0.54	0.57	0.58	0.57	0.54	0.49
65	RA 18 55	3.3	3.8	4.5	5.5	6.5	7.3	7.9	8.1	7.9	7.3	6.7	6.4	6.6
	DEC - 467	0.53	0.53	0.52	0.52	0.51	0.50	0.50	0.50	0.51	0.52	0.52	0.52	0.51
66	RA 19 50	37.0	37.3	37.8	38.6	39.5	40.3	40.9	41.2	41.1	40.6	40.0	39.7	39.6
	DEC 157	0.56	0.53	0.52	0.51	0.53	0.55	0.58	0.61	0.63	0.64	0.63	0.62	0.60
67	RA 20 25	22.0	22.3	23.0	24.3	25.8	27.3	28.5	29.1	29.1	28.4	27.3	26.5	26.2
	DEC - 1008	0.80	0.77	0.73	0.70	0.68	0.68	0.69	0.72	0.75	0.78	0.79	0.78	0.75
68	RA 20 41	18.6	18.5	18.9	19.8	20.8	21.9	22.8	23.2	23.0	22.4	21.6	20.8	20.4
	DEC 804	0.86	0.81	0.78	0.76	0.76	0.78	0.82	0.87	0.92	0.95	0.96	0.95	0.92
69	RA 21 41	2.4	1.7	2.3	4.4	7.4	10.8	13.9	16.1	16.6	15.5	13.0	10.3	8.3
	DEC - 1375	1.11	1.06	1.01	0.97	0.93	0.92	0.93	0.96	1.00	1.04	1.06	1.06	1.04
70	RA 21 44	1.5	1.5	1.7	2.2	3.0	3.9	4.7	5.3	5.5	5.3	4.9	4.4	4.1
	DEC 175	0.34	0.32	0.31	0.30	0.31	0.34	0.37	0.40	0.42	0.44	0.44	0.43	0.42
71	RA 22 08	1.0	0.8	1.0	1.6	2.6	3.8	5.0	6.0	6.4	6.2	5.5	4.8	4.3
	DEC - 834	1.16	1.14	1.11	1.07	1.03	1.01	1.00	1.01	1.03	1.06	1.09	1.10	1.09
72	RA 22 57	28.2	27.9	27.9	28.3	29.0	29.9	30.9	31.8	32.3	32.3	32.0	31.5	31.1
	DEC - 526	0.94	0.93	0.91	0.88	0.85	0.81	0.80	0.79	0.80	0.81	0.83	0.85	0.85
73	RA 23 04	36.4	36.1	36.1	36.3	37.0	37.8	38.8	39.6	40.0	40.0	39.8	39.4	39.0
	DEC 270	0.06	0.04	0.02	0.01	0.01	0.03	0.06	0.10	0.13	0.15	0.16	0.16	0.14

Table 11a. Apparent places of Polaris (star No. 10), 1993

	DECLINATION				RIGHT ASCENSION		
	DEG	MIN	SEC	MILS	HR	MIN	SEC
JAN 0	89	14	22	1586.48	02	25	33
JAN 10	89	14	23	1586.49	02	25	20
JAN 20	89	14	24	1586.49	02	25	06
JAN 30	89	14	25	1586.49	02	24	49
FEB 0	89	14	25	1586.49	02	24	47
FEB 10	89	14	25	1586.49	02	24	32
FEB 20	89	14	24	1586.49	02	24	17
FEB 30	89	14	22	1586.48	02	24	03
MAR 0	89	14	23	1586.48	02	24	05
MAR 10	89	14	21	1586.47	02	23	52
MAR 20	89	14	18	1586.46	02	23	42
MAR 30	89	14	15	1586.45	02	23	35
APR 0	89	14	15	1586.45	02	23	34
APR 10	89	14	12	1586.43	02	23	29
APR 20	89	14	09	1586.41	02	23	27
APR 30	89	14	06	1586.40	02	23	29
MAY 0	89	14	06	1586.40	02	23	29
MAY 10	89	14	03	1586.38	02	23	34
MAY 20	89	14	00	1586.37	02	23	41
MAY 30	89	13	58	1586.36	02	23	50
JUN 0	89	13	57	1586.36	02	23	51
JUN 10	89	13	55	1586.35	02	24	04
JUN 20	89	13	54	1586.34	02	24	19
JUN 30	89	13	52	1586.33	02	24	34
JUL 0	89	13	52	1586.33	02	24	34
JUL 10	89	13	52	1586.33	02	24	50
JUL 20	89	13	52	1586.33	02	25	08
JUL 30	89	13	52	1586.33	02	25	25
AUG 0	89	13	52	1586.33	02	25	27
AUG 10	89	13	53	1586.34	02	25	44
AUG 20	89	13	55	1586.34	02	26	00
AUG 30	89	13	57	1586.35	02	26	17
SEP 0	89	13	57	1586.36	02	26	18
SEP 10	89	13	59	1586.37	02	26	33
SEP 20	89	14	02	1586.38	02	26	46
SEP 30	89	14	05	1586.40	02	26	57
OCT 0	89	14	05	1586.40	02	26	57
OCT 10	89	14	09	1586.41	02	27	07
OCT 20	89	14	12	1586.43	02	27	15
OCT 30	89	14	16	1586.45	02	27	18
NOV 0	89	14	16	1586.45	02	27	19
NOV 10	89	14	20	1586.47	02	27	21
NOV 20	89	14	23	1586.49	02	27	20
NOV 30	89	14	27	1586.50	02	27	16
DEC 0	89	14	27	1586.50	02	27	16
DEC 10	89	14	30	1586.52	02	27	09
DEC 20	89	14	33	1586.53	02	27	00
DEC 30	89	14	35	1586.54	02	26	49

Table 11b. Apparent places of Polaris (star No. 10), 1994

	DECLINATION				RIGHT ASCENSION		
	DEG	MIN	SEC	MILS	HR	MIN	SEC
JAN 0	89	14	35	1586.54	02	26	47
JAN 10	89	14	37	1586.55	02	26	34
JAN 20	89	14	38	1586.56	02	26	18
JAN 30	89	14	39	1586.56	02	26	02
FEB 0	89	14	39	1586.56	02	26	00
FEB 10	89	14	39	1586.56	02	25	45
FEB 20	89	14	38	1586.56	02	25	29
FEB 30	89	14	36	1586.55	02	25	15
MAR 0	89	14	36	1586.55	02	25	17
MAR 10	89	14	35	1586.54	02	25	05
MAR 20	89	14	32	1586.53	02	24	54
MAR 30	89	14	29	1586.51	02	24	46
APR 0	89	14	29	1586.51	02	24	45
APR 10	89	14	26	1586.50	02	24	40
APR 20	89	14	23	1586.48	02	24	39
APR 30	89	14	20	1586.47	02	24	40
MAY 0	89	14	20	1586.47	02	24	40
MAY 10	89	14	17	1586.45	02	24	44
MAY 20	89	14	14	1586.44	02	24	51
MAY 30	89	14	11	1586.43	02	25	01
JUN 0	89	14	11	1586.43	02	25	02
JUN 10	89	14	09	1586.41	02	25	14
JUN 20	89	14	07	1586.41	02	25	28
JUN 30	89	14	06	1586.40	02	25	43
JUL 0	89	14	06	1586.40	02	25	43
JUL 10	89	14	05	1586.40	02	26	00
JUL 20	89	14	05	1586.40	02	26	17
JUL 30	89	14	06	1586.40	02	26	34
AUG 0	89	14	06	1586.40	02	26	36
AUG 10	89	14	07	1586.40	02	26	53
AUG 20	89	14	08	1586.41	02	27	11
AUG 30	89	14	10	1586.42	02	27	26
SEP 0	89	14	10	1586.42	02	27	28
SEP 10	89	14	13	1586.43	02	27	42
SEP 20	89	14	16	1586.45	02	27	56
SEP 30	89	14	19	1586.46	02	28	08
OCT 0	89	14	19	1586.46	02	28	08
OCT 10	89	14	22	1586.48	02	28	17
OCT 20	89	14	25	1586.50	02	28	24
OCT 30	89	14	29	1586.51	02	28	29
NOV 0	89	14	29	1586.52	02	28	29
NOV 10	89	14	33	1586.53	02	28	31
NOV 20	89	14	37	1586.55	02	28	30
NOV 30	89	14	40	1586.57	02	28	26
DEC 0	89	14	40	1586.57	02	28	26
DEC 10	89	14	43	1586.58	02	28	19
DEC 20	89	14	46	1586.60	02	28	10
DEC 30	89	14	48	1586.61	02	27	59

Table 11c. Apparent places of Polaris (star No. 10), 1995

	DECLINATION				RIGHT ASCENSION		
	DEG	MIN	SEC	MILS	HR	MIN	SEC
JAN 0	89	14	49	1586.61	02	27	57
JAN 10	89	14	50	1586.62	02	27	43
JAN 20	89	14	52	1586.63	02	27	28
JAN 30	89	14	52	1586.63	02	27	12
FEB 0	89	14	52	1586.63	02	27	11
FEB 10	89	14	52	1586.63	02	26	54
FEB 20	89	14	51	1586.62	02	26	38
FEB 30	89	14	50	1586.62	02	26	23
MAR 0	89	14	50	1586.62	02	26	27
MAR 10	89	14	48	1586.61	02	26	13
MAR 20	89	14	46	1586.60	02	26	02
MAR 30	89	14	43	1586.58	02	25	53
APR 0	89	14	43	1586.58	02	25	53
APR 10	89	14	40	1586.57	02	25	48
APR 20	89	14	36	1586.55	02	25	46
APR 30	89	14	33	1586.53	02	25	47
MAY 0	89	14	33	1586.53	02	25	47
MAY 10	89	14	30	1586.52	02	25	50
MAY 20	89	14	27	1586.51	02	25	58
MAY 30	89	14	25	1586.49	02	26	07
JUN 0	89	14	25	1586.49	02	26	08
JUN 10	89	14	22	1586.48	02	26	20
JUN 20	89	14	21	1586.47	02	26	34
JUN 30	89	14	20	1586.47	02	26	50
JUL 0	89	14	20	1586.47	02	26	50
JUL 10	89	14	19	1586.46	02	27	06
JUL 20	89	14	19	1586.46	02	27	22
JUL 30	89	14	19	1586.46	02	27	40
AUG 0	89	14	19	1586.47	02	27	42
AUG 10	89	14	20	1586.47	02	27	59
AUG 20	89	14	21	1586.48	02	28	16
AUG 30	89	14	23	1586.49	02	28	31
SEP 0	89	14	24	1586.49	02	28	33
SEP 10	89	14	26	1586.50	02	28	48
SEP 20	89	14	29	1586.51	02	29	02
SEP 30	89	14	32	1586.53	02	29	13
OCT 0	89	14	32	1586.53	02	29	13
OCT 10	89	14	35	1586.54	02	29	22
OCT 20	89	14	39	1586.56	02	29	30
OCT 30	89	14	42	1586.58	02	29	35
NOV 0	89	14	43	1586.58	02	29	35
NOV 10	89	14	46	1586.60	02	29	37
NOV 20	89	14	50	1586.62	02	29	35
NOV 30	89	14	53	1586.63	02	29	32
DEC 0	89	14	53	1586.63	02	29	32
DEC 10	89	14	57	1586.65	02	29	26
DEC 20	89	14	59	1586.66	02	29	16
DEC 30	89	15	02	1586.68	02	29	04

Table 11d. Apparent places of Polaris (star No. 10), 1996

	DECLINATION				RIGHT ASCENSION		
	DEG	MIN	SEC	MILS	HR	MIN	SEC
JAN 0	89	15	02	1586.68	02	29	03
JAN 10	89	15	04	1586.69	02	28	49
JAN 20	89	15	05	1586.69	02	28	34
JAN 30	89	15	06	1586.69	02	28	17
FEB 0	89	15	06	1586.69	02	28	16
FEB 10	89	15	05	1586.69	02	27	58
FEB 20	89	15	05	1586.69	02	27	43
FEB 30	89	15	03	1586.68	02	27	28
MAR 0	89	15	03	1586.68	02	27	30
MAR 10	89	15	01	1586.67	02	27	16
MAR 20	89	14	59	1586.66	02	27	05
MAR 30	89	14	56	1586.65	02	26	57
APR 0	89	14	56	1586.65	02	26	56
APR 10	89	14	53	1586.63	02	26	51
APR 20	89	14	50	1586.62	02	26	48
APR 30	89	14	47	1586.60	02	26	49
MAY 0	89	14	47	1586.60	02	26	49
MAY 10	89	14	44	1586.59	02	26	54
MAY 20	89	14	41	1586.57	02	27	01
MAY 30	89	14	38	1586.56	02	27	10
JUN 0	89	14	38	1586.56	02	27	11
JUN 10	89	14	36	1586.55	02	27	23
JUN 20	89	14	34	1586.54	02	27	37
JUN 30	89	14	33	1586.53	02	27	52
JUL 0	89	14	33	1586.53	02	27	52
JUL 10	89	14	32	1586.53	02	28	08
JUL 20	89	14	32	1586.53	02	28	25
JUL 30	89	14	33	1586.53	02	28	43
AUG 0	89	14	33	1586.53	02	28	45
AUG 10	89	14	34	1586.54	02	29	02
AUG 20	89	14	35	1586.54	02	29	18
AUG 30	89	14	37	1586.55	02	29	34
SEP 0	89	14	37	1586.56	02	29	36
SEP 10	89	14	40	1586.57	02	29	51
SEP 20	89	14	42	1586.58	02	30	04
SEP 30	89	14	46	1586.60	02	30	15
OCT 0	89	14	46	1586.60	02	30	15
OCT 10	89	14	49	1586.61	02	30	24
OCT 20	89	14	52	1586.63	02	30	32
OCT 30	89	14	56	1586.65	02	30	36
NOV 0	89	14	56	1586.65	02	30	37
NOV 10	89	15	00	1586.67	02	30	38
NOV 20	89	15	04	1586.69	02	30	37
NOV 30	89	15	07	1586.70	02	30	33
DEC 0	89	15	07	1586.70	02	30	33
DEC 10	89	15	10	1586.72	02	30	26
DEC 20	89	15	13	1586.73	02	30	16
DEC 30	89	15	16	1586.74	02	30	04

Table IIe. Apparent places of Polaris (star No. 10), 1997

	DECLINATION				RIGHT ASCENSION		
	DEG	MIN	SEC	MILS	HR	MIN	SEC
JAN 0	89	15	16	1586.74	02	30	02
JAN 10	89	15	18	1586.75	02	29	49
JAN 20	89	15	19	1586.76	02	29	33
JAN 30	89	15	19	1586.76	02	29	16
FEB 0	89	15	19	1586.76	02	29	14
FEB 10	89	15	19	1586.76	02	28	57
FEB 20	89	15	18	1586.76	02	28	42
FEB 30	89	15	17	1586.75	02	28	26
MAR 0	89	15	17	1586.75	02	28	29
MAR 10	89	15	15	1586.74	02	28	15
MAR 20	89	15	13	1586.73	02	28	05
MAR 30	89	15	10	1586.72	02	27	56
APR 0	89	15	10	1586.72	02	27	55
APR 10	89	15	07	1586.70	02	27	49
APR 20	89	15	04	1586.69	02	27	47
APR 30	89	15	01	1586.67	02	27	48
MAY 0	89	15	01	1586.67	02	27	48
MAY 10	89	14	58	1586.65	02	27	52
MAY 20	89	14	55	1586.64	02	27	58
MAY 30	89	14	52	1586.63	02	28	07
JUN 0	89	14	52	1586.63	02	28	08
JUN 10	89	14	50	1586.62	02	28	21
JUN 20	89	14	48	1586.61	02	28	34
JUN 30	89	14	47	1586.60	02	28	49
JUL 0	89	14	47	1586.60	02	28	49
JUL 10	89	14	46	1586.60	02	29	05
JUL 20	89	14	46	1586.60	02	29	23
JUL 30	89	14	47	1586.60	02	29	40
AUG 0	89	14	47	1586.60	02	29	42
AUG 10	89	14	48	1586.61	02	29	59
AUG 20	89	14	49	1586.61	02	30	15
AUG 30	89	14	51	1586.62	02	30	32
SEP 0	89	14	51	1586.62	02	30	33
SEP 10	89	14	54	1586.64	02	30	48
SEP 20	89	14	56	1586.65	02	31	01
SEP 30	89	15	00	1586.66	02	31	12
OCT 0	89	15	00	1586.66	02	31	12
OCT 10	89	15	03	1586.68	02	31	22
OCT 20	89	15	06	1586.70	02	31	29
OCT 30	89	15	10	1586.72	02	31	33
NOV 0	89	15	10	1586.72	02	31	34
NOV 10	89	15	14	1586.74	02	31	35
NOV 20	89	15	18	1586.75	02	31	35
NOV 30	89	15	21	1586.77	02	31	30
DEC 0	89	15	21	1586.77	02	31	30
DEC 10	89	15	24	1586.79	02	31	23
DEC 20	89	15	27	1586.80	02	31	13
DEC 30	89	15	30	1586.81	02	31	02

Table 12a. To determine azimuth from Polaris, 1993

LST	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	8^h	9^h	10^h	11^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	+27.5	+16.9	+ 5.1	- 7.0	-18.6	-29.0	-37.2	-42.9	-45.6	-45.2	-41.7	-35.4
3	27.0	16.4	4.5	7.6	19.2	29.4	37.6	43.1	45.7	45.1	41.4	35.0
6	26.5	15.8	3.9	8.2	19.7	29.9	37.9	43.3	45.7	45.0	41.2	34.7
9	26.0	15.2	3.3	8.8	20.3	30.3	38.3	43.5	45.7	44.8	40.9	34.3
12	25.5	14.6	2.7	9.4	20.8	30.8	38.6	43.7	45.8	44.7	40.6	33.9
15	+25.0	+14.1	+ 2.1	-10.0	-21.4	-31.2	-38.9	-43.9	-45.8	-44.6	-40.4	-33.5
18	24.5	13.5	1.5	10.6	21.9	31.7	39.2	44.0	45.8	44.4	40.1	33.1
21	24.0	12.9	0.9	11.2	22.4	- 32.1	39.5	44.2	45.8	44.3	39.8	32.6
24	23.5	12.3	+ 0.3	11.8	23.0	32.5	39.8	44.4	45.8	44.1	39.5	32.2
27	22.9	11.7	- 0.3	12.3	23.5	33.0	40.1	44.5	45.8	44.0	39.2	31.8
30	+22.4	+11.1	- 0.9	-12.9	-24.0	-33.4	-40.4	-44.6	-45.8	-43.8	-38.9	-31.4
33	21.9	10.5	1.5	13.5	24.5	33.8	40.7	44.8	45.8	43.6	38.6	30.9
36	21.3	10.0	2.1	14.1	25.0	34.2	41.0	44.9	45.7	43.4	38.2	30.5
39	20.8	9.4	2.8	14.7	25.5	34.6	41.2	45.0	45.7	43.2	37.9	30.0
42	20.3	8.8	3.4	15.2	26.0	35.0	41.5	45.1	45.6	43.0	37.6	29.6
45	+19.7	+ 8.2	- 4.0	-15.8	-26.5	-35.4	-41.8	-45.2	-45.6	-42.8	-37.2	-29.1
48	19.2	7.6	4.6	16.4	27.0	35.8	42.0	45.3	45.5	42.6	36.9	28.7
51	18.6	7.0	5.2	17.0	27.5	36.1	42.2	45.4	45.4	42.4	36.5	28.2
54	18.0	6.4	5.8	17.5	28.0	36.5	42.5	45.5	45.4	42.2	36.2	27.8
57	17.5	5.8	6.4	18.1	28.5	36.9	42.7	45.5	45.3	41.9	35.8	27.3
60	+16.9	+ 5.1	- 7.0	-18.6	-29.0	-37.2	-42.9	-45.6	-45.2	-41.7	-35.4	-26.8
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.3	+.2	+.1	.0	-.1	-.2	-.3
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.1	.0	-.2	-.3	-.3	-.3	-.1	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	-.1	-.1	.0	.0	+.1	+.1	+.1	+.2	+.2	+.2	+.2	+.2
FEB	-.3	-.2	-.2	-.1	-.1	.0	+.1	+.1	+.2	+.2	+.3	+.3
MAR	-.3	-.3	-.3	-.3	-.2	-.1	-.1	.0	+.1	+.2	+.3	+.3
APR	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1	+.2	+.2
MAY	-.2	-.3	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1
JUN	-.1	-.2	-.2	-.3	-.3	-.4	-.4	-.3	-.3	-.2	-.1	.0
JUL	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.3	-.3	-.3	-.2	-.2
AUG	+.2	+.2	+.1	.0	-.1	-.1	-.2	-.3	-.3	-.3	-.3	-.3
SEP	+.3	+.3	+.2	+.2	+.1	.0	.0	-.1	-.2	-.2	-.3	-.3
OCT	+.3	+.3	+.3	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.2	-.3
NOV	+.3	+.3	+.4	+.4	+.4	+.4	+.3	+.2	+.2	.0	-.1	-.2
DEC	+.1	+.2	+.3	+.4	+.4	+.5	+.4	+.4	+.3	+.2	+.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 12a. To determine azimuth from Polaris, 1993 – continued

LST	12^h	13^h	14^h	15^h	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	-26.8	-16.4	- 5.0	+ 6.8	+18.1	+28.2	+36.5	+42.4	+45.4	+45.4	+42.2	+36.1
3	26.3	15.9	4.4	7.4	18.6	28.7	36.9	42.6	45.5	45.3	42.0	35.8
6	25.8	15.3	3.8	7.9	19.2	29.2	37.2	42.8	45.6	45.2	41.7	35.4
9	25.3	14.8	3.2	8.5	19.7	29.6	37.6	43.1	45.6	45.1	41.5	35.0
12	24.8	14.2	2.6	9.1	20.2	30.1	37.9	43.3	45.7	45.0	41.2	34.6
15	-24.3	-13.6	- 2.0	+ 9.7	+20.8	+30.5	+38.3	+43.4	+45.7	+44.9	+41.0	+34.2
18	23.8	13.1	1.5	10.3	21.3	31.0	38.6	43.6	45.8	44.8	40.7	33.8
21	23.3	12.5	0.9	10.8	21.8	31.4	38.9	43.8	45.8	44.6	40.4	33.4
24	22.8	11.9	- 0.3	11.4	22.3	31.8	39.2	44.0	45.8	44.5	40.1	32.9
27	22.3	11.4	+ 0.3	12.0	22.9	32.2	39.5	44.1	45.8	44.3	39.8	32.5
30	-21.8	-10.8	+ 0.9	+12.5	+23.4	+32.7	+39.8	+44.3	+45.8	+44.2	+39.5	+32.1
33	21.3	10.2	1.5	13.1	23.9	33.1	40.1	44.4	45.8	44.0	39.2	31.7
36	20.7	9.6	2.1	13.7	24.4	33.5	40.4	44.6	45.8	43.9	38.9	31.2
39	20.2	9.1	2.7	14.2	24.9	33.9	40.7	44.7	45.8	43.7	38.6	30.8
42	19.7	8.5	3.3	14.8	25.4	34.3	40.9	44.8	45.7	43.5	38.2	30.3
45	-19.2	- 7.9	+ 3.8	+15.4	+25.9	+34.7	+41.2	+45.0	+45.7	+43.3	+37.9	+29.9
48	18.6	7.3	4.4	15.9	26.3	35.1	41.5	45.1	45.6	43.1	37.6	29.4
51	18.1	6.7	5.0	16.5	26.8	35.4	41.7	45.2	45.6	42.9	37.2	28.9
54	17.5	6.2	5.6	17.0	27.3	35.8	41.9	45.3	45.5	42.7	36.9	28.5
57	17.0	5.6	6.2	17.6	27.8	36.2	42.2	45.4	45.5	42.5	36.5	28.0
60	-16.4	- 5.0	+ 6.8	+18.1	+28.2	+36.5	+42.4	+45.4	+45.4	+42.2	+36.1	+27.5
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.3	+.2	+.1	.0	-.1	-.2	-.3
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.1	.0	-.2	-.3	-.3	-.3	-.1	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	+.1	+.1	.0	.0	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.2
FEB	+.3	+.2	+.2	+.1	+.1	.0	-.1	-.1	-.2	-.2	-.3	-.3
MAR	+.3	+.3	+.3	+.3	+.2	+.1	+.1	.0	-.1	-.2	-.3	-.3
APR	+.3	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1	-.2	-.2
MAY	+.2	+.3	+.3	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1
JUN	+.1	+.2	+.2	+.3	+.3	+.4	+.4	+.3	+.3	+.2	+.1	.0
JUL	-.1	.0	+.1	+.2	+.2	+.3	+.3	+.3	+.3	+.3	+.2	+.2
AUG	-.2	-.2	-.1	.0	+.1	+.1	+.2	+.3	+.3	+.3	+.3	+.3
SEP	-.3	-.3	-.2	-.2	-.1	.0	.0	+.1	+.2	+.2	+.3	+.3
OCT	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.2	+.3
NOV	-.3	-.3	-.4	-.4	-.4	-.4	-.3	-.2	-.2	.0	+.1	+.2
DEC	-.1	-.2	-.3	-.4	-.4	-.5	-.4	-.4	-.3	-.2	-.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\text{DOS (Latitude)}}$$

Table 12b. To determine azimuth from Polaris, 1994

LST	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	8^h	9^h	10^h	11^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	+27.6	+17.1	+ 5.4	- 6.7	-18.3	-28.6	-36.9	-42.6	-45.4	-45.0	-41.6	-35.4
3	27.1	16.5	4.8	7.3	18.9	29.1	37.3	42.8	45.4	44.9	41.4	35.0
6	26.6	15.9	4.2	7.9	19.4	29.6	37.6	43.0	45.5	44.8	41.1	34.7
9	26.1	15.4	3.6	8.5	20.0	30.0	38.0	43.2	45.5	44.7	40.8	34.3
12	25.6	14.8	2.9	9.1	20.5	30.5	38.3	43.4	45.6	44.6	40.6	33.9
15	+25.1	+14.2	+ 2.3	- 9.7	-21.1	-30.9	-38.6	-43.6	-45.6	-44.4	-40.3	-33.5
18	24.6	13.6	1.7	10.3	21.6	31.4	38.9	43.8	45.6	44.3	40.0	33.1
21	24.1	13.1	1.1	10.9	22.1	31.8	39.2	43.9	45.6	44.2	39.7	32.7
24	23.6	12.5	+ 0.5	11.5	22.7	32.2	39.5	44.1	45.6	44.0	39.4	32.2
27	23.0	11.9	- 0.1	12.1	23.2	32.7	39.8	44.2	45.6	43.8	39.1	31.8
30	+22.5	+11.3	- 0.7	-12.6	-23.7	-33.1	-40.1	-44.4	-45.6	-43.7	-38.8	-31.4
33	22.0	10.7	1.3	13.2	24.2	33.5	40.4	44.5	45.6	43.5	38.5	31.0
36	21.5	10.1	1.9	13.8	24.7	33.9	40.7	44.6	45.5	43.3	38.2	30.5
39	20.9	9.5	2.5	14.4	25.2	34.3	41.0	44.8	45.5	43.1	37.9	30.1
42	20.4	9.0	3.1	15.0	25.7	34.7	41.2	44.9	45.4	42.9	37.5	29.6
45	+19.8	+ 8.4	- 3.7	-15.5	-26.2	-35.1	-41.5	-45.0	-45.4	-42.7	-37.2	-29.2
48	19.3	7.8	4.3	16.1	26.7	35.5	41.7	45.1	45.3	42.5	36.9	28.7
51	18.7	7.2	4.9	16.7	27.2	35.8	42.0	45.2	45.3	42.3	36.5	28.3
54	18.2	6.6	5.5	17.2	27.7	36.2	42.2	45.2	45.2	42.1	36.1	27.8
57	17.6	6.0	6.1	17.8	28.2	36.6	42.4	45.3	45.1	41.8	35.8	27.3
60	+17.1	+ 5.4	- 6.7	-18.3	-28.6	-36.9	-42.6	-45.4	-45.0	-41.6	-35.4	-26.9
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.3	+.2	+.1	.0	-.1	-.2	-.3
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	-.1	-.1	.0	.0	+.1	+.1	+.2	+.2	+.2	+.2	+.2	+.2
FEB	-.3	-.2	-.2	-.1	.0	.0	+.1	+.2	+.2	+.3	+.3	+.3
MAR	-.3	-.3	-.3	-.3	-.2	-.1	.0	+.1	+.1	+.2	+.3	+.3
APR	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1	+.2	+.3
MAY	-.2	-.3	-.3	-.4	-.4	-.3	-.3	-.2	-.1	.0	.0	+.1
JUN	-.1	-.2	-.2	-.3	-.3	-.4	-.3	-.3	-.3	-.2	-.1	.0
JUL	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.3	-.3	-.3	-.2	-.2
AUG	+.2	+.2	+.1	.0	-.1	-.1	-.2	-.2	-.3	-.3	-.3	-.3
SEP	+.3	+.3	+.2	+.2	+.1	+.1	.0	-.1	-.2	-.2	-.3	-.3
OCT	+.3	+.3	+.3	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.2	-.2
NOV	+.2	+.3	+.4	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1
DEC	+.1	+.2	+.3	+.4	+.4	+.5	+.5	+.4	+.3	+.2	+.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 12b. To determine azimuth from Polaris, 1994 - continued

LST	12^h	13^h	14^h	15^h	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	-26.9	-16.6	- 5.2	+ 6.5	+17.8	+27.9	+36.2	+42.1	+45.2	+45.2	+42.1	+36.1
3	26.6	16.0	4.6	7.1	18.4	28.4	36.6	42.4	45.3	45.1	41.9	35.7
6	25.9	15.5	4.0	7.7	18.9	28.9	36.9	42.6	45.4	45.0	41.7	35.4
9	25.4	14.9	3.4	8.3	19.4	29.3	37.3	42.8	45.4	45.0	41.4	35.0
12	24.9	14.4	2.9	8.8	20.0	29.8	37.6	43.0	45.5	44.8	41.1	34.6
15	-24.4	-13.8	+ 2.3	+ 9.4	+20.5	+30.2	+38.0	+43.2	+45.5	+44.7	+40.9	+34.2
18	23.9	13.2	1.7	10.0	21.0	30.7	38.3	43.4	45.5	44.6	40.6	33.8
21	23.4	12.7	1.1	10.6	21.5	31.1	38.6	43.5	45.6	44.5	40.3	33.4
24	22.9	12.1	- 0.5	11.1	22.0	31.5	38.9	43.7	45.6	44.4	40.1	33.0
27	22.4	11.5	+ 0.1	11.7	22.6	31.9	39.2	43.9	45.6	44.2	39.8	32.5
30	-21.9	-11.0	+ 0.7	+12.3	+23.1	+32.4	+39.5	+44.0	+45.6	+44.1	+39.5	+32.1
33	21.4	10.4	1.3	12.8	23.6	32.8	39.8	44.2	45.6	43.9	39.2	31.7
36	20.9	9.8	1.8	13.4	24.1	33.2	40.1	44.3	45.6	43.7	38.8	31.3
39	20.3	9.3	2.4	14.0	24.6	33.6	40.4	44.5	45.6	43.6	38.5	30.8
42	19.8	8.7	3.0	14.5	25.1	34.0	40.6	44.6	45.5	43.4	38.2	30.4
45	-19.3	- 8.1	+ 3.6	+15.1	+25.6	+34.4	+40.9	+44.7	+45.5	+43.2	+37.9	+29.9
48	18.7	7.5	4.2	15.6	26.0	34.8	41.2	44.8	45.5	43.0	37.5	29.5
51	18.2	6.9	4.8	16.2	26.5	35.1	41.4	44.9	45.4	42.8	37.2	29.0
54	17.7	6.4	5.4	16.7	27.0	35.5	41.7	45.0	45.4	42.6	36.8	28.5
57	17.1	5.8	5.9	17.3	27.5	35.9	41.9	45.1	45.3	42.4	36.5	28.0
60	-16.6	- 5.2	+ 6.5	+17.8	+27.9	+36.2	+42.1	+45.2	+45.2	+42.1	+36.1	+27.6
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.3	+.2	+.1	.0	-.1	-.2	-.3
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	+.1	+.1	.0	.0	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.2
FEB	+.3	+.2	+.2	+.1	.0	.0	-.1	-.2	-.2	-.3	-.3	-.3
MAR	+.3	+.3	+.3	+.3	+.2	+.1	.0	-.1	-.1	-.2	-.3	-.3
APR	+.3	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1	-.2	-.3
MAY	+.2	+.3	+.3	+.4	+.4	+.3	+.3	+.2	+.1	.0	.0	-.1
JUN	+.1	+.2	+.2	+.3	+.3	+.4	+.3	+.3	+.3	+.2	+.1	.0
JUL	-.1	.0	+.1	+.2	+.2	+.3	+.3	+.3	+.3	+.3	+.2	+.2
AUG	-.2	-.2	-.1	.0	+.1	+.1	+.2	+.2	+.3	+.3	+.3	+.3
SEP	-.3	-.3	-.2	-.2	-.1	-.1	.0	+.1	+.2	+.2	+.3	+.3
OCT	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.2	+.2
NOV	-.2	-.3	-.4	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1
DEC	-.1	-.2	-.3	-.4	-.4	-.5	-.5	-.4	-.3	-.2	-.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 12c. To determine azimuth from Polaris, 1995

LST	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	8^h	9^h	10^h	11^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	+27.6	+17.2	+ 5.5	- 6.5	-18.0	-28.3	-36.6	-42.3	-45.1	-44.8	-41.4	-35.3
3	27.1	16.6	5.0	7.1	18.6	28.7	36.9	42.5	45.1	44.7	41.2	34.9
6	26.6	16.0	4.4	7.7	19.1	29.2	37.2	42.7	45.2	44.6	40.9	34.6
9	26.1	15.5	3.8	8.2	19.7	29.7	37.6	42.9	45.2	44.4	40.7	34.2
12	25.6	14.9	3.2	8.8	20.2	30.1	37.9	43.1	45.2	44.3	40.4	33.8
15	+25.1	+14.3	+ 2.5	- 9.4	-20.7	-30.6	-38.2	-43.3	-45.3	-44.2	-40.1	-33.4
18	24.6	13.8	1.9	10.0	21.3	31.0	38.6	43.4	45.3	44.1	39.9	33.0
21	24.1	13.2	1.3	10.6	21.8	31.4	38.9	43.6	45.3	43.9	39.6	32.6
24	23.6	12.6	0.7	11.2	22.3	31.9	39.2	43.7	45.3	43.8	39.3	32.2
27	23.1	12.0	0.1	11.8	22.8	32.3	39.5	43.9	45.3	43.6	39.0	31.8
30	+22.6	+11.5	- 0.5	-12.3	-23.4	-32.7	-39.8	-44.0	-45.3	-43.5	-38.7	-31.4
33	22.0	10.9	1.1	12.9	23.9	33.1	40.0	44.2	45.3	43.3	38.4	30.9
36	21.5	10.3	1.7	13.5	24.4	33.5	40.3	44.3	45.2	43.1	38.1	30.5
39	21.0	9.7	2.3	14.1	24.9	33.9	40.6	44.4	45.2	42.9	37.7	30.1
42	20.4	9.1	2.9	14.6	25.4	34.3	40.8	44.5	45.2	42.7	37.4	29.6
45	+19.9	+ 8.5	- 3.5	-15.2	-25.9	-34.7	-41.1	-44.6	-45.1	-42.5	-37.1	-29.2
48	19.4	7.9	4.1	15.8	26.4	35.1	41.4	44.7	45.1	42.3	36.7	28.7
51	18.8	7.3	4.7	16.3	26.9	35.5	41.6	44.8	45.0	42.1	36.4	28.3
54	18.3	6.7	5.3	16.9	27.3	35.8	41.8	44.9	44.9	41.9	36.0	27.8
57	17.7	6.1	5.9	17.5	27.8	36.2	42.1	45.0	44.8	41.7	35.7	27.3
60	+17.2	+ 5.5	- 6.5	-18.0	-28.3	-36.6	-42.3	-45.1	-44.8	-41.4	-35.3	-26.9
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	-.1	-.1	.0	.0	.0	+.1	+.1	+.1	+.1	+.1	+.1	+.1
FEB	-.2	-.2	-.2	-.1	-.1	.0	.0	+.1	+.2	+.2	+.2	+.2
MAR	-.3	-.3	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.1	+.2	+.3
APR	-.3	-.3	-.4	-.4	-.4	-.3	-.2	-.2	-.1	.0	+.1	+.2
MAY	-.2	-.3	-.3	-.4	-.4	-.4	-.4	-.3	-.2	-.1	.0	+.1
JUN	.0	-.1	-.2	-.3	-.4	-.4	-.4	-.4	-.3	-.3	-.2	-.1
JUL	+.1	.0	-.1	-.2	-.3	-.3	-.4	-.4	-.4	-.3	-.3	-.2
AUG	+.2	+.2	+.1	.0	-.1	-.2	-.3	-.3	-.3	-.4	-.3	-.3
SEP	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.3
OCT	+.3	+.3	+.3	+.3	+.3	+.2	+.1	.0	-.1	-.2	-.2	-.3
NOV	+.3	+.3	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1	-.2
DEC	+.1	+.2	+.3	+.4	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\text{COS (Latitude)}}$$

Table 12c. To determine azimuth from Polaris, 1995 - continued

LST	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	-26.9	-16.7	- 5.4	+ 6.3	+17.5	+27.6	+35.9	+41.8	+44.9	+44.9	+41.9	+36.0
3	26.4	16.1	4.8	6.8	18.0	28.1	36.2	42.0	45.0	44.9	41.7	35.6
6	25.9	15.6	4.2	7.4	18.6	28.5	36.6	42.2	45.0	44.8	41.5	35.3
9	25.4	15.0	3.6	8.0	19.1	29.0	36.9	42.4	45.1	44.7	41.2	34.9
12	25.0	14.5	3.1	8.6	19.6	29.4	37.3	42.6	45.1	44.6	41.0	34.5
15	-24.5	-13.9	- 2.5	+ 9.1	+20.2	+29.9	+37.6	+42.8	+45.2	+44.5	+40.7	+34.1
18	24.0	13.4	1.9	9.7	20.7	30.3	37.9	43.0	45.2	44.4	40.4	33.7
21	23.5	12.8	1.3	10.3	21.2	30.7	38.2	43.2	45.3	44.2	40.2	33.3
24	23.0	12.2	0.7	10.8	21.7	31.2	38.5	43.4	45.3	44.1	39.9	32.9
27	22.5	11.7	0.1	11.4	22.2	31.6	38.9	43.5	45.3	44.0	39.6	32.5
30	-22.0	-11.1	+ 0.4	+12.0	+22.7	+32.0	+39.2	+43.7	+45.3	+43.8	+39.3	+32.1
33	21.4	10.5	1.0	12.5	23.2	32.4	39.4	43.9	45.3	43.7	39.0	31.6
36	20.9	10.0	1.6	13.1	23.7	32.8	39.7	44.0	45.3	43.5	38.7	31.2
39	20.4	9.4	2.2	13.7	24.2	33.2	40.0	44.1	45.3	43.3	38.4	30.8
42	19.9	8.8	2.8	14.2	24.7	33.6	40.3	44.3	45.3	43.2	38.1	30.3
45	-19.4	- 8.3	+ 3.4	+14.8	+25.2	+34.0	+40.5	+44.4	+45.2	+43.0	+37.7	+29.9
48	18.8	7.7	3.9	15.3	25.7	34.4	40.8	44.5	45.2	42.8	37.4	29.4
51	18.3	7.1	4.5	15.9	26.2	34.8	41.1	44.6	45.1	42.6	37.1	29.0
54	17.8	6.5	5.1	16.4	26.7	35.1	41.3	44.7	45.1	42.4	36.7	28.5
57	17.2	6.0	5.7	17.0	27.1	35.5	41.5	44.8	45.0	42.2	36.4	28.0
60	-16.7	- 5.4	+ 6.3	+17.5	+27.6	+35.9	+41.8	+44.9	+44.9	+41.9	+36.0	+27.6
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	+.1	+.1	.0	.0	.0	.0	-.1	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	+.1	+.1	.0	.0	.0	-.1	-.1	-.1	-.1	-.1	-.1	-.1
FEB	+.2	+.2	+.2	+.1	+.1	.0	.0	-.1	-.2	-.2	-.2	-.2
MAR	+.3	+.3	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.1	-.2	-.3
APR	+.3	+.3	+.4	+.4	+.4	+.3	+.2	+.2	+.1	.0	-.1	-.2
MAY	+.2	+.3	+.3	+.4	+.4	+.4	+.4	+.3	+.2	+.1	.0	-.1
JUN	.0	+.1	+.2	+.3	+.4	+.4	+.4	+.4	+.3	+.3	+.2	+.1
JUL	-.1	.0	+.1	+.2	+.3	+.3	+.4	+.4	+.4	+.3	+.3	+.2
AUG	-.2	-.2	-.1	.0	+.1	+.2	+.3	+.3	+.3	+.4	+.3	+.3
SEP	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.2	+.2	+.3	+.3	+.3
OCT	-.3	-.3	-.3	-.3	-.3	-.2	-.1	.0	+.1	+.2	+.2	+.3
NOV	-.3	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1	+.2
DEC	-.1	-.2	-.3	-.4	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 12d. To determine azimuth from Polaris, 1996

LST	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	8^h	9^h	10^h	11^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	+27.6	+17.3	+ 5.7	- 6.2	-17.7	-28.0	-36.3	-42.0	-44.8	-44.6	-41.3	-35.3
3	27.1	16.7	5.1	6.8	18.3	28.5	36.6	42.2	44.9	44.5	41.1	34.9
6	26.6	16.2	4.5	7.4	18.8	28.9	37.0	42.4	44.9	44.4	40.8	34.5
9	26.2	15.6	3.9	8.0	19.4	29.4	37.3	42.6	45.0	44.3	40.6	34.2
12	25.7	15.0	3.3	8.6	19.9	29.8	37.6	42.8	45.0	44.2	40.3	33.8
15	+25.2	+14.5	+ 2.7	- 9.2	-20.5	-30.3	-38.0	-43.0	-45.1	-44.0	-40.1	-33.4
18	24.7	13.9	2.1	9.8	21.0	30.7	38.3	43.2	45.1	43.9	39.8	33.0
21	24.2	13.3	1.5	10.4	21.5	31.1	38.6	43.3	45.1	43.8	39.5	32.6
24	23.7	12.8	0.9	10.9	22.0	31.6	38.9	43.5	45.1	43.6	39.2	32.2
27	23.2	12.2	0.3	11.5	22.6	32.0	39.2	43.7	45.1	43.5	38.9	31.8
30	+22.6	+11.6	- 0.3	-12.1	-23.1	-32.4	-39.5	-43.8	-45.1	-43.3	-38.6	-31.4
33	22.1	11.0	0.9	12.7	23.6	32.8	39.8	43.9	45.1	43.2	38.3	30.9
36	21.6	10.4	1.5	13.2	24.1	33.2	40.0	44.1	45.1	43.0	38.0	30.5
39	21.1	9.9	2.1	13.8	24.6	33.6	40.3	44.2	45.0	42.8	37.7	30.1
42	20.5	9.3	2.6	14.4	25.1	34.0	40.6	44.3	45.0	42.6	37.4	29.6
45	+20.0	+ 8.7	- 3.2	-14.9	-25.6	-34.4	-40.8	-44.4	-44.9	-42.4	-37.0	-29.2
48	19.5	8.1	3.8	15.5	26.1	34.8	41.1	44.5	44.9	42.2	36.7	28.8
51	18.9	7.5	4.4	16.1	26.6	35.2	41.3	44.6	44.8	42.0	36.4	28.3
54	18.4	6.9	5.0	16.6	27.0	35.5	41.6	44.7	44.7	41.8	36.0	27.8
57	17.8	6.3	5.6	17.2	27.5	35.9	41.8	44.8	44.7	41.6	35.6	27.4
60	+17.3	+ 5.7	- 6.2	-17.7	-28.0	-36.3	-42.0	-44.8	-44.6	-41.3	-35.3	-26.9
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	.0	+.1	.0	.0	.0	.0	.0	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	-.1	-.1	.0	.0	+.1	+.1	+.1	+.2	+.2	+.2	+.2	+.1
FEB	-.2	-.2	-.2	-.1	-.1	.0	+.1	+.1	+.2	+.2	+.2	+.2
MAR	-.3	-.3	-.3	-.3	-.2	-.1	-.1	.0	+.1	+.2	+.2	+.3
APR	-.3	-.3	-.4	-.4	-.3	-.3	-.2	-.1	.0	.0	+.1	+.2
MAY	-.2	-.3	-.3	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1
JUN	.0	-.1	-.2	-.3	-.4	-.4	-.4	-.4	-.3	-.2	-.2	-.1
JUL	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.4	-.4	-.3	-.3	-.2
AUG	+.2	+.2	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.3	-.3	-.3
SEP	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.1	-.2	-.3	-.3	-.3
OCT	+.3	+.3	+.3	+.3	+.3	+.2	+.1	.0	.0	-.1	-.2	-.3
NOV	+.3	+.3	+.4	+.4	+.4	+.4	+.3	+.2	+.1	.0	-.1	-.2
DEC	+.1	+.2	+.3	+.4	+.4	+.4	+.4	+.4	+.3	+.2	+.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 12d. To determine azimuth from Polaris, 1996 - continued

LST	12^h	13^h	14^h	15^h	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	-26.9	-16.8	- 5.6	+ 6.0	+17.2	+27.3	+35.6	+41.5	+44.7	+44.8	+41.8	+36.0
3	26.4	16.2	5.0	6.6	17.8	27.8	35.9	41.7	44.7	44.7	41.6	35.6
6	26.0	15.7	4.4	7.2	18.3	28.2	36.3	42.0	44.8	44.6	41.4	35.2
9	25.5	15.2	3.8	7.8	18.8	28.7	36.6	42.2	44.9	44.5	41.1	34.9
12	25.0	14.6	3.2	8.3	19.4	29.1	37.0	42.4	44.9	44.4	40.9	34.5
15	-24.5	-14.0	- 2.7	+ 8.9	+19.9	+29.6	+37.3	+42.6	+45.0	+44.3	+40.6	+34.1
18	24.0	13.5	2.1	9.5	20.4	30.0	37.6	42.8	45.0	44.2	40.4	33.7
21	23.5	12.9	1.5	10.0	20.9	30.4	38.0	42.9	45.1	44.1	40.1	33.3
24	23.0	12.4	0.9	10.6	21.4	30.9	38.3	43.1	45.1	44.0	39.8	32.9
27	22.5	11.8	0.3	11.2	22.0	31.3	38.6	43.3	45.1	43.8	39.5	32.5
30	-22.0	-11.3	+ 0.2	+11.7	+22.5	+31.7	+38.9	+43.5	+45.1	+43.7	+39.2	+32.1
33	21.5	10.7	0.8	12.3	23.0	32.1	39.2	43.6	45.1	43.5	38.9	31.6
36	21.0	10.1	1.4	12.9	23.5	32.5	39.5	43.8	45.1	43.4	38.6	31.2
39	20.5	9.6	2.0	13.4	24.0	32.9	39.7	43.9	45.1	43.2	38.3	30.8
42	20.0	9.0	2.6	14.0	24.4	33.3	40.0	44.0	45.1	43.0	38.0	30.3
45	-19.4	- 8.4	+ 3.1	+14.5	+24.9	+33.7	+40.3	+44.1	+45.0	+42.8	+37.7	+29.9
48	18.9	7.9	3.7	15.1	25.4	34.1	40.5	44.3	45.0	42.7	37.4	29.4
51	18.4	7.3	4.3	15.6	25.9	34.5	40.8	44.4	45.0	42.5	37.0	29.0
54	17.9	6.7	4.9	16.2	26.4	34.9	41.0	44.5	44.9	42.3	36.7	28.5
57	17.3	6.1	5.5	16.7	26.8	35.2	41.3	44.6	44.8	42.0	36.3	28.1
60	-16.8	- 5.6	+ 6.0	+17.2	+27.3	+35.6	+41.5	+44.7	+44.8	+41.8	+36.0	+27.6
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.4	+.3	+.2	.0	-.2	-.3	-.4
10	-.3	-.1	.0	+.2	+.3	+.3	+.3	+.1	.0	-.2	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	.0	+.1	.0	.0	.0	.0	.0	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	+.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	+.1	+.1	.0	.0	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.1
FEB	+.2	+.2	+.2	+.1	+.1	.0	-.1	-.1	-.2	-.2	-.2	-.2
MAR	+.3	+.3	+.3	+.3	+.2	+.1	+.1	.0	-.1	-.2	-.2	-.3
APR	+.3	+.3	+.4	+.4	+.3	+.3	+.2	+.1	.0	.0	-.1	-.2
MAY	+.2	+.3	+.3	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1
JUN	.0	+.1	+.2	+.3	+.4	+.4	+.4	+.4	+.3	+.2	+.2	+.1
JUL	-.1	.0	+.1	+.2	+.2	+.3	+.3	+.4	+.4	+.3	+.3	+.2
AUG	-.2	-.2	+.1	.0	+.1	+.2	+.2	+.3	+.3	+.3	+.3	+.3
SEP	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.1	+.2	+.3	+.3	+.3
OCT	-.3	-.3	-.3	-.3	-.3	-.2	-.1	.0	.0	+.1	+.2	+.3
NOV	-.3	-.3	-.4	-.4	-.4	-.4	-.3	-.2	-.1	.0	+.1	+.2
DEC	-.1	-.2	-.3	-.4	-.4	-.4	-.4	-.4	-.3	-.2	-.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\text{COS (Latitude)}}$$

Table 12e. To determine azimuth from Polaris, 1997

LST	0^h	1^h	2^h	3^h	4^h	5^h	6^h	7^h	8^h	9^h	10^h	11^h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	+27.6	+17.4	+ 5.9	- 6.0	-17.5	-27.7	-36.0	-41.8	-44.6	-44.4	-41.2	-35.2
3	27.2	16.8	5.3	6.6	18.0	28.2	36.3	42.0	44.7	44.3	41.0	34.9
6	26.7	16.3	4.7	7.2	18.6	28.6	36.7	42.2	44.7	44.2	40.7	34.5
9	26.2	15.7	4.1	7.8	19.1	29.1	37.0	42.4	44.8	44.1	40.5	34.1
12	25.7	15.2	3.5	8.4	19.7	29.5	37.4	42.6	44.8	44.0	40.2	33.8
15	+25.2	+14.6	+ 2.9	- 9.0	-20.2	-30.0	-37.7	-42.7	-44.9	-43.9	-40.0	-33.4
18	24.7	14.0	2.3	9.5	20.7	30.4	38.0	42.9	44.9	43.8	39.7	33.0
21	24.2	13.5	1.7	10.1	21.2	30.9	38.3	43.1	44.9	43.6	39.4	32.6
24	23.7	12.9	1.1	10.7	21.8	31.3	38.6	43.3	44.9	43.5	39.1	32.2
27	23.2	12.3	0.5	11.3	22.3	31.7	38.9	43.4	44.9	43.3	38.8	31.8
30	+22.7	+11.7	- 0.1	-11.9	-22.8	-32.1	-39.2	-43.6	-44.9	-43.2	-38.6	-31.4
33	22.2	11.2	0.7	12.4	23.3	32.6	39.5	43.7	44.9	43.0	38.2	30.9
36	21.7	10.6	1.3	13.0	23.8	33.0	39.8	43.8	44.9	42.8	37.9	30.5
39	21.1	10.0	1.8	13.6	24.3	33.4	40.1	44.0	44.8	42.7	37.6	30.1
42	20.6	9.4	2.4	14.1	24.8	33.8	40.3	44.1	44.8	42.5	37.3	29.7
45	+20.1	+ 8.8	- 3.0	-14.7	-25.3	-34.1	-40.6	-44.2	-44.8	-42.3	-37.0	-29.2
48	19.5	8.2	3.6	15.3	25.8	34.5	40.8	44.3	44.7	42.1	36.6	28.8
51	19.0	7.7	4.2	15.8	26.3	34.9	41.1	44.4	44.6	41.9	36.3	28.3
54	18.5	7.1	4.8	16.4	26.8	35.3	41.3	44.5	44.6	41.7	36.0	27.9
57	17.9	6.5	5.4	16.9	27.2	35.6	41.5	44.5	44.5	41.4	35.6	27.4
60	+17.4	+ 5.9	- 6.0	-17.5	-27.7	-36.0	-41.8	-44.6	-44.4	-41.2	-35.2	-26.9
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.3	+.3	+.2	.0	-.2	-.3	-.3
10	-.3	-.1	.0	+.1	+.3	+.3	+.3	+.1	.0	-.1	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	.0	+.1	.0	.0	.0	.0	.0	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	-.1	-.1	.0	.0	+.1	+.1	+.2	+.2	+.2	+.2	+.2	+.1
FEB	-.2	-.2	-.2	-.1	.0	.0	+.1	+.2	+.2	+.2	+.3	+.3
MAR	-.3	-.3	-.3	-.3	-.2	-.1	.0	.0	+.1	+.2	+.3	+.3
APR	-.3	-.3	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1	+.2	+.2
MAY	-.2	-.3	-.3	-.4	-.4	-.4	-.3	-.2	-.2	-.1	.0	+.1
JUN	-.1	-.2	-.2	-.3	-.3	-.4	-.4	-.3	-.3	-.2	-.1	.0
JUL	+.1	.0	-.1	-.2	-.2	-.3	-.3	-.3	+.3	-.3	-.2	-.2
AUG	+.2	+.2	+.1	.0	-.1	-.1	-.2	-.2	-.3	-.3	-.3	-.3
SEP	+.3	+.3	+.2	+.2	+.1	.0	.0	-.1	-.2	-.2	-.3	-.3
OCT	+.3	+.3	+.3	+.3	+.3	+.2	+.2	+.1	.0	-.1	-.2	-.2
NOV	+.2	+.3	+.4	+.4	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1
DEC	+.1	+.2	+.3	+.4	+.4	+.4	+.4	+.4	+.3	+.2	+.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\text{COS (Latitude)}}$$

Table 12a. To determine azimuth from Polaris, 1997 - continued

LST	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0	b_0
Minutes												
0	-26.9	-16.9	- 5.7	+ 5.8	+17.0	+27.0	+35.3	+41.3	+44.4	+44.6	+41.7	+35.9
3	26.5	16.3	5.1	6.4	17.5	27.5	35.7	41.5	44.5	44.5	41.5	35.6
6	26.0	15.8	4.6	7.0	18.1	28.0	36.0	41.7	44.6	44.4	41.3	35.2
9	25.5	15.3	4.0	7.5	18.6	28.4	36.4	41.9	44.7	44.4	41.0	34.8
12	25.1	14.7	3.4	8.1	19.1	28.9	36.7	42.1	44.7	44.3	40.8	34.4
15	-24.6	-14.2	- 2.8	+ 8.7	+19.6	+29.3	+37.0	+42.3	+44.8	+44.2	+40.5	+34.1
18	24.1	13.6	2.3	9.2	20.2	29.7	37.4	42.5	44.8	44.0	40.3	33.7
21	23.6	13.1	1.7	9.8	20.7	30.2	37.7	42.7	44.8	43.9	40.0	33.3
24	23.1	12.5	1.1	10.4	21.2	30.6	38.0	42.9	44.9	43.8	39.7	32.9
27	22.6	11.9	0.5	10.9	21.7	31.0	38.3	43.0	44.9	43.7	39.4	32.5
30	-22.1	-11.4	+ 0.1	+11.5	+22.2	+31.4	+38.6	+43.2	+44.9	+43.5	+39.2	+32.1
33	21.6	10.8	0.6	12.1	22.7	31.9	38.9	43.4	44.9	43.4	38.9	31.6
36	21.1	10.3	1.2	12.6	23.2	32.3	39.2	43.5	44.9	43.2	38.6	31.2
39	20.6	9.7	1.8	13.2	23.7	32.7	39.5	43.7	44.9	43.1	38.3	30.8
42	20.1	9.1	2.4	13.7	24.2	33.1	39.8	43.8	44.9	42.9	37.9	30.3
45	-19.5	- 8.6	+ 2.9	+14.3	+24.7	+33.4	+40.0	+43.9	+44.8	+42.7	+37.6	+29.9
48	19.0	8.0	3.5	14.8	25.2	33.8	40.3	44.0	44.8	42.5	37.3	29.5
51	18.5	7.4	4.1	15.4	25.6	34.2	40.5	44.1	44.8	42.3	37.0	29.0
54	18.0	6.9	4.7	15.9	26.1	34.6	40.8	44.2	44.7	42.1	36.6	28.6
57	17.4	6.3	5.3	16.5	26.6	35.0	41.0	44.3	44.7	41.9	36.3	28.1
60	-16.9	- 5.7	+ 5.8	+17.0	+27.0	+35.3	+41.3	+44.4	+44.6	+41.7	+35.9	+27.6
LATITUDE	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1	b_1
Degrees												
0	-.3	-.2	.0	+.2	+.3	+.3	+.3	+.2	.0	-.2	-.3	-.3
10	-.3	-.1	.0	+.1	+.3	+.3	+.3	+.1	.0	-.1	-.3	-.3
20	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
30	-.2	-.1	.0	+.1	+.2	+.2	+.2	+.1	.0	-.1	-.2	-.2
40	-.1	-.1	.0	+.1	+.1	+.1	+.1	+.1	.0	-.1	-.1	-.1
45	.0	.0	.0	.0	.0	+.1	.0	.0	.0	.0	.0	-.1
50	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
55	+.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	.0	+.1	+.1
60	+.1	+.1	.0	-.1	-.1	-.2	-.1	-.1	.0	+.1	+.1	+.2
62	+.2	+.1	.0	-.1	-.2	-.2	-.2	-.1	.0	+.1	+.2	+.2
64	+.2	+.1	.0	-.1	-.2	-.3	-.2	-.1	.0	+.1	+.2	+.3
66	+.3	+.2	.0	-.2	-.3	-.3	-.3	-.2	.0	+.2	+.3	+.3
MONTH	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2	b_2
JAN	+.1	+.1	.0	.0	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.1
FEB	+.2	+.2	+.2	+.1	.0	.0	-.1	-.2	-.2	-.2	-.3	-.3
MAR	+.3	+.3	+.3	+.3	+.2	+.1	.0	.0	-.1	-.2	-.3	-.3
APR	+.3	+.3	+.4	+.4	+.3	+.3	+.2	+.1	.0	-.1	-.2	-.2
MAY	+.2	+.3	+.3	+.4	+.4	+.4	+.3	+.2	+.2	+.1	.0	-.1
JUN	+.1	+.2	+.2	+.3	+.3	+.4	+.4	+.3	+.3	+.2	+.1	.0
JUL	-.1	.0	+.1	+.2	+.2	+.3	+.3	+.3	+.3	+.3	+.2	+.2
AUG	-.2	-.2	-.1	.0	+.1	+.1	+.2	+.2	+.3	+.3	+.3	+.3
SEP	-.3	-.3	-.2	-.2	-.1	.0	.0	+.1	+.2	+.2	+.3	+.3
OCT	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.1	.0	+.1	+.2	+.2
NOV	-.2	-.3	-.4	-.4	-.4	-.4	-.3	-.3	-.2	-.1	.0	+.1
DEC	-.1	-.2	-.3	-.4	-.4	-.4	-.4	-.4	-.3	-.2	-.1	.0

$$\text{Azimuth of Polaris} = \frac{(b_0 + b_1 + b_2)}{\cos(\text{Latitude})}$$

Table 13. Grid azimuth correction, simultaneous observation