

ARMY EPHEMERIS, 1993-1997

HEADQUARTERS, DEPARTMENT OF THE ARMY

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Effective 1 January 1993

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Note. Table numbers are referenced 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.

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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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 astronomical 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	39-45	38-53	38-02	37-15	36-27	35-44	35-01	34-20	33-40	33-01	32-26	31-51	31-36	30-43	30-14	29-46
20	35-57	35-06	34-20	33-35	32-53	32-11	31-33	30-55	30-18	29-44	29-09	28-38	28-07	27-37	27-07	26-42	26-17
40	32-00	31-15	30-34	29-54	29-16	28-39	28-05	27-31	26-59	26-28	25-57	25-30	25-02	24-35	24-09	23-46	23-23
01 00	28-42	28-01	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	20-59
20	25-55	25-19	24-46	24-13	23-43	23-13	22-45	22-18	21-51	21-26	21-02	20-39	20-17	19-55	19-44	19-15	18-57
40	23-34	23-00	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	16-00	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	14-56	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	13-35	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	15-25	15-05	14-45	14-27	14-08	13-51	13-35	13-19	13-04	12-48	12-35	12-21	12-08	11-55	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	09-08	08-59
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	10-46	10-32	10-18	10-05	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	09-59	09-45	09-32	09-20	09-08	08-56	08-46	08-35	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	07-05	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	07-16	07-07	06-57	06-49	06-40	06-32	06-24	06-17	06-09	06-02	05-56	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	05-49	05-43	05-37	05-31	05-25	05-20	05-15
09 00	06-56	06-46	06-37	06-28	06-20	06-12	06-05	05-58	05-51	05-44	05-37	05-31	05-25	05-19	05-14	05-09	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	04-59	04-53	04-49	04-44
10 00	06-16	06-07	06-00	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	06-05	05-56	05-48	05-41	05-34	05-27	05-20	05-14	05-08	05-02	04-56	04-51	04-45	04-40	04-35	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	04-19
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	04-49	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	04-59	04-52	04-46	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	03-39	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	03-05	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	02-26	02-23	02-21	02-18	02-15	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	01-59	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	01-59	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	01-49	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	01-59	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	01-36	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	01-39	01-36	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	01-15	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	01-15	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	01-09	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	01-15	01-14	01-13	01-11	01-10	01-09	01-07	01-06	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	01-06	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	00-55	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	00-45
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	00-45	00-44
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	00-45	00-44	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	00-44	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	00-39	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 1b. 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	9.60	9.39	9.18	8.99	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	6.35	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	5.85	5.72	5.60	5.48	5.36	5.26	5.15	5.05	4.95	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	3.95	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	3.76	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	3.29	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	2.46
100	3.13	3.05	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	2.05	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	1.95	1.91	1.88	1.84	1.80	1.77	1.74	1.71	1.68	1.65	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	1.35	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	0.95	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	0.85	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	0.85	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	0.85	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	0.75	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	0.79	0.77	0.76	0.74	0.72	0.71	0.70	0.68	0.67	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.58
420	0.77	0.75	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	0.55	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	0.51	0.50	0.49	0.48	0.47	0.47
500	0.63	0.62	0.60	0.59	0.58	0.57	0.55	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	0.45
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	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.45	0.44	0.43	0.43	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	0.45	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	0.36	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	0.29	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	0.35	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
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 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
910	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	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	0.19
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	0.19	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	0.19	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	0.15	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	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12
1140	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	0.13	0.12	0.12	0.12
1150	0.16	0.16	0.15	0.15	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	0.15	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	0.11	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	0.10	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		MIN	SEC	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)						MILS
JAN 0 TH	-23	05	40		-02	57.0		6	38	41.3
JAN 1 FR	-23	01	03	+ 278	-410.57	+1.37	-28.5	6	42	37.8
2 SA	-22	55	58	+ 305	-409.20	+1.51	-28.2	6	46	34.4
3 SU	-22	50	25	+ 332	-407.69	+1.64	-27.9	6	50	30.9
4 MO	-22	44	26	+ 360	-406.05	+1.78	-27.5	6	54	27.5
5 TU	-22	37	59	+ 387	-404.27	+1.91	-27.0	6	58	24.0
6 WE	-22	31	06	+ 413	-402.37	+2.04	-26.6	7	02	20.6
7 TH	-22	23	45	+ 440	-400.32	+2.17	-26.1	7	06	17.2
8 FR	-22	15	59	+ 467	-398.15	+2.31	-25.6	7	10	13.7
9 SA	-22	07	46	+ 493	-395.85	+2.43	-25.1	7	14	10.3
10 SU	-22	07	46	+ 519	-393.41	+2.56	-24.6	7	14	10.3
11 MO	-21	59	08	+ 544	-390.85	+2.69	-24.0	7	18	06.9
12 TU	-21	50	03	+ 570	-388.16	+2.81	-23.5	7	22	03.4
13 WE	-21	40	33	+ 595	-385.35	+2.94	-22.9	7	26	00.0
14 TH	-21	30	38	+ 620	-382.41	+3.06	-22.3	7	29	56.5
15 FR	-21	20	17	+ 645	-379.35	+3.19	-21.6	7	33	53.1
16 SA	-21	09	32	+ 669	-376.16	+3.30	-21.0	7	37	49.6
17 SU	-20	58	23	+ 694	-372.85	+3.43	-20.3	7	41	46.2
18 MO	-20	46	49	+ 717	-369.43	+3.54	-19.6	7	45	42.7
19 TU	-20	34	52	+ 741	-365.89	+3.66	-18.9	7	49	39.3
20 WE	-20	22	31	+ 764	-362.23	+3.77	-18.2	7	53	35.9
21 TH	-20	09	47	+ 787	-358.46	+3.89	-17.5	7	57	32.4
22 FR	-19	56	41	+ 809	-354.57	+4.00	-16.7	8	01	29.0
23 SA	-19	43	12	+ 831	-350.58	+4.10	-16.0	8	05	25.5
24 SU	-19	29	21	+ 853	-346.47	+4.21	-15.2	8	09	22.1
25 MO	-19	15	08	+ 874	-342.26	+4.32	-14.4	8	13	18.7
26 TU	-19	00	34	+ 895	-337.95	+4.42	-13.6	8	17	15.2
27 WE	-18	45	40	+ 915	-333.53	+4.52	-12.8	8	21	11.8
28 TH	-18	30	25	+ 935	-329.01	+4.62	-12.0	8	25	08.3
29 FR	-18	14	50	+ 955	-324.39	+4.72	-11.1	8	29	04.9
30 SA	-17	58	55	+ 974	-319.68	+4.81	-10.3	8	33	01.4
31 SU	-17	42	41	+ 993	-314.87	+4.90	- 9.5	8	36	58.0
				+1011	-309.96	+4.99	- 8.6	8	40	54.5

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME					
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC			
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)	
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 (GMT) - continued

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)							MILS
APR 1 TH	+ 4	27	43	+ 79.32	+6.85	-04	00.8	+17.9	12	37	27.7
2 FR	+ 4	50	50	+ 86.17	+6.82	-03	42.9	+17.8	12	41	24.3
3 SA	+ 5	13	52	+ 93.00	+6.80	-03	25.1	+17.7	12	45	20.9
4 SU	+ 5	36	49	+ 99.80	+6.77	-03	07.5	+17.5	12	49	17.4
5 MO	+ 5	59	39	+106.56	+6.74	-02	50.0	+17.3	12	53	14.0
6 TU	+ 6	22	24	+113.30	+6.71	-02	32.6	+17.2	12	57	10.5
7 WE	+ 6	45	01	+120.01	+6.67	-02	15.5	+16.9	13	01	07.0
8 TH	+ 7	07	32	+126.68	+6.64	-01	58.5	+16.7	13	05	03.6
9 FR	+ 7	29	56	+133.31	+6.60	-01	41.8	+16.4	13	09	00.2
10 SA	+ 7	52	12	+139.91	+6.56	-01	25.4	+16.2	13	12	56.7
11 SU	+ 8	14	21	+146.47	+6.52	-01	09.2	+15.9	13	16	53.3
12 MO	+ 8	36	21	+152.99	+6.48	-00	53.4	+15.5	13	20	49.8
13 TU	+ 8	58	12	+159.47	+6.43	-00	37.9	+15.2	13	24	46.4
14 WE	+ 9	19	55	+165.90	+6.39	-00	22.7	+14.8	13	28	42.9
15 TH	+ 9	41	29	+172.29	+6.34	-00	07.8	+14.5	13	32	39.5
16 FR	+10	02	53	+178.63	+6.29	+00	06.7	+14.1	13	36	36.0
17 SA	+10	24	07	+184.92	+6.24	+00	20.8	+13.7	13	40	32.6
18 SU	+10	45	11	+191.16	+6.19	+00	34.5	+13.3	13	44	29.1
19 MO	+11	06	04	+197.35	+6.13	+00	47.8	+12.9	13	48	25.7
20 TU	+11	26	46	+203.49	+6.08	+01	00.7	+12.5	13	52	22.2
21 WE	+11	47	17	+209.57	+6.02	+01	13.1	+12.0	13	56	18.8
22 TH	+12	07	36	+215.59	+5.96	+01	25.1	+11.6	14	00	15.3
23 FR	+12	27	44	+221.55	+5.90	+01	36.7	+11.1	14	04	11.9
24 SA	+12	47	39	+227.45	+5.84	+01	47.8	+10.7	14	08	08.4
25 SU	+13	07	21	+233.29	+5.77	+01	58.5	+10.2	14	12	05.0
26 MO	+13	26	50	+239.06	+5.71	+02	08.7	+ 9.7	14	16	01.6
27 TU	+13	46	06	+244.77	+5.64	+02	18.4	+ 9.2	14	19	58.1
28 WE	+14	05	09	+250.41	+5.57	+02	27.6	+ 8.7	14	23	54.7
29 TH	+14	23	57	+255.99	+5.50	+02	36.3	+ 8.2	14	27	51.2
30 FR	+14	42	31	+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		MIN	SEC	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)						MILS
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	+287.88	+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
JUN 1 TU	+22	01	29	+391.55	+2.38	+02	17.1	- 9.1	16	37	57.6
2 WE	+22	09	31	+393.93	+2.27	+02	08.0	- 9.5	16	41	54.1
3 TH	+22	17	10	+396.20	+2.15	+01	58.5	- 9.9	16	45	50.7
4 FR	+22	24	26	+398.35	+2.03	+01	48.6	-10.2	16	49	47.2
5 SA	+22	31	18	+400.38	+1.92	+01	38.4	-10.5	16	53	43.8
6 SU	+22	37	46	+402.30	+1.80	+01	27.9	-10.9	16	57	40.4
7 MO	+22	43	51	+404.10	+1.68	+01	17.0	-11.2	17	01	36.9
8 TU	+22	49	32	+405.79	+1.57	+01	05.8	-11.5	17	05	33.5
9 WE	+22	54	48	+407.35	+1.45	+00	54.4	-11.7	17	09	30.0
10 TH	+22	59	41	+408.79	+1.32	+00	42.6	-12.0	17	13	26.6
11 FR	+23	04	09	+410.12	+1.20	+00	30.7	-12.2	17	17	23.2
12 SA	+23	08	13	+411.32	+1.08	+00	18.5	-12.4	17	21	19.7
13 SU	+23	11	52	+412.41	+0.96	+00	06.1	-12.6	17	25	16.3
14 MO	+23	15	07	+413.37	+0.84	-00	06.5	-12.7	17	29	12.8
15 TU	+23	17	57	+414.21	+0.72	-00	19.3	-12.9	17	33	09.4
16 WE	+23	20	23	+414.93	+0.60	-00	32.1	-13.0	17	37	05.9
17 TH	+23	22	23	+415.52	+0.47	-00	45.1	-13.1	17	41	02.5
18 FR	+23	23	59	+416.00	+0.35	-00	58.2	-13.1	17	44	59.0
19 SA	+23	25	11	+416.35	+0.23	-01	11.3	-13.2	17	48	55.6
20 SU	+23	25	57	+416.58	+0.11	-01	24.5	-13.2	17	52	52.2
21 MO	+23	26	19	+416.68	-0.01	-01	37.7	-13.1	17	56	48.7
22 TU	+23	26	15	+416.67	-0.14	-01	50.8	-13.1	18	00	45.3
23 WE	+23	25	47	+416.53	-0.26	-02	03.9	-13.0	18	04	41.9
24 TH	+23	24	55	+416.27	-0.38	-02	16.9	-12.9	18	08	38.4
25 FR	+23	23	37	+415.89	-0.50	-02	29.8	-12.8	18	12	35.0
26 SA	+23	21	55	+415.38	-0.63	-02	42.5	-12.6	18	16	31.5
27 SU	+23	19	48	+414.76	-0.75	-02	55.1	-12.4	18	20	28.1
28 MO	+23	17	17	+414.01	-0.87	-03	07.5	-12.2	18	24	24.6
29 TU	+23	14	21	+413.14	-0.99	-03	19.7	-12.0	18	28	21.2
30 WE	+23	11	01	+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		MIN	SEC	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)						MILS
JUL 1 TH	+23	07	16	+411.04	-1.23	-03	43.4	18	36	14.3
2 FR	+23	03	08	+409.82	-1.35	-03	54.9	18	40	10.9
3 SA	+22	58	35	+408.47	-1.47	-04	06.1	18	44	07.4
4 SU	+22	53	38	+407.00	-1.59	-04	16.9	18	48	04.0
5 MO	+22	48	17	+405.42	-1.70	-04	27.5	18	52	00.5
6 TU	+22	42	32	+403.72	-1.82	-04	37.7	18	55	57.1
7 WE	+22	36	24	+401.90	-1.94	-04	47.6	18	59	53.7
8 TH	+22	29	52	+399.96	-2.05	-04	57.2	19	03	50.2
9 FR	+22	22	57	+397.91	-2.16	-05	06.3	19	07	46.8
10 SA	+22	15	39	+395.75	-2.28	-05	15.1	19	11	43.3
11 SU	+22	07	57	+393.47	-2.39	-05	23.4	19	15	39.9
12 MO	+21	59	53	+391.08	-2.50	-05	31.3	19	19	36.4
13 TU	+21	51	26	+388.57	-2.62	-05	38.8	19	23	33.0
14 WE	+21	42	36	+385.96	-2.73	-05	45.8	19	27	29.5
15 TH	+21	33	24	+383.23	-2.83	-05	52.4	19	31	26.1
16 FR	+21	23	50	+380.40	-2.94	-05	58.5	19	35	22.6
17 SA	+21	13	54	+377.45	-3.05	-06	04.1	19	39	19.2
18 SU	+21	03	37	+374.40	-3.16	-06	09.1	19	43	15.8
19 MO	+20	52	58	+371.25	-3.26	-06	13.7	19	47	12.3
20 TU	+20	41	58	+367.99	-3.36	-06	17.6	19	51	08.9
21 WE	+20	30	37	+364.63	-3.46	-06	21.1	19	55	05.5
22 TH	+20	18	56	+361.16	-3.57	-06	23.9	19	59	02.0
23 FR	+20	06	54	+357.60	-3.66	-06	26.2	20	02	58.6
24 SA	+19	54	32	+353.94	-3.76	-06	27.9	20	06	55.1
25 SU	+19	41	50	+350.17	-3.86	-06	29.0	20	10	51.7
26 MO	+19	28	49	+346.32	-3.96	-06	29.4	20	14	48.2
27 TU	+19	15	28	+342.36	-4.05	-06	29.3	20	18	44.8
28 WE	+19	01	49	+338.32	-4.14	-06	28.5	20	22	41.3
29 TH	+18	47	50	+334.18	-4.23	-06	27.1	20	26	37.9
30 FR	+18	33	34	+329.94	-4.32	-06	25.1	20	30	34.4
31 SA	+18	18	59	+325.62	-4.41	-06	22.5	20	34	31.0

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC
	°	'	"	DAILY CHANGE (SEC)					
AUG 1 SU	+18	04	06	+321.21	-06	19.2	20	38	27.6
2 MO	+17	48	55	+316.72	-06	15.4	20	42	24.1
3 TU	+17	33	27	+312.13	-06	10.9	20	46	20.7
4 WE	+17	17	42	+307.47	-06	05.8	20	50	17.2
5 TH	+17	01	40	+302.71	-06	00.1	20	54	13.8
6 FR	+16	45	21	+297.88	-05	53.9	20	58	10.3
7 SA	+16	28	46	+292.97	-05	47.0	21	02	06.9
8 SU	+16	11	55	+287.98	-05	39.6	21	06	03.4
9 MO	+15	54	49	+282.91	-05	31.6	21	10	00.0
10 TU	+15	37	27	+277.76	-05	23.0	21	13	56.5
11 WE	+15	19	50	+272.54	-05	13.9	21	17	53.1
12 TH	+15	01	58	+267.25	-05	04.3	21	21	49.6
13 FR	+14	43	51	+261.88	-04	54.0	21	25	46.2
14 SA	+14	25	31	+256.45	-04	43.3	21	29	42.8
15 SU	+14	06	56	+250.94	-04	32.0	21	33	39.3
16 MO	+13	48	08	+245.37	-04	20.2	21	37	35.9
17 TU	+13	29	07	+239.74	-04	07.9	21	41	32.4
18 WE	+13	09	53	+234.04	-03	55.1	21	45	29.0
19 TH	+12	50	27	+228.28	-03	41.8	21	49	25.5
20 FR	+12	30	48	+222.46	-03	27.9	21	53	22.1
21 SA	+12	10	58	+216.58	-03	13.6	21	57	18.6
22 SU	+11	50	56	+210.65	-02	58.8	22	01	15.2
23 MO	+11	30	43	+204.66	-02	43.6	22	05	11.7
24 TU	+11	10	19	+198.61	-02	27.9	22	09	08.3
25 WE	+10	49	45	+192.52	-02	11.7	22	13	04.9
26 TH	+10	29	00	+186.37	-01	55.1	22	17	01.4
27 FR	+10	08	06	+180.18	-01	38.1	22	20	58.0
28 SA	+ 9	47	02	+173.94	-01	20.7	22	24	54.5
29 SU	+ 9	25	49	+167.65	-01	02.9	22	28	51.1
30 MO	+ 9	04	27	+161.32	-00	44.8	22	32	47.6
31 TU	+ 8	42	56	+154.94	-00	26.3	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		MIN	SEC	HR	MIN	SEC	
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)						DAILY CHANGE (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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
OCT 1 FR	- 3 06 24		- 55.23		+10	11.3	0	38	57.3
2 SA	- 3 29 39	-1395	- 62.12	-6.89	+10	30.6	0	42	53.8
3 SU	- 3 52 52	-1393	- 69.00	-6.88	+10	49.6	0	46	50.4
4 MO	- 4 16 03	-1390	- 75.87	-6.86	+11	08.3	0	50	46.9
5 TU	- 4 39 10	-1388	- 82.72	-6.85	+11	26.7	0	54	43.5
6 WE	- 5 02 14	-1384	- 89.55	-6.83	+11	44.7	0	58	40.1
7 TH	- 5 25 15	-1381	- 96.37	-6.82	+12	02.3	1	02	36.6
8 FR	- 5 48 11	-1376	-103.17	-6.80	+12	19.4	1	06	33.2
9 SA	- 6 11 04	-1372	-109.94	-6.78	+12	36.1	1	10	29.7
10 SU	- 6 33 51	-1367	-116.70	-6.75	+12	52.4	1	14	26.3
11 MO	- 6 56 33	-1362	-123.42	-6.73	+13	08.2	1	18	22.8
12 TU	- 7 19 10	-1357	-130.12	-6.70	+13	23.4	1	22	19.4
13 WE	- 7 41 40	-1351	-136.79	-6.67	+13	38.2	1	26	15.9
14 TH	- 8 04 04	-1344	-143.43	-6.64	+13	52.4	1	30	12.5
15 FR	- 8 26 22	-1338	-150.03	-6.61	+14	06.1	1	34	09.0
16 SA	- 8 48 32	-1330	-156.60	-6.57	+14	19.2	1	38	05.6
17 SU	- 9 10 35	-1323	-163.14	-6.53	+14	31.8	1	42	02.1
18 MO	- 9 32 30	-1315	-169.63	-6.49	+14	43.7	1	45	58.7
19 TU	- 9 54 17	-1307	-176.08	-6.45	+14	55.1	1	49	55.3
20 WE	-10 15 55	-1298	-182.49	-6.41	+15	05.9	1	53	51.8
21 TH	-10 37 24	-1289	-188.86	-6.37	+15	16.0	1	57	48.4
22 FR	-10 58 43	-1279	-195.17	-6.32	+15	25.5	2	01	44.9
23 SA	-11 19 52	-1269	-201.44	-6.27	+15	34.4	2	05	41.5
24 SU	-11 40 51	-1259	-207.66	-6.22	+15	42.6	2	09	38.0
25 MO	-12 01 39	-1248	-213.82	-6.16	+15	50.1	2	13	34.6
26 TU	-12 22 17	-1237	-219.93	-6.11	+15	56.9	2	17	31.1
27 WE	-12 42 42	-1226	-225.99	-6.05	+16	02.9	2	21	27.7
28 TH	-13 02 56	-1214	-231.98	-6.00	+16	08.3	2	25	24.2
29 FR	-13 22 58	-1202	-237.92	-5.94	+16	12.9	2	29	20.8
30 SA	-13 42 47	-1189	-243.79	-5.87	+16	16.8	2	33	17.3
31 SU	-14 02 23	-1176	-249.59	-5.81	+16	19.9	2	37	13.9
		-1163		-5.74		+ 2.3			

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
NOV 1 MO	-14	21	45	-255.34	-5.67	+16	22.1	+ 1.5	2	41	10.4
2 TU	-14	40	54	-261.01	-5.60	+16	23.6	+ 0.7	2	45	07.0
3 WE	-14	59	49	-266.61	-5.53	+16	24.3	- 0.1	2	49	03.6
4 TH	-15	18	29	-272.14	-5.46	+16	24.2	- 1.0	2	53	00.1
5 FR	-15	36	54	-277.60	-5.38	+16	23.2	- 1.8	2	56	56.7
6 SA	-15	55	03	-282.98	-5.30	+16	21.4	- 2.7	3	00	53.2
7 SU	-16	12	57	-288.28	-5.22	+16	18.7	- 3.5	3	04	49.8
8 MO	-16	30	35	-293.51	-5.14	+16	15.2	- 4.4	3	08	46.3
9 TU	-16	47	56	-298.65	-5.06	+16	10.8	- 5.3	3	12	42.9
10 WE	-17	05	00	-303.70	-4.97	+16	05.5	- 6.1	3	16	39.4
11 TH	-17	21	46	-308.67	-4.88	+15	59.4	- 7.0	3	20	36.0
12 FR	-17	38	15	-313.55	-4.79	+15	52.4	- 7.9	3	24	32.5
13 SA	-17	54	25	-318.35	-4.70	+15	44.5	- 8.7	3	28	29.1
14 SU	-18	10	17	-323.05	-4.61	+15	35.8	- 9.6	3	32	25.7
15 MO	-18	25	49	-327.65	-4.51	+15	26.3	-10.4	3	36	22.2
16 TU	-18	41	02	-332.16	-4.41	+15	15.9	-11.2	3	40	18.8
17 WE	-18	55	55	-336.57	-4.31	+15	04.7	-12.0	3	44	15.3
18 TH	-19	10	28	-340.88	-4.21	+14	52.6	-12.9	3	48	11.9
19 FR	-19	24	41	-345.09	-4.10	+14	39.7	-13.7	3	52	08.5
20 SA	-19	38	32	-349.19	-4.00	+14	26.1	-14.5	3	56	05.0
21 SU	-19	52	02	-353.19	-3.89	+14	11.6	-15.2	4	00	01.6
22 MO	-20	05	10	-357.09	-3.78	+13	56.4	-16.0	4	03	58.1
23 TU	-20	17	56	-360.87	-3.67	+13	40.4	-16.8	4	07	54.7
24 WE	-20	30	19	-364.54	-3.56	+13	23.6	-17.5	4	11	51.2
25 TH	-20	42	20	-368.10	-3.45	+13	06.0	-18.3	4	15	47.8
26 FR	-20	53	58	-371.54	-3.33	+12	47.8	-19.0	4	19	44.3
27 SA	-21	05	12	-374.87	-3.21	+12	28.7	-19.7	4	23	40.9
28 SU	-21	16	02	-378.09	-3.09	+12	09.0	-20.4	4	27	37.4
29 MO	-21	26	29	-381.18	-2.97	+11	48.6	-21.1	4	31	34.0
30 TU	-21	36	31	-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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
DEC 1 WE	-21	46	08	-387.00	-2.73	+11	05.7	-22.5	4	39	27.1
2 TH	-21	55	20	-389.73	-2.60	+10	43.2	-23.1	4	43	23.7
3 FR	-22	04	08	-392.33	-2.48	+10	20.1	-23.7	4	47	20.3
4 SA	-22	12	29	-394.81	-2.35	+09	56.4	-24.3	4	51	16.8
5 SU	-22	20	25	-397.16	-2.22	+09	32.1	-24.9	4	55	13.4
6 MO	-22	27	55	-399.38	-2.09	+09	07.2	-25.4	4	59	09.9
7 TU	-22	34	59	-401.48	-1.96	+08	41.8	-26.0	5	03	06.5
8 WE	-22	41	36	-403.44	-1.83	+08	15.8	-26.5	5	07	03.0
9 TH	-22	47	46	-405.27	-1.69	+07	49.3	-26.9	5	10	59.6
10 FR	-22	53	30	-406.96	-1.56	+07	22.4	-27.4	5	14	56.1
11 SA	-22	58	46	-408.52	-1.43	+06	55.0	-27.8	5	18	52.7
12 SU	-23	03	35	-409.95	-1.29	+06	27.2	-28.2	5	22	49.3
13 MO	-23	07	57	-411.24	-1.16	+05	59.1	-28.5	5	26	45.8
14 TU	-23	11	51	-412.40	-1.02	+05	30.6	-28.8	5	30	42.4
15 WE	-23	15	17	-413.42	-0.88	+05	01.8	-29.0	5	34	38.9
16 TH	-23	18	16	-414.30	-0.75	+04	32.8	-29.3	5	38	35.5
17 FR	-23	20	47	-415.05	-0.61	+04	03.5	-29.4	5	42	32.1
18 SA	-23	22	49	-415.65	-0.47	+03	34.1	-29.6	5	46	28.6
19 SU	-23	24	24	-416.12	-0.33	+03	04.5	-29.7	5	50	25.2
20 MO	-23	25	30	-416.45	-0.19	+02	34.8	-29.8	5	54	21.7
21 TU	-23	26	08	-416.63	-0.05	+02	05.0	-29.8	5	58	18.3
22 WE	-23	26	18	-416.68	+0.09	+01	35.2	-29.8	6	02	14.8
23 TH	-23	26	00	-416.59	+0.23	+01	05.4	-29.8	6	06	11.4
24 FR	-23	25	14	-416.36	+0.37	+00	35.6	-29.8	6	10	07.9
25 SA	-23	23	59	-415.99	+0.51	+00	05.8	-29.7	6	14	04.5
26 SU	-23	22	16	-415.49	+0.65	-00	23.8	-29.5	6	18	01.1
27 MO	-23	20	05	-414.84	+0.79	-00	53.4	-29.4	6	21	57.6
28 TU	-23	17	26	-414.05	+0.92	-01	22.8	-29.2	6	25	54.2
29 WE	-23	14	19	-413.13	+1.06	-01	52.0	-29.0	6	29	50.7
30 TH	-23	10	44	-412.07	+1.20	-02	21.0	-28.8	6	33	47.3
31 FR	-23	06	41	-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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)	MILS							DAILY CHANGE (MILS)
JAN 0 FR	-23	06	41	+ 271	-410.87	+1.34	-02	49.8	-28.5	6	37	43.9
JAN 1 SA	-23	02	10	+ 298	-409.53	+1.47	-03	18.3	-28.2	6	41	40.4
2 SU	-22	57	12	+ 326	-408.06	+1.61	-03	46.5	-27.9	6	45	37.0
3 MO	-22	51	46	+ 353	-406.45	+1.74	-04	14.4	-27.6	6	49	33.5
4 TU	-22	45	53	+ 380	-404.71	+1.88	-04	42.0	-27.2	6	53	30.1
5 WE	-22	39	33	+ 407	-402.83	+2.01	-05	09.1	-26.8	6	57	26.6
6 TH	-22	32	46	+ 434	-400.82	+2.14	-05	35.9	-26.3	7	01	23.2
7 FR	-22	25	32	+ 461	-398.67	+2.28	-06	02.3	-25.9	7	05	19.8
8 SA	-22	17	51	+ 487	-396.40	+2.40	-06	28.2	-25.4	7	09	16.3
9 SU	-22	09	44	+ 513	-394.00	+2.53	-06	53.6	-24.9	7	13	12.9
10 MO	-22	01	11	+ 539	-391.46	+2.66	-07	18.4	-24.3	7	17	09.4
11 TU	-21	52	12	+ 564	-388.80	+2.79	-07	42.8	-23.8	7	21	06.0
12 WE	-21	42	48	+ 590	-386.01	+2.91	-08	06.5	-23.2	7	25	02.6
13 TH	-21	32	58	+ 615	-383.10	+3.04	-08	29.7	-22.5	7	28	59.1
14 FR	-21	22	43	+ 639	-380.07	+3.16	-08	52.2	-21.9	7	32	55.7
15 SA	-21	12	04	+ 664	-376.91	+3.28	-09	14.1	-21.2	7	36	52.2
16 SU	-21	01	00	+ 688	-373.63	+3.40	-09	35.3	-20.5	7	40	48.8
17 MO	-20	49	33	+ 711	-370.24	+3.51	-09	55.8	-19.8	7	44	45.3
18 TU	-20	37	41	+ 735	-366.72	+3.63	-10	15.6	-19.1	7	48	41.9
19 WE	-20	25	26	+ 758	-363.09	+3.74	-10	34.7	-18.3	7	52	38.4
20 TH	-20	12	49	+ 781	-359.35	+3.86	-10	53.0	-17.6	7	56	35.0
21 FR	-19	59	48	+ 803	-355.50	+3.97	-11	10.5	-16.8	8	00	31.6
22 SA	-19	46	25	+ 825	-351.53	+4.07	-11	27.3	-16.0	8	04	28.1
23 SU	-19	32	40	+ 847	-347.46	+4.18	-11	43.3	-15.2	8	08	24.7
24 MO	-19	18	33	+ 868	-343.28	+4.29	-11	58.5	-14.4	8	12	21.2
25 TU	-19	04	05	+ 889	-338.99	+4.39	-12	12.9	-13.6	8	16	17.8
26 WE	-18	49	17	+ 909	-334.60	+4.49	-12	26.5	-12.8	8	20	14.4
27 TH	-18	34	07	+ 930	-330.11	+4.59	-12	39.3	-12.0	8	24	10.9
28 FR	-18	18	38	+ 949	-325.52	+4.69	-12	51.3	-11.2	8	28	07.5
29 SA	-18	02	48	+ 969	-320.83	+4.79	-13	02.5	-10.4	8	32	04.0
30 SU	-17	46	39	+ 988	-316.05	+4.88	-13	12.9	- 9.6	8	36	00.6
31 MO	-17	30	11	+1007	-311.17	+4.97	-13	22.4	- 8.8	8	39	57.1

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
FEB 1 TU	-17 13 25	+1025	-306.20	+5.06	-13	31.2	8	43	53.7
2 WE	-16 56 20	+1043	-301.13	+5.15	-13	39.2	8	47	50.2
3 TH	-16 38 57	+1061	-295.98	+5.24	-13	46.3	8	51	46.8
4 FR	-16 21 16	+1078	-290.75	+5.32	-13	52.7	8	55	43.3
5 SA	-16 03 18	+1094	-285.42	+5.40	-13	58.3	8	59	39.9
6 SU	-15 45 04	+1111	-280.02	+5.49	-14	03.1	9	03	36.5
7 MO	-15 26 34	+1126	-274.54	+5.56	-14	07.1	9	07	33.0
8 TU	-15 07 47	+1142	-268.97	+5.64	-14	10.3	9	11	29.6
9 WE	-14 48 46	+1157	-263.34	+5.71	-14	12.8	9	15	26.1
10 TH	-14 29 29	+1171	-257.62	+5.78	-14	14.4	9	19	22.7
11 FR	-14 09 58	+1185	-251.84	+5.85	-14	15.3	9	23	19.2
12 SA	-13 50 13	+1199	-245.99	+5.92	-14	15.4	9	27	15.8
13 SU	-13 30 14	+1212	-240.07	+5.99	-14	14.8	9	31	12.3
14 MO	-13 10 02	+1225	-234.08	+6.05	-14	13.4	9	35	08.9
15 TU	-12 49 37	+1237	-228.03	+6.11	-14	11.2	9	39	05.4
16 WE	-12 29 00	+1249	-221.92	+6.17	-14	08.3	9	43	02.0
17 TH	-12 08 10	+1261	-215.76	+6.23	-14	04.6	9	46	58.5
18 FR	-11 47 10	+1272	-209.53	+6.28	-14	00.3	9	50	55.1
19 SA	-11 25 58	+1282	-203.25	+6.33	-13	55.2	9	54	51.6
20 SU	-11 04 35	+1293	-196.92	+6.39	-13	49.5	9	58	48.2
21 MO	-10 43 03	+1303	-190.53	+6.43	-13	43.0	10	02	44.8
22 TU	-10 21 20	+1312	-184.10	+6.48	-13	35.9	10	06	41.3
23 WE	- 9 59 28	+1321	-177.62	+6.52	-13	28.2	10	10	37.9
24 TH	- 9 37 27	+1330	-171.10	+6.57	-13	19.8	10	14	34.4
25 FR	- 9 15 17	+1338	-164.53	+6.61	-13	10.8	10	18	31.0
26 SA	- 8 52 59	+1346	-157.92	+6.65	-13	01.2	10	22	27.5
27 SU	- 8 30 33	+1354	-151.27	+6.69	-12	51.0	10	26	24.1
28 MO	- 8 07 59	+1361	-144.59	+6.72	-12	40.3	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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
MAR 1 TU	- 7 45 18	+1368	-137.87	+6.76	-12	29.1	10	34	17.2
2 WE	- 7 22 30	+1374	-131.11	+6.79	-12	17.4	10	38	13.7
3 TH	- 6 59 36	+1380	-124.33	+6.81	-12	05.1	10	42	10.3
4 FR	- 6 36 36	+1386	-117.51	+6.84	-11	52.5	10	46	06.8
5 SA	- 6 13 30	+1391	-110.67	+6.87	-11	39.4	10	50	03.4
6 SU	- 5 50 19	+1396	-103.80	+6.89	-11	25.8	10	54	00.0
7 MO	- 5 27 03	+1400	- 96.90	+6.91	-11	11.9	10	57	56.5
8 TU	- 5 03 42	+1405	- 89.99	+6.94	-10	57.6	11	01	53.1
9 WE	- 4 40 18	+1408	- 83.05	+6.95	-10	42.9	11	05	49.6
10 TH	- 4 16 49	+1411	- 76.10	+6.97	-10	27.8	11	09	46.2
11 FR	- 3 53 18	+1414	- 69.13	+6.98	-10	12.5	11	13	42.7
12 SA	- 3 29 44	+1417	- 62.14	+7.00	-09	56.8	11	17	39.3
13 SU	- 3 06 07	+1419	- 55.15	+7.01	-09	40.8	11	21	35.8
14 MO	- 2 42 28	+1420	- 48.14	+7.01	-09	24.5	11	25	32.4
15 TU	- 2 18 48	+1422	- 41.13	+7.02	-09	07.9	11	29	28.9
16 WE	- 1 55 06	+1423	- 34.10	+7.03	-08	51.1	11	33	25.5
17 TH	- 1 31 23	+1423	- 27.08	+7.03	-08	34.1	11	37	22.0
18 FR	- 1 07 40	+1423	- 20.05	+7.03	-08	16.8	11	41	18.6
19 SA	- 0 43 57	+1423	- 13.02	+7.03	-07	59.4	11	45	15.1
20 SU	- 0 20 14	+1423	- 5.99	+7.03	-07	41.8	11	49	11.7
21 MO	+ 0 03 29	+1422	+ 1.03	+7.02	-07	24.0	11	53	08.2
22 TU	+ 0 27 11	+1420	+ 8.05	+7.01	-07	06.1	11	57	04.8
23 WE	+ 0 50 51	+1419	+ 15.07	+7.01	-06	48.0	12	01	01.3
24 TH	+ 1 14 29	+1417	+ 22.07	+7.00	-06	29.9	12	04	57.9
25 FR	+ 1 38 06	+1414	+ 29.07	+6.98	-06	11.7	12	08	54.5
26 SA	+ 2 01 40	+1412	+ 36.05	+6.97	-05	53.4	12	12	51.0
27 SU	+ 2 25 12	+1409	+ 43.02	+6.96	-05	35.2	12	16	47.5
28 MO	+ 2 48 41	+1405	+ 49.98	+6.94	-05	16.9	12	20	44.1
29 TU	+ 3 12 06	+1402	+ 56.92	+6.92	-04	58.6	12	24	40.6
30 WE	+ 3 35 28	+1398	+ 63.84	+6.90	-04	40.4	12	28	37.2
31 TH	+ 3 58 45	+1393	+ 70.74	+6.88	-04	22.3	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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
APR 1 FR	+ 4	21	59	+ 77.62	+6.86	-04	04.2	+17.9	12	36	30.3
2 SA	+ 4	45	08	+ 84.48	+6.83	-03	46.3	+17.8	12	40	26.9
3 SU	+ 5	08	12	+ 91.32	+6.80	-03	28.5	+17.6	12	44	23.4
4 MO	+ 5	31	10	+ 98.12	+6.78	-03	10.9	+17.5	12	48	20.0
5 TU	+ 5	54	03	+104.90	+6.75	-02	53.4	+17.3	12	52	16.5
6 WE	+ 6	16	49	+111.65	+6.72	-02	36.2	+17.1	12	56	13.1
7 TH	+ 6	39	30	+118.37	+6.68	-02	19.1	+16.8	13	00	09.6
8 FR	+ 7	02	03	+125.05	+6.65	-02	02.3	+16.6	13	04	06.2
9 SA	+ 7	24	29	+131.70	+6.61	-01	45.7	+16.3	13	08	02.7
10 SU	+ 7	46	48	+138.31	+6.57	-01	29.3	+16.1	13	11	59.3
11 MO	+ 8	08	59	+144.88	+6.53	-01	13.3	+15.8	13	15	55.8
12 TU	+ 8	31	02	+151.42	+6.49	-00	57.5	+15.5	13	19	52.4
13 WE	+ 8	52	56	+157.90	+6.44	-00	42.0	+15.2	13	23	48.9
14 TH	+ 9	14	41	+164.35	+6.40	-00	26.8	+14.9	13	27	45.5
15 FR	+ 9	36	17	+170.75	+6.35	-00	11.9	+14.5	13	31	42.0
16 SA	+ 9	57	43	+177.10	+6.30	+00	02.6	+14.2	13	35	38.6
17 SU	+10	19	00	+183.41	+6.25	+00	16.8	+13.8	13	39	35.2
18 MO	+10	40	06	+189.66	+6.20	+00	30.6	+13.4	13	43	31.7
19 TU	+11	01	01	+195.86	+6.14	+00	44.0	+13.1	13	47	28.3
20 WE	+11	21	46	+202.00	+6.09	+00	57.1	+12.7	13	51	24.8
21 TH	+11	42	19	+208.09	+6.03	+01	09.8	+12.3	13	55	21.4
22 FR	+12	02	40	+214.12	+5.98	+01	22.0	+11.8	13	59	17.9
23 SA	+12	22	50	+220.10	+5.91	+01	33.8	+11.4	14	03	14.5
24 SU	+12	42	47	+226.01	+5.85	+01	45.2	+10.9	14	07	11.0
25 MO	+13	02	32	+231.86	+5.79	+01	56.2	+10.5	14	11	07.6
26 TU	+13	22	04	+237.65	+5.72	+02	06.6	+10.0	14	15	04.1
27 WE	+13	41	23	+243.37	+5.65	+02	16.6	+ 9.5	14	19	00.7
28 TH	+14	00	28	+249.03	+5.59	+02	26.0	+ 8.9	14	22	57.2
29 FR	+14	19	19	+254.61	+5.52	+02	35.0	+ 8.4	14	26	53.8
30 SA	+14	37	57	+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
MAY 1 SU	+14	56	20	+265.58	+5.37	+02	51.3	+ 7.3	14	34	46.9
2 MO	+15	14	28	+270.95	+5.30	+02	58.6	+ 6.8	14	38	43.5
3 TU	+15	32	22	+276.25	+5.22	+03	05.3	+ 6.2	14	42	40.0
4 WE	+15	49	59	+281.48	+5.15	+03	11.5	+ 5.6	14	46	36.6
5 TH	+16	07	22	+286.62	+5.07	+03	17.1	+ 5.0	14	50	33.1
6 FR	+16	24	28	+291.69	+4.99	+03	22.2	+ 4.5	14	54	29.7
7 SA	+16	41	17	+296.68	+4.90	+03	26.6	+ 3.9	14	58	26.2
8 SU	+16	57	50	+301.58	+4.82	+03	30.5	+ 3.3	15	02	22.8
9 MO	+17	14	07	+306.40	+4.74	+03	33.8	+ 2.7	15	06	19.3
10 TU	+17	30	05	+311.14	+4.65	+03	36.6	+ 2.2	15	10	15.9
11 WE	+17	45	47	+315.79	+4.56	+03	38.7	+ 1.6	15	14	12.4
12 TH	+18	01	10	+320.35	+4.47	+03	40.3	+ 1.0	15	18	09.0
13 FR	+18	16	15	+324.82	+4.38	+03	41.3	+ 0.5	15	22	05.6
14 SA	+18	31	02	+329.20	+4.29	+03	41.8	- 0.1	15	26	02.1
15 SU	+18	45	30	+333.48	+4.19	+03	41.7	- 0.7	15	29	58.7
16 MO	+18	59	39	+337.68	+4.10	+03	41.0	- 1.2	15	33	55.2
17 TU	+19	13	29	+341.77	+4.00	+03	39.8	- 1.8	15	37	51.8
18 WE	+19	26	59	+345.77	+3.90	+03	38.0	- 2.3	15	41	48.3
19 TH	+19	40	09	+349.68	+3.80	+03	35.8	- 2.8	15	45	44.9
20 FR	+19	53	00	+353.48	+3.70	+03	32.9	- 3.3	15	49	41.5
21 SA	+20	05	29	+357.18	+3.60	+03	29.6	- 3.9	15	53	38.0
22 SU	+20	17	38	+360.78	+3.50	+03	25.7	- 4.4	15	57	34.6
23 MO	+20	29	27	+364.28	+3.39	+03	21.4	- 4.9	16	01	31.1
24 TU	+20	40	54	+367.67	+3.29	+03	16.5	- 5.4	16	05	27.7
25 WE	+20	52	00	+370.96	+3.18	+03	11.1	- 5.9	16	09	24.2
26 TH	+21	02	44	+374.14	+3.08	+03	05.2	- 6.4	16	13	20.8
27 FR	+21	13	06	+377.22	+2.97	+02	58.8	- 6.9	16	17	17.3
28 SA	+21	23	07	+380.18	+2.85	+02	52.0	- 7.3	16	21	13.9
29 SU	+21	32	46	+383.04	+2.75	+02	44.7	- 7.8	16	25	10.5
30 MO	+21	42	02	+385.79	+2.63	+02	36.8	- 8.3	16	29	07.0
31 TU	+21	50	55	+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		DAILY CHANGE (SEC)	MILS		MIN SEC	DAILY CHANGE (SEC)	HR MIN SEC		
	°	'		''	MILS					
JUN 1 WE	+21	59	26	+390.94	+2.41	+02 19.9	- 9.1	16	37	00.1
2 TH	+22	07	34	+393.35	+2.30	+02 10.8	- 9.5	16	40	56.7
3 FR	+22	15	18	+395.64	+2.18	+02 01.2	- 9.9	16	44	53.2
4 SA	+22	22	39	+397.82	+2.06	+01 51.3	-10.3	16	48	49.8
5 SU	+22	29	37	+399.89	+1.95	+01 41.0	-10.6	16	52	46.3
6 MO	+22	36	11	+401.83	+1.83	+01 30.4	-11.0	16	56	42.9
7 TU	+22	42	22	+403.66	+1.71	+01 19.4	-11.3	17	00	39.5
8 WE	+22	48	08	+405.37	+1.59	+01 08.1	-11.6	17	04	36.0
9 TH	+22	53	30	+406.97	+1.47	+00 56.6	-11.8	17	08	32.6
10 FR	+22	58	29	+408.44	+1.35	+00 44.8	-12.0	17	12	29.1
11 SA	+23	03	03	+409.79	+1.23	+00 32.7	-12.3	17	16	25.7
12 SU	+23	07	13	+411.02	+1.11	+00 20.5	-12.4	17	20	22.3
13 MO	+23	10	58	+412.14	+0.99	+00 08.0	-12.6	17	24	18.8
14 TU	+23	14	19	+413.13	+0.87	-00 04.6	-12.7	17	28	15.4
15 WE	+23	17	15	+414.00	+0.75	-00 17.3	-12.8	17	32	11.9
16 TH	+23	19	46	+414.75	+0.63	-00 30.1	-12.9	17	36	08.5
17 FR	+23	21	53	+415.37	+0.50	-00 43.0	-13.0	17	40	05.0
18 SA	+23	23	35	+415.88	+0.38	-00 56.0	-13.0	17	44	01.6
19 SU	+23	24	53	+416.26	+0.26	-01 08.9	-13.0	17	47	58.1
20 MO	+23	25	45	+416.52	+0.14	-01 22.0	-13.0	17	51	54.7
21 TU	+23	26	13	+416.66	+0.01	-01 34.9	-13.0	17	55	51.3
22 WE	+23	26	16	+416.67	-0.11	-01 47.9	-12.9	17	59	47.8
23 TH	+23	25	54	+416.56	-0.23	-02 00.8	-12.8	18	03	44.4
24 FR	+23	25	08	+416.33	-0.35	-02 13.7	-12.8	18	07	40.9
25 SA	+23	23	56	+415.98	-0.47	-02 26.4	-12.7	18	11	37.5
26 SU	+23	22	20	+415.51	-0.60	-02 39.1	-12.5	18	15	34.1
27 MO	+23	20	20	+414.91	-0.72	-02 51.6	-12.4	18	19	30.6
28 TU	+23	17	54	+414.19	-0.84	-03 04.0	-12.2	18	23	27.2
29 WE	+23	15	04	+413.36	-0.96	-03 16.3	-12.0	18	27	23.7
30 TH	+23	11	50	+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
JUL 1 FR	+23	08	11	+411.31	-1.20	-03	40.1	-11.6	18	35	16.8
2 SA	+23	04	08	+410.11	-1.32	-03	51.7	-11.4	18	39	13.4
3 SU	+22	59	41	+408.79	-1.44	-04	03.1	-11.1	18	43	09.9
4 MO	+22	54	49	+407.35	-1.56	-04	14.2	-10.8	18	47	06.5
5 TU	+22	49	34	+405.80	-1.67	-04	25.0	-10.5	18	51	03.1
6 WE	+22	43	54	+404.12	-1.79	-04	35.5	-10.1	18	54	59.6
7 TH	+22	37	51	+402.33	-1.91	-04	45.6	-9.8	18	58	56.2
8 FR	+22	31	25	+400.42	-2.02	-04	55.4	-9.4	19	02	52.7
9 SA	+22	24	35	+398.39	-2.14	-05	04.8	-9.0	19	06	49.3
10 SU	+22	17	22	+396.25	-2.25	-05	13.8	-8.6	19	10	45.9
11 MO	+22	09	45	+394.00	-2.37	-05	22.3	-8.1	19	14	42.4
12 TU	+22	01	46	+391.64	-2.48	-05	30.4	-7.6	19	18	39.0
13 WE	+21	53	25	+389.16	-2.59	-05	38.1	-7.2	19	22	35.5
14 TH	+21	44	41	+386.57	-2.70	-05	45.2	-6.7	19	26	32.1
15 FR	+21	35	35	+383.87	-2.80	-05	51.9	-6.1	19	30	28.6
16 SA	+21	26	06	+381.07	-2.91	-05	58.0	-5.6	19	34	25.2
17 SU	+21	16	16	+378.15	-3.02	-06	03.7	-5.1	19	38	21.7
18 MO	+21	06	04	+375.13	-3.13	-06	08.7	-4.5	19	42	18.3
19 TU	+20	55	31	+372.01	-3.23	-06	13.2	-4.0	19	46	14.9
20 WE	+20	44	37	+368.77	-3.33	-06	17.2	-3.4	19	50	11.4
21 TH	+20	33	22	+365.44	-3.44	-06	20.6	-2.8	19	54	08.0
22 FR	+20	21	46	+362.00	-3.54	-06	23.4	-2.2	19	58	04.5
23 SA	+20	09	50	+358.47	-3.63	-06	25.6	-1.7	20	02	01.1
24 SU	+19	57	33	+354.83	-3.73	-06	27.3	-1.1	20	05	57.7
25 MO	+19	44	57	+351.09	-3.83	-06	28.4	-0.5	20	09	54.2
26 TU	+19	32	01	+347.26	-3.93	-06	28.9	+0.1	20	13	50.8
27 WE	+19	18	45	+343.33	-4.02	-06	28.8	+0.7	20	17	47.3
28 TH	+19	05	10	+339.31	-4.12	-06	28.1	+1.2	20	21	43.9
29 FR	+18	51	16	+335.19	-4.21	-06	26.9	+1.8	20	25	40.4
30 SA	+18	37	03	+330.98	-4.30	-06	25.1	+2.4	20	29	37.0
31 SU	+18	22	32	+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
AUG 1 MO	+18	07	43	- 907	+322.29	-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		MIN	SEC	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)						MILS
SEP 1 TH	+ 8	26	34	+150.09	-6.45	-00	11.5	22	39	43.3
2 FR	+ 8	04	48	+143.64	-6.49	+00	07.4	22	43	39.8
3 SA	+ 7	42	54	+137.16	-6.52	+00	26.6	22	47	36.4
4 SU	+ 7	20	53	+130.63	-6.56	+00	46.1	22	51	32.9
5 MO	+ 6	58	44	+124.07	-6.59	+01	05.8	22	55	29.5
6 TU	+ 6	36	29	+117.47	-6.63	+01	25.7	22	59	26.0
7 WE	+ 6	14	07	+110.85	-6.66	+01	45.8	23	03	22.6
8 TH	+ 5	51	39	+104.19	-6.69	+02	06.2	23	07	19.1
9 FR	+ 5	29	05	+ 97.51	-6.71	+02	26.7	23	11	15.7
10 SA	+ 5	06	26	+ 90.79	-6.74	+02	47.5	23	15	12.2
11 SU	+ 4	43	41	+ 84.06	-6.76	+03	08.3	23	19	08.8
12 MO	+ 4	20	52	+ 77.29	-6.79	+03	29.4	23	23	05.3
13 TU	+ 3	57	59	+ 70.51	-6.80	+03	50.5	23	27	01.9
14 WE	+ 3	35	01	+ 63.71	-6.82	+04	11.8	23	30	58.4
15 TH	+ 3	11	59	+ 56.89	-6.84	+04	33.1	23	34	55.0
16 FR	+ 2	48	55	+ 50.05	-6.85	+04	54.5	23	38	51.6
17 SA	+ 2	25	46	+ 43.19	-6.87	+05	15.9	23	42	48.1
18 SU	+ 2	02	35	+ 36.32	-6.88	+05	37.4	23	46	44.7
19 MO	+ 1	39	22	+ 29.44	-6.89	+05	58.9	23	50	41.2
20 TU	+ 1	16	06	+ 22.55	-6.90	+06	20.3	23	54	37.8
21 WE	+ 0	52	49	+ 15.65	-6.91	+06	41.6	23	58	34.3
22 TH	+ 0	29	30	+ 8.74	-6.91	+07	02.9	0	02	30.8
23 FR	+ 0	06	09	+ 1.82	-6.92	+07	24.1	0	06	27.4
24 SA	- 0	17	12	- 5.10	-6.92	+07	45.2	0	10	23.9
25 SU	- 0	40	34	-12.02	-6.92	+08	06.1	0	14	20.5
26 MO	- 1	03	57	-18.95	-6.92	+08	26.9	0	18	17.1
27 TU	- 1	27	19	-25.87	-6.92	+08	47.4	0	22	13.6
28 WE	- 1	50	41	-32.79	-6.92	+09	07.8	0	26	10.2
29 TH	- 2	14	02	-39.71	-6.91	+09	27.9	0	30	06.7
30 FR	- 2	37	22	-46.63	-6.90	+09	47.7	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		MIN	SEC	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)						MILS
OCT 1 SA	- 3	00	40	- 53.53	-6.90	+10	07.3	0	37	59.8
2 SU	- 3	23	57	- 60.43	-6.88	+10	26.6	0	41	56.4
3 MO	- 3	47	11	- 67.32	-6.87	+10	45.6	0	45	52.9
4 TU	- 4	10	23	- 74.19	-6.86	+11	04.2	0	49	49.5
5 WE	- 4	33	32	- 81.05	-6.84	+11	22.5	0	53	46.0
6 TH	- 4	56	38	- 87.89	-6.82	+11	40.4	0	57	42.6
7 FR	- 5	19	39	- 94.71	-6.80	+11	58.0	1	01	39.1
8 SA	- 5	42	37	-101.52	-6.78	+12	15.1	1	05	35.7
9 SU	- 6	05	30	-108.30	-6.76	+12	31.9	1	09	32.2
10 MO	- 6	28	19	-115.06	-6.73	+12	48.2	1	13	28.8
11 TU	- 6	51	02	-121.79	-6.71	+13	04.1	1	17	25.4
12 WE	- 7	13	39	-128.49	-6.68	+13	19.6	1	21	21.9
13 TH	- 7	36	11	-135.17	-6.64	+13	34.5	1	25	18.5
14 FR	- 7	58	36	-141.81	-6.61	+13	49.0	1	29	15.0
15 SA	- 8	20	55	-148.42	-6.57	+14	03.0	1	33	11.6
16 SU	- 8	43	06	-154.99	-6.54	+14	16.4	1	37	08.1
17 MO	- 9	05	10	-161.53	-6.50	+14	29.3	1	41	04.7
18 TU	- 9	27	06	-168.03	-6.46	+14	41.5	1	45	01.2
19 WE	- 9	48	54	-174.49	-6.41	+14	53.2	1	48	57.8
20 TH	-10	10	33	-180.91	-6.37	+15	04.3	1	52	54.3
21 FR	-10	32	04	-187.28	-6.33	+15	14.7	1	56	50.9
22 SA	-10	53	25	-193.60	-6.28	+15	24.5	2	00	47.4
23 SU	-11	14	36	-199.88	-6.23	+15	33.6	2	04	44.0
24 MO	-11	35	38	-206.11	-6.18	+15	42.0	2	08	40.5
25 TU	-11	56	29	-212.29	-6.12	+15	49.7	2	12	37.1
26 WE	-12	17	09	-218.41	-6.07	+15	56.7	2	16	33.6
27 TH	-12	37	38	-224.48	-6.01	+16	02.9	2	20	30.2
28 FR	-12	57	55	-230.49	-5.95	+16	08.4	2	24	26.8
29 SA	-13	18	00	-236.44	-5.89	+16	13.1	2	28	23.3
30 SU	-13	37	53	-242.33	-5.83	+16	17.0	2	32	19.9
31 MO	-13	57	32	-248.16	-5.76	+16	20.2	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		MIN SEC	DAILY CHANGE (SEC)	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
NOV 1 TU	-14 16 59		-253.92		+16 22.5		2	40	13.0
2 WE	-14 36 11	-1153	-259.61	-5.69	+16 24.0	+ 1.5	2	44	09.5
3 TH	-14 55 10	-1139	-265.23	-5.62	+16 24.7	+ 0.7	2	48	06.1
4 FR	-15 13 54	-1124	-270.79	-5.55	+16 24.6	- 0.1	2	52	02.6
5 SA	-15 32 23	-1109	-276.26	-5.48	+16 23.7	- 0.9	2	55	59.2
6 SU	-15 50 37	-1094	-281.66	-5.40	+16 22.0	- 1.7	2	59	55.7
7 MO	-16 08 35	-1078	-286.99	-5.32	+16 19.4	- 2.6	3	03	52.3
8 TU	-16 26 16	-1062	-292.23	-5.24	+16 16.0	- 3.4	3	07	48.9
9 WE	-16 43 41	-1045	-297.39	-5.16	+16 11.8	- 4.2	3	11	45.4
10 TH	-17 00 49	-1028	-302.47	-5.08	+16 06.8	- 5.0	3	15	42.0
11 FR	-17 17 40	-1011	-307.46	-4.99	+16 01.0	- 5.9	3	19	38.5
12 SA	-17 34 12	- 993	-312.36	-4.90	+15 54.3	- 6.7	3	23	35.1
13 SU	-17 50 27	- 974	-317.17	-4.81	+15 46.8	- 7.5	3	27	31.6
14 MO	-18 06 23	- 956	-321.89	-4.72	+15 38.4	- 8.3	3	31	28.2
15 TU	-18 22 00	- 937	-326.52	-4.63	+15 29.2	- 9.2	3	35	24.7
16 WE	-18 37 17	- 917	-331.05	-4.53	+15 19.2	-10.0	3	39	21.3
17 TH	-18 52 15	- 898	-335.48	-4.43	+15 08.4	-10.8	3	43	17.8
18 FR	-19 06 52	- 878	-339.81	-4.34	+14 56.7	-11.7	3	47	14.4
19 SA	-19 21 09	- 857	-344.05	-4.23	+14 44.2	-12.5	3	51	10.9
20 SU	-19 35 05	- 836	-348.18	-4.13	+14 30.8	-13.3	3	55	07.5
21 MO	-19 48 40	- 815	-352.20	-4.02	+14 16.7	-14.2	3	59	04.1
22 TU	-20 01 54	- 793	-356.12	-3.92	+14 01.7	-15.0	4	03	00.6
23 WE	-20 14 45	- 771	-359.93	-3.81	+13 45.9	-15.8	4	06	57.2
24 TH	-20 27 14	- 749	-363.63	-3.70	+13 29.3	-16.6	4	10	53.7
25 FR	-20 39 21	- 726	-367.21	-3.59	+13 11.9	-17.4	4	14	50.3
26 SA	-20 51 04	- 703	-370.69	-3.47	+12 53.8	-18.2	4	18	46.8
27 SU	-21 02 25	- 680	-374.05	-3.36	+12 34.9	-18.9	4	22	43.4
28 MO	-21 13 21	- 656	-377.29	-3.24	+12 15.2	-19.7	4	26	40.0
29 TU	-21 23 53	- 632	-380.41	-3.12	+11 54.8	-20.4	4	30	36.5
30 WE	-21 34 02	- 608	-383.42	-3.00	+11 33.6	-21.1	4	34	33.1
		- 584		-2.88		-21.8			

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
JAN 0 SA	-23 07 39		-411.15		-02	42.6	6	36	46.3
JAN 1 SU	-23 03 14	+ 264	-409.85	+1.30	-03	11.3	6	40	42.9
2 MO	-22 58 23	+ 292	-408.41	+1.44	-03	39.8	6	44	39.5
3 TU	-22 53 03	+ 319	-406.83	+1.58	-04	08.0	6	48	36.0
4 WE	-22 47 17	+ 347	-405.12	+1.71	-04	35.8	6	52	32.6
5 TH	-22 41 03	+ 374	-403.27	+1.85	-05	03.2	6	56	29.2
6 FR	-22 34 22	+ 401	-401.29	+1.98	-05	30.2	7	00	25.7
7 SA	-22 27 15	+ 427	-399.18	+2.11	-05	56.7	7	04	22.3
8 SU	-22 19 41	+ 454	-396.94	+2.24	-06	22.7	7	08	18.8
9 MO	-22 11 40	+ 480	-394.57	+2.37	-06	48.1	7	12	15.4
10 TU	-22 03 14	+ 506	-392.07	+2.50	-07	13.1	7	16	11.9
11 WE	-21 54 22	+ 532	-389.44	+2.63	-07	37.5	7	20	08.5
12 TH	-21 45 04	+ 558	-386.69	+2.76	-08	01.2	7	24	05.0
13 FR	-21 35 21	+ 583	-383.81	+2.88	-08	24.4	7	28	01.6
14 SA	-21 25 13	+ 608	-380.80	+3.00	-08	47.0	7	31	58.2
15 SU	-21 14 40	+ 633	-377.68	+3.13	-09	08.8	7	35	54.7
16 MO	-21 03 42	+ 657	-374.43	+3.24	-09	30.1	7	39	51.3
17 TU	-20 52 21	+ 682	-371.07	+3.37	-09	50.6	7	43	47.8
18 WE	-20 40 36	+ 705	-367.58	+3.48	-10	10.5	7	47	44.4
19 TH	-20 28 27	+ 729	-363.98	+3.60	-10	29.6	7	51	40.9
20 FR	-20 15 55	+ 752	-360.27	+3.71	-10	48.1	7	55	37.5
21 SA	-20 02 59	+ 775	-356.44	+3.83	-11	05.8	7	59	34.0
22 SU	-19 49 42	+ 798	-352.50	+3.94	-11	22.7	8	03	30.6
23 MO	-19 36 02	+ 820	-348.45	+4.05	-11	38.9	8	07	27.2
24 TU	-19 22 00	+ 842	-344.30	+4.16	-11	54.4	8	11	23.7
25 WE	-19 07 37	+ 863	-340.03	+4.26	-12	09.1	8	15	20.3
26 TH	-18 52 52	+ 884	-335.66	+4.37	-12	23.1	8	19	16.8
27 FR	-18 37 47	+ 905	-331.19	+4.47	-12	36.2	8	23	13.4
28 SA	-18 22 21	+ 926	-326.62	+4.57	-12	48.6	8	27	09.9
29 SU	-18 06 36	+ 946	-321.95	+4.67	-13	00.2	8	31	06.5
30 MO	-17 50 31	+ 965	-317.19	+4.77	-13	10.9	8	35	03.1
31 TU	-17 34 07	+ 984	-312.33	+4.86	-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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC			
	°	'	''	DAILY CHANGE (SEC)							MILS	DAILY CHANGE (MILS)	
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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
APR 1 SA	+ 4 16 32		+ 76.01		-04	10.4	12	35	32.8
2 SU	+ 4 39 42	+1390	+ 82.87	+6.86	-03	52.6	12	39	29.3
3 MO	+ 5 02 47	+1385	+ 89.72	+6.84	-03	34.9	12	43	25.9
4 TU	+ 5 25 47	+1380	+ 96.53	+6.81	-03	17.3	12	47	22.4
5 WE	+ 5 48 41	+1374	+103.32	+6.79	-02	59.8	12	51	19.0
6 TH	+ 6 11 29	+1368	+110.07	+6.76	-02	42.5	12	55	15.5
7 FR	+ 6 34 11	+1362	+116.80	+6.73	-02	25.4	12	59	12.1
8 SA	+ 6 56 46	+1355	+123.49	+6.69	-02	08.5	13	03	08.6
9 SU	+ 7 19 13	+1348	+130.14	+6.66	-01	51.8	13	07	05.2
10 MO	+ 7 41 33	+1340	+136.76	+6.62	-01	35.3	13	11	01.8
11 TU	+ 8 03 45	+1332	+143.34	+6.58	-01	19.0	13	14	58.3
12 WE	+ 8 25 49	+1324	+149.87	+6.54	-01	03.0	13	18	54.9
13 TH	+ 8 47 45	+1315	+156.37	+6.49	-00	47.3	13	22	51.4
14 FR	+ 9 09 31	+1307	+162.82	+6.45	-00	31.9	13	26	47.9
15 SA	+ 9 31 09	+1297	+169.23	+6.40	-00	16.8	13	30	44.5
16 SU	+ 9 52 37	+1288	+175.59	+6.36	-00	02.0	13	34	41.0
17 MO	+10 13 55	+1278	+181.90	+6.31	+00	12.4	13	38	37.6
18 TU	+10 35 03	+1268	+188.16	+6.26	+00	26.4	13	42	34.2
19 WE	+10 56 01	+1258	+194.37	+6.21	+00	40.0	13	46	30.7
20 TH	+11 16 48	+1247	+200.53	+6.16	+00	53.2	13	50	27.3
21 FR	+11 37 24	+1236	+206.64	+6.10	+01	06.0	13	54	23.8
22 SA	+11 57 48	+1225	+212.68	+6.05	+01	18.3	13	58	20.4
23 SU	+12 18 01	+1213	+218.67	+5.99	+01	30.2	14	02	16.9
24 MO	+12 38 02	+1201	+224.60	+5.93	+01	41.5	14	06	13.5
25 TU	+12 57 50	+1188	+230.47	+5.87	+01	52.5	14	10	10.1
26 WE	+13 17 26	+1176	+236.28	+5.81	+02	02.9	14	14	06.6
27 TH	+13 36 48	+1162	+242.02	+5.74	+02	12.8	14	18	03.1
28 FR	+13 55 57	+1149	+247.69	+5.67	+02	22.2	14	21	59.7
29 SA	+14 14 53	+1135	+253.30	+5.60	+02	31.1	14	25	56.2
30 SU	+14 33 34	+1121	+258.83	+5.54	+02	39.5	14	29	52.8
		+1107		+5.47					

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

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

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME			
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC	
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)						DAILY CHANGE (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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)							MILS
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		MIN	SEC	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)						MILS
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		MIN	SEC	HR	MIN	SEC			
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)	
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	-6.76	+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
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	-5.64	+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	-4.92	+16 09.9	- 5.6	3	14	44.4
11 SA	-17	13	27	- 997	-306.21	-4.83	+16 04.4	- 6.4	3	18	40.9
12 SU	-17	30	04	- 979	-311.13	-4.75	+15 57.9	- 7.3	3	22	37.5
13 MO	-17	46	23	- 961	-315.97	-4.65	+15 50.6	- 8.2	3	26	34.0
14 TU	-18	02	24	- 942	-320.71	-4.55	+15 42.5	- 9.0	3	30	30.6
15 WE	-18	18	05	- 922	-325.36	-4.46	+15 33.5	- 9.9	3	34	27.1
16 TH	-18	33	28	- 903	-329.92	-4.36	+15 23.6	-10.8	3	38	23.7
17 FR	-18	48	31	- 883	-334.37	-4.26	+15 12.8	-11.6	3	42	20.3
18 SA	-19	03	14	- 862	-338.73	-4.16	+15 01.2	-12.5	3	46	16.8
19 SU	-19	17	36	- 842	-342.99	-4.05	+14 48.8	-13.3	3	50	13.4
20 MO	-19	31	38	- 821	-347.15	-3.95	+14 35.5	-14.1	3	54	09.9
21 TU	-19	45	18	- 799	-351.20	-3.84	+14 21.3	-15.0	3	58	06.5
22 WE	-19	58	37	- 777	-355.15	-3.73	+14 06.4	-15.8	4	02	03.0
23 TH	-20	11	35	- 755	-358.99	-3.61	+13 50.6	-16.6	4	05	59.6
24 FR	-20	24	10	- 732	-362.71	-3.50	+13 34.0	-17.3	4	09	56.1
25 SA	-20	36	22	- 709	-366.33	-3.39	+13 16.7	-18.1	4	13	52.7
26 SU	-20	48	11	- 686	-369.83	-3.27	+12 58.6	-18.8	4	17	49.3
27 MO	-20	59	37	- 662	-373.22	-3.16	+12 39.8	-19.5	4	21	45.8
28 TU	-21	10	40	- 639	-376.49	-3.03	+12 20.3	-20.2	4	25	42.4
29 WE	-21	21	18	- 614	-379.65	-2.91	+12 00.1	-20.9	4	29	38.9
30 TH	-21	31	33	- 590	-382.68		+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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
DEC 1 FR	-21	41	22	-385.59	-2.79	+11	17.7	-22.2	4	37	32.0
2 SA	-21	50	47	-388.38	-2.67	+10	55.5	-22.8	4	41	28.6
3 SU	-21	59	47	-391.05	-2.54	+10	32.7	-23.4	4	45	25.1
4 MO	-22	08	21	-393.59	-2.41	+10	09.2	-24.0	4	49	21.7
5 TU	-22	16	30	-396.00	-2.29	+09	45.2	-24.6	4	53	18.3
6 WE	-22	24	12	-398.28	-2.16	+09	20.7	-25.1	4	57	14.8
7 TH	-22	31	29	-400.44	-2.02	+08	55.5	-25.6	5	01	11.4
8 FR	-22	38	19	-402.46	-1.90	+08	29.9	-26.1	5	05	07.9
9 SA	-22	44	42	-404.36	-1.76	+08	03.8	-26.6	5	09	04.5
10 SU	-22	50	39	-406.12	-1.63	+07	37.2	-27.0	5	13	01.1
11 MO	-22	56	09	-407.75	-1.50	+07	10.2	-27.5	5	16	57.6
12 TU	-23	01	12	-409.24	-1.36	+06	42.7	-27.9	5	20	54.2
13 WE	-23	05	47	-410.60	-1.22	+06	14.8	-28.2	5	24	50.7
14 TH	-23	09	54	-411.82	-1.09	+05	46.6	-28.5	5	28	47.3
15 FR	-23	13	35	-412.91	-0.95	+05	18.1	-28.8	5	32	43.8
16 SA	-23	16	47	-413.86	-0.81	+04	49.2	-29.1	5	36	40.4
17 SU	-23	19	31	-414.67	-0.67	+04	20.1	-29.4	5	40	36.9
18 MO	-23	21	48	-415.35	-0.53	+03	50.8	-29.6	5	44	33.5
19 TU	-23	23	36	-415.88	-0.40	+03	21.2	-29.7	5	48	30.1
20 WE	-23	24	56	-416.28	-0.26	+02	51.5	-29.9	5	52	26.6
21 TH	-23	25	48	-416.53	-0.12	+02	21.6	-29.9	5	56	23.2
22 FR	-23	26	12	-416.65	+0.02	+01	51.7	-30.0	6	00	19.7
23 SA	-23	26	07	-416.63	+0.16	+01	21.7	-30.0	6	04	16.3
24 SU	-23	25	35	-416.47	+0.30	+00	51.7	-30.0	6	08	12.9
25 MO	-23	24	34	-416.17	+0.44	+00	21.8	-29.9	6	12	09.4
26 TU	-23	23	05	-415.73	+0.58	-00	08.1	-29.8	6	16	06.0
27 WE	-23	21	08	-415.15	+0.72	-00	37.9	-29.6	6	20	02.5
28 TH	-23	18	42	-414.43	+0.85	-01	07.5	-29.4	6	23	59.1
29 FR	-23	15	49	-413.57	+0.99	-01	37.0	-29.2	6	27	55.6
30 SA	-23	12	27	-412.58	+1.13	-02	06.2	-29.0	6	31	52.2
31 SU	-23	08	38	-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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC		
	°	'	''	DAILY CHANGE (SEC)							MILS	DAILY CHANGE (MILS)
JAN 0 SU	-23	08	38	+ 257	-411.45	+1.27	-02	35.2	-28.7	6	35	48.8
JAN 1 MO	-23	04	21	+ 285	-410.18	+1.41	-03	03.9	-28.4	6	39	45.3
2 TU	-22	59	36	+ 312	-408.77	+1.54	-03	32.3	-28.1	6	43	41.9
3 WE	-22	54	24	+ 340	-407.23	+1.68	-04	00.4	-27.7	6	47	38.4
4 TH	-22	48	44	+ 367	-405.55	+1.81	-04	28.2	-27.3	6	51	35.0
5 FR	-22	42	37	+ 394	-403.74	+1.95	-04	55.5	-26.9	6	55	31.5
6 SA	-22	36	03	+ 421	-401.79	+2.08	-05	22.4	-26.5	6	59	28.1
7 SU	-22	29	03	+ 447	-399.72	+2.21	-05	48.9	-26.0	7	03	24.7
8 MO	-22	21	35	+ 474	-397.51	+2.34	-06	14.9	-25.5	7	07	21.2
9 TU	-22	13	42	+ 500	-395.17	+2.47	-06	40.4	-25.0	7	11	17.8
10 WE	-22	05	22	+ 526	-392.70	+2.60	-07	05.5	-24.5	7	15	14.3
11 TH	-21	56	36	+ 552	-390.10	+2.73	-07	30.0	-23.9	7	19	10.9
12 FR	-21	47	24	+ 577	-387.38	+2.85	-07	53.9	-23.4	7	23	07.4
13 SA	-21	37	47	+ 602	-384.53	+2.97	-08	17.3	-22.8	7	27	04.0
14 SU	-21	27	45	+ 627	-381.55	+3.10	-08	40.1	-22.2	7	31	00.5
15 MO	-21	17	17	+ 652	-378.46	+3.22	-09	02.2	-21.5	7	34	57.1
16 TU	-21	06	25	+ 676	-375.24	+3.34	-09	23.8	-20.9	7	38	53.7
17 WE	-20	55	09	+ 700	-371.90	+3.46	-09	44.6	-20.2	7	42	50.2
18 TH	-20	43	29	+ 724	-368.44	+3.58	-10	04.8	-19.5	7	46	46.8
19 FR	-20	31	25	+ 747	-364.87	+3.69	-10	24.4	-18.8	7	50	43.3
20 SA	-20	18	58	+ 770	-361.18	+3.80	-10	43.2	-18.1	7	54	39.9
21 SU	-20	06	08	+ 793	-357.37	+3.92	-11	01.2	-17.3	7	58	36.5
22 MO	-19	52	56	+ 815	-353.46	+4.02	-11	18.6	-16.6	8	02	33.0
23 TU	-19	39	21	+ 837	-349.44	+4.13	-11	35.1	-15.8	8	06	29.6
24 WE	-19	25	24	+ 858	-345.31	+4.24	-11	50.9	-15.0	8	10	26.1
25 TH	-19	11	06	+ 879	-341.07	+4.34	-12	05.8	-14.2	8	14	22.7
26 FR	-18	56	27	+ 900	-336.73	+4.44	-12	20.0	-13.3	8	18	19.2
27 SA	-18	41	27	+ 920	-332.28	+4.54	-12	33.4	-12.5	8	22	15.8
28 SU	-18	26	07	+ 940	-327.74	+4.64	-12	45.9	-11.7	8	26	12.3
29 MO	-18	10	27	+ 960	-323.09	+4.74	-12	57.6	-10.9	8	30	08.9
30 TU	-17	54	27	+ 979	-318.35	+4.83	-13	08.4	-10.0	8	34	05.4
31 WE	-17	38	08	+ 998	-313.52	+4.93	-13	18.5	- 9.2	8	38	02.0

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
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	16	35.8
27 TU	- 8	41	19	+1351	-154.46	+6.67	-12 57.3	+ 9.8	10	20	32.4
28 WE	- 8	18	48	+1358	-147.79	+6.71	-12 46.9	+10.3	10	24	29.0
29 TH	- 7	56	11	+1365	-141.09	+6.74	-12 36.0	+10.9	10	28	25.5
								+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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
MAR 1 FR	- 7 33 26		-134.35		-12	24.6	10	36	18.6
2 SA	- 7 10 35	+1371	-127.58	+6.77	-12	12.6	10	40	15.2
3 SU	- 6 47 38	+1377	-120.78	+6.80	-12	00.2	10	44	11.7
4 MO	- 6 24 35	+1383	-113.95	+6.83	-11	47.2	10	48	08.3
5 TU	- 6 01 27	+1388	-107.10	+6.85	-11	33.8	10	52	04.8
6 WE	- 5 38 14	+1393	-100.22	+6.88	-11	20.0	10	56	01.4
7 TH	- 5 14 56	+1398	- 93.31	+6.90	-11	05.8	10	59	57.9
8 FR	- 4 51 34	+1402	- 86.39	+6.92	-10	51.2	11	03	54.5
9 SA	- 4 28 08	+1406	- 79.45	+6.94	-10	36.2	11	07	51.0
10 SU	- 4 04 39	+1409	- 72.49	+6.96	-10	20.8	11	11	47.6
11 MO	- 3 41 07	+1412	- 65.51	+6.97	-10	05.2	11	15	44.1
12 TU	- 3 17 31	+1415	- 58.53	+6.99	-09	49.3	11	19	40.7
13 WE	- 2 53 54	+1418	- 51.53	+7.00	-09	33.0	11	23	37.2
14 TH	- 2 30 14	+1420	- 44.52	+7.01	-09	16.6	11	27	33.8
15 FR	- 2 06 33	+1421	- 37.50	+7.02	-08	59.9	11	31	30.4
16 SA	- 1 42 51	+1422	- 30.47	+7.02	-08	42.9	11	35	26.9
17 SU	- 1 19 08	+1423	- 23.45	+7.03	-08	25.8	11	39	23.5
18 MO	- 0 55 24	+1424	- 16.42	+7.03	-08	08.5	11	43	20.0
19 TU	- 0 31 40	+1424	- 9.38	+7.03	-07	51.1	11	47	16.6
20 WE	- 0 07 57	+1423	- 2.36	+7.03	-07	33.5	11	51	13.1
21 TH	+ 0 15 46	+1423	+ 4.67	+7.03	-07	15.7	11	55	09.6
22 FR	+ 0 39 27	+1422	+ 11.69	+7.02	-06	57.9	11	59	06.2
23 SA	+ 1 03 07	+1420	+ 18.70	+7.01	-06	39.9	12	03	02.7
24 SU	+ 1 26 46	+1418	+ 25.71	+7.00	-06	21.9	12	06	59.3
25 MO	+ 1 50 22	+1416	+ 32.70	+6.99	-06	03.8	12	10	55.9
26 TU	+ 2 13 55	+1414	+ 39.68	+6.98	-05	45.6	12	14	52.4
27 WE	+ 2 37 26	+1411	+ 46.65	+6.97	-05	27.5	12	18	49.0
28 TH	+ 3 00 54	+1407	+ 53.60	+6.95	-05	09.3	12	22	45.5
29 FR	+ 3 24 17	+1404	+ 60.53	+6.93	-04	51.1	12	26	42.1
30 SA	+ 3 47 37	+1400	+ 67.44	+6.91	-04	33.0	12	30	38.6
31 SU	+ 4 10 53	+1396	+ 74.33	+6.89	-04	14.9	12	34	35.2
		+1391		+6.87					

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

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

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
JUN 1 SA	+22	03	38	+392.19	+2.35	+02	13.7	- 9.2	16	39	01.5
2 SU	+22	11	33	+394.54	+2.23	+02	04.5	- 9.6	16	42	58.1
3 MO	+22	19	06	+396.77	+2.12	+01	54.9	-10.0	16	46	54.6
4 TU	+22	26	15	+398.89	+2.00	+01	45.0	-10.3	16	50	51.2
5 WE	+22	33	00	+400.89	+1.89	+01	34.7	-10.7	16	54	47.8
6 TH	+22	39	22	+402.77	+1.77	+01	24.0	-11.0	16	58	44.3
7 FR	+22	45	20	+404.54	+1.65	+01	13.0	-11.3	17	02	40.9
8 SA	+22	50	54	+406.19	+1.53	+01	01.7	-11.6	17	06	37.4
9 SU	+22	56	04	+407.72	+1.41	+00	50.2	-11.8	17	10	34.0
10 MO	+23	00	49	+409.13	+1.29	+00	38.3	-12.1	17	14	30.5
11 TU	+23	05	11	+410.42	+1.17	+00	26.2	-12.3	17	18	27.1
12 WE	+23	09	08	+411.59	+1.05	+00	13.9	-12.5	17	22	23.6
13 TH	+23	12	40	+412.64	+0.93	+00	01.4	-12.7	17	26	20.2
14 FR	+23	15	48	+413.57	+0.80	-00	11.2	-12.8	17	30	16.7
15 SA	+23	18	32	+414.38	+0.69	-00	24.0	-12.9	17	34	13.3
16 SU	+23	20	50	+415.06	+0.56	-00	37.0	-13.0	17	38	09.9
17 MO	+23	22	44	+415.63	+0.44	-00	50.0	-13.1	17	42	06.4
18 TU	+23	24	14	+416.07	+0.32	-01	03.1	-13.1	17	46	03.0
19 WE	+23	25	18	+416.39	+0.20	-01	16.2	-13.1	17	49	59.5
20 TH	+23	25	58	+416.58	+0.07	-01	29.3	-13.1	17	53	56.1
21 FR	+23	26	13	+416.66	-0.05	-01	42.4	-13.1	17	57	52.7
22 SA	+23	26	03	+416.61	-0.17	-01	55.5	-13.0	18	01	49.2
23 SU	+23	25	29	+416.44	-0.29	-02	08.5	-12.9	18	05	45.8
24 MO	+23	24	29	+416.14	-0.41	-02	21.4	-12.8	18	09	42.3
25 TU	+23	23	05	+415.73	-0.54	-02	34.1	-12.6	18	13	38.9
26 WE	+23	21	16	+415.19	-0.66	-02	46.8	-12.5	18	17	35.4
27 TH	+23	19	03	+414.53	-0.78	-02	59.3	-12.3	18	21	32.0
28 FR	+23	16	25	+413.75	-0.90	-03	11.5	-12.1	18	25	28.5
29 SA	+23	13	23	+412.85	-1.02	-03	23.6	-11.8	18	29	25.1
30 SU	+23	09	56	+411.83	-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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
JUL 1 MO	+23 06 04		+410.69		-03	47.1	18	37	18.2
2 TU	+23 01 49	- 255	+409.43	-1.26	-03	58.4	18	41	14.8
3 WE	+22 57 09	- 280	+408.05	-1.38	-04	09.5	18	45	11.3
4 TH	+22 52 06	- 304	+406.55	-1.50	-04	20.3	18	49	07.9
5 FR	+22 46 38	- 327	+404.93	-1.61	-04	30.7	18	53	04.5
6 SA	+22 40 47	- 351	+403.20	-1.73	-04	40.9	18	57	01.0
7 SU	+22 34 32	- 375	+401.34	-1.85	-04	50.7	19	00	57.6
8 MO	+22 27 54	- 398	+399.38	-1.97	-05	00.2	19	04	54.1
9 TU	+22 20 52	- 422	+397.29	-2.08	-05	09.2	19	08	50.7
10 WE	+22 13 27	- 445	+395.10	-2.20	-05	17.9	19	12	47.2
11 TH	+22 05 39	- 468	+392.79	-2.31	-05	26.2	19	16	43.8
12 FR	+21 57 29	- 491	+390.36	-2.42	-05	34.1	19	20	40.3
13 SA	+21 48 55	- 513	+387.83	-2.53	-05	41.5	19	24	36.9
14 SU	+21 40 00	- 536	+385.18	-2.65	-05	48.4	19	28	33.5
15 MO	+21 30 42	- 558	+382.43	-2.76	-05	54.8	19	32	30.0
16 TU	+21 21 02	- 580	+379.57	-2.86	-06	00.8	19	36	26.6
17 WE	+21 11 01	- 601	+376.60	-2.97	-06	06.2	19	40	23.1
18 TH	+21 00 38	- 623	+373.52	-3.08	-06	11.1	19	44	19.7
19 FR	+20 49 54	- 644	+370.34	-3.18	-06	15.5	19	48	16.2
20 SA	+20 38 48	- 665	+367.05	-3.28	-06	19.2	19	52	12.8
21 SU	+20 27 22	- 686	+363.66	-3.39	-06	22.5	19	56	09.3
22 MO	+20 15 35	- 707	+360.18	-3.49	-06	25.1	20	00	05.9
23 TU	+20 03 29	- 727	+356.59	-3.59	-06	27.1	20	04	02.4
24 WE	+19 51 02	- 747	+352.90	-3.69	-06	28.6	20	07	59.0
25 TH	+19 38 15	- 767	+349.11	-3.79	-06	29.4	20	11	55.6
26 FR	+19 25 08	- 786	+345.23	-3.88	-06	29.6	20	15	52.1
27 SA	+19 11 43	- 806	+341.25	-3.98	-06	29.3	20	19	48.7
28 SU	+18 57 58	- 825	+337.18	-4.07	-06	28.2	20	23	45.2
29 MO	+18 43 55	- 843	+333.01	-4.16	-06	26.6	20	27	41.8
30 TU	+18 29 34	- 862	+328.76	-4.26	-06	24.4	20	31	38.4
31 WE	+18 14 54	- 880	+324.41	-4.35	-06	21.5	20	35	34.9
		- 898		-4.43					

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME					
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC			
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)	
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		MIN	SEC	HR	MIN	SEC	
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)						DAILY CHANGE (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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
OCT 1 TU	- 3	12	33	- 57.05	-6.89	+10	17.8		0	40	01.2
2 WE	- 3	35	47	- 63.94	-6.87	+10	37.1	+19.3	0	43	57.7
3 TH	- 3	59	00	- 70.81	-6.86	+10	56.0	+18.9	0	47	54.3
4 FR	- 4	22	10	- 77.68	-6.85	+11	14.6	+18.6	0	51	50.8
5 SA	- 4	45	16	- 84.52	-6.83	+11	32.8	+18.2	0	55	47.4
6 SU	- 5	08	20	- 91.36	-6.81	+11	50.7	+17.8	0	59	43.9
7 MO	- 5	31	19	- 98.17	-6.79	+12	08.1	+17.4	1	03	40.5
8 TU	- 5	54	14	-104.96	-6.77	+12	25.1	+17.0	1	07	37.0
9 WE	- 6	17	05	-111.73	-6.75	+12	41.6	+16.6	1	11	33.6
10 TH	- 6	39	51	-118.47	-6.72	+12	57.7	+16.1	1	15	30.1
11 FR	- 7	02	31	-125.19	-6.69	+13	13.3	+15.6	1	19	26.7
12 SA	- 7	25	06	-131.88	-6.66	+13	28.5	+15.1	1	23	23.2
13 SU	- 7	47	35	-138.54	-6.63	+13	43.1	+14.6	1	27	19.8
14 MO	- 8	09	57	-145.17	-6.59	+13	57.2	+14.1	1	31	16.3
15 TU	- 8	32	13	-151.77	-6.56	+14	10.7	+13.6	1	35	12.9
16 WE	- 8	54	21	-158.32	-6.52	+14	23.8	+13.0	1	39	09.4
17 TH	- 9	16	21	-164.85	-6.52	+14	36.2	+12.4	1	43	06.0
18 FR	- 9	38	14	-171.33	-6.48	+14	48.1	+11.9	1	47	02.6
19 SA	- 9	59	58	-177.77	-6.44	+14	59.3	+11.3	1	50	59.1
20 SU	-10	21	33	-184.16	-6.40	+14	59.3	+10.7	1	54	55.7
21 MO	-10	42	59	-190.51	-6.35	+15	10.0	+10.0	1	58	52.2
22 TU	-11	04	15	-196.82	-6.30	+15	20.0	+ 9.4	1	58	52.2
23 WE	-11	25	22	-203.07	-6.25	+15	29.4	+ 8.7	2	02	48.8
24 TH	-11	46	18	-209.27	-6.20	+15	38.2	+ 8.1	2	06	45.3
25 FR	-11	46	18	-209.27	-6.15	+15	46.3	+ 7.4	2	10	41.9
26 SA	-12	07	03	-215.42	-6.09	+15	53.6	+ 6.7	2	14	38.4
27 SU	-12	27	37	-221.52	-6.03	+16	00.3	+ 5.9	2	18	35.0
28 MO	-12	47	59	-227.55	-5.98	+16	06.2	+ 5.2	2	22	31.5
29 TU	-13	08	10	-233.53	-5.92	+16	11.4	+ 4.4	2	26	28.1
30 WE	-13	28	08	-239.45	-5.86	+16	15.9	+ 3.7	2	30	24.6
31 TH	-13	47	54	-245.30	-5.79	+16	19.5	+ 2.9	2	34	21.2
	-14	07	26	-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		MIN	SEC	HR	MIN	SEC			
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)	DAILY CHANGE (SEC)
NOV 1 FR	-14	26	45		-256.81		+16	24.4		2	42	14.3
2 SA	-14	45	50	-1145	-262.47	-5.65	+16	25.7	+ 1.2	2	46	10.9
3 SU	-15	04	41	-1131	-268.05	-5.59	+16	26.1	+ 0.4	2	50	07.4
4 MO	-15	23	17	-1116	-273.57	-5.51	+16	25.7	- 0.4	2	54	04.0
5 TU	-15	41	38	-1101	-279.00	-5.44	+16	24.4	- 1.3	2	58	00.5
6 WE	-15	59	43	-1085	-284.36	-5.36	+16	22.3	- 2.1	3	01	57.1
7 TH	-16	17	33	-1070	-289.64	-5.28	+16	19.3	- 3.0	3	05	53.6
8 FR	-16	35	06	-1053	-294.85	-5.20	+16	15.5	- 3.8	3	09	50.2
9 SA	-16	52	23	-1036	-299.96	-5.12	+16	10.9	- 4.7	3	13	46.7
10 SU	-17	09	22	-1019	-305.00	-5.03	+16	05.3	- 5.5	3	17	43.3
11 MO	-17	26	04	-1002	-309.94	-4.95	+15	59.0	- 6.4	3	21	39.8
12 TU	-17	42	27	- 984	-314.80	-4.86	+15	51.7	- 7.2	3	25	36.4
13 WE	-17	58	33	- 965	-319.57	-4.77	+15	43.7	- 8.1	3	29	32.9
14 TH	-18	14	19	- 947	-324.24	-4.68	+15	34.8	- 8.9	3	33	29.5
15 FR	-18	29	47	- 927	-328.82	-4.58	+15	25.0	- 9.7	3	37	26.1
16 SA	-18	44	55	- 908	-333.31	-4.48	+15	14.4	-10.6	3	41	22.6
17 SU	-18	59	43	- 888	-337.69	-4.39	+15	03.0	-11.4	3	45	19.2
18 MO	-19	14	10	- 867	-341.98	-4.28	+14	50.8	-12.2	3	49	15.7
19 TU	-19	28	17	- 847	-346.16	-4.18	+14	37.8	-13.0	3	53	12.3
20 WE	-19	42	02	- 826	-350.23	-4.08	+14	24.0	-13.8	3	57	08.8
21 TH	-19	55	26	- 804	-354.20	-3.97	+14	09.4	-14.6	4	01	05.4
22 FR	-20	08	28	- 782	-358.07	-3.86	+13	54.0	-15.4	4	05	01.9
23 SA	-20	21	08	- 760	-361.82	-3.75	+13	37.8	-16.2	4	08	58.5
24 SU	-20	33	26	- 737	-365.46	-3.64	+13	20.9	-16.9	4	12	55.1
25 MO	-20	45	21	- 715	-368.99	-3.53	+13	03.2	-17.7	4	16	51.6
26 TU	-20	56	52	- 691	-372.40	-3.41	+12	44.7	-18.5	4	20	48.2
27 WE	-21	08	00	- 668	-375.70	-3.30	+12	25.5	-19.2	4	24	44.7
28 TH	-21	18	44	- 644	-378.88	-3.18	+12	05.6	-19.9	4	28	41.3
29 FR	-21	29	04	- 620	-381.94	-3.06	+11	45.0	-20.6	4	32	37.9
30 SA	-21	38	59	- 595	-384.89	-2.94	+11	23.6	-21.3	4	36	34.4
				- 571		-2.82			-22.0			

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

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

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

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

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME						
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC				
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)		
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	+ 16.98	+7.01	-07	01.9	+18.1	11	58	08.6
23 SU	+	0	57	19	+1418	+ 23.98	+7.00	-06	43.8	+18.2	12	02	05.1
24 MO	+	1	20	57	+1416	+ 30.98	+6.99	-06	25.7	+18.2	12	06	01.7
25 TU	+	1	44	33	+1414	+ 37.96	+6.98	-06	07.4	+18.3	12	09	58.2
26 WE	+	2	08	06	+1411	+ 44.92	+6.97	-05	49.2	+18.3	12	13	54.8
27 TH	+	2	31	37	+1408	+ 51.88	+6.95	-05	30.9	+18.2	12	17	51.3
28 FR	+	2	55	05	+1405	+ 58.81	+6.94	-05	12.7	+18.2	12	21	47.9
29 SA	+	3	18	30	+1401	+ 65.73	+6.92	-04	54.5	+18.1	12	25	44.4
30 SU	+	3	41	51	+1397	+ 72.63	+6.90	-04	36.3	+18.1	12	29	41.0
31 MO	+	4	05	07	+1392		+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		MIN	SEC	HR	MIN	SEC		
	°	'	''	DAILY CHANGE (SEC)						MILS	DAILY CHANGE (MILS)
APR 1 TU	+ 4	28	20	+1388	+ 79.50	+6.85	-04	00.3	12	37	34.1
2 WE	+ 4	51	27	+1382	+ 86.36	+6.82	-03	42.5	12	41	30.6
3 TH	+ 5	14	30	+1377	+ 93.18	+6.80	-03	24.8	12	45	27.2
4 FR	+ 5	37	27	+1371	+ 99.98	+6.77	-03	07.3	12	49	23.7
5 SA	+ 6	00	18	+1365	+106.75	+6.74	-02	49.9	12	53	20.3
6 SU	+ 6	23	03	+1358	+113.49	+6.71	-02	32.8	12	57	16.8
7 MO	+ 6	45	41	+1351	+120.20	+6.67	-02	15.8	13	01	13.4
8 TU	+ 7	08	12	+1344	+126.88	+6.64	-01	59.1	13	05	09.9
9 WE	+ 7	30	37	+1337	+133.51	+6.60	-01	42.6	13	09	06.5
10 TH	+ 7	52	53	+1329	+140.11	+6.56	-01	26.3	13	13	03.0
11 FR	+ 8	15	02	+1320	+146.67	+6.52	-01	10.3	13	16	59.6
12 SA	+ 8	37	02	+1312	+153.19	+6.48	-00	54.6	13	20	56.1
13 SU	+ 8	58	53	+1302	+159.67	+6.43	-00	39.1	13	24	52.7
14 MO	+ 9	20	36	+1293	+166.10	+6.39	-00	24.0	13	28	49.3
15 TU	+ 9	42	09	+1283	+172.49	+6.34	-00	09.1	13	32	45.8
16 WE	+10	03	32	+1273	+178.83	+6.29	+00	05.4	13	36	42.4
17 TH	+10	24	46	+1263	+185.11	+6.24	+00	19.5	13	40	38.9
18 FR	+10	45	49	+1252	+191.35	+6.18	+00	33.3	13	44	35.5
19 SA	+11	06	41	+1241	+197.54	+6.13	+00	46.7	13	48	32.0
20 SU	+11	27	22	+1230	+203.66	+6.07	+00	59.7	13	52	28.6
21 MO	+11	47	52	+1218	+209.74	+6.01	+01	12.3	13	56	25.1
22 TU	+12	08	10	+1206	+215.75	+5.96	+01	24.5	14	00	21.7
23 WE	+12	28	16	+1194	+221.71	+5.90	+01	36.2	14	04	18.2
24 TH	+12	48	10	+1181	+227.60	+5.83	+01	47.5	14	08	14.8
25 FR	+13	07	51	+1168	+233.44	+5.77	+01	58.3	14	12	11.3
26 SA	+13	27	19	+1155	+239.21	+5.70	+02	08.6	14	16	07.9
27 SU	+13	46	34	+1142	+244.91	+5.64	+02	18.4	14	20	04.4
28 MO	+14	05	36	+1128	+250.55	+5.57	+02	27.7	14	24	01.0
29 TU	+14	24	24	+1113	+256.12	+5.50	+02	36.4	14	27	57.6
30 WE	+14	42	57	+1099	+261.62	+5.43	+02	44.7	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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
MAY 1 TH	+15 01 16		+267.04		+02	52.3	14	35	50.7
2 FR	+15 19 20	+1084	+272.40	+5.35	+02	59.4	14	39	47.2
3 SA	+15 37 09	+1069	+277.68	+5.28	+03	06.0	14	43	43.8
4 SU	+15 54 43	+1054	+282.88	+5.20	+03	12.0	14	47	40.3
5 MO	+16 12 01	+1038	+288.00	+5.13	+03	17.4	14	51	36.9
6 TU	+16 29 02	+1022	+293.05	+5.05	+03	22.3	14	55	33.4
7 WE	+16 45 47	+1005	+298.01	+4.96	+03	26.5	14	59	30.0
8 TH	+17 02 16	+ 988	+302.89	+4.88	+03	30.3	15	03	26.5
9 FR	+17 18 27	+ 971	+307.69	+4.80	+03	33.4	15	07	23.1
10 SA	+17 34 21	+ 954	+312.40	+4.71	+03	36.0	15	11	19.6
11 SU	+17 49 58	+ 936	+317.03	+4.62	+03	38.1	15	15	16.2
12 MO	+18 05 16	+ 918	+321.56	+4.53	+03	39.5	15	19	12.8
13 TU	+18 20 16	+ 900	+326.01	+4.44	+03	40.5	15	23	09.3
14 WE	+18 34 58	+ 882	+330.36	+4.36	+03	40.8	15	27	05.9
15 TH	+18 49 21	+ 863	+334.62	+4.26	+03	40.6	15	31	02.4
16 FR	+19 03 24	+ 844	+338.79	+4.17	+03	39.9	15	34	59.0
17 SA	+19 17 09	+ 824	+342.86	+4.07	+03	38.6	15	38	55.5
18 SU	+19 30 33	+ 805	+346.83	+3.98	+03	36.8	15	42	52.1
19 MO	+19 43 38	+ 785	+350.70	+3.88	+03	34.5	15	46	48.6
20 TU	+19 56 22	+ 764	+354.48	+3.77	+03	31.6	15	50	45.2
21 WE	+20 08 46	+ 744	+358.15	+3.67	+03	28.1	15	54	41.7
22 TH	+20 20 49	+ 723	+361.72	+3.57	+03	24.2	15	58	38.3
23 FR	+20 32 32	+ 702	+365.19	+3.47	+03	19.7	16	02	34.9
24 SA	+20 43 53	+ 681	+368.56	+3.36	+03	14.7	16	06	31.4
25 SU	+20 54 53	+ 660	+371.82	+3.26	+03	09.2	16	10	28.0
26 MO	+21 05 31	+ 638	+374.97	+3.15	+03	03.1	16	14	24.5
27 TU	+21 15 47	+ 616	+378.01	+3.04	+02	56.6	16	18	21.1
28 WE	+21 25 42	+ 594	+380.95	+2.93	+02	49.6	16	22	17.7
29 TH	+21 35 14	+ 572	+383.77	+2.82	+02	42.1	16	26	14.2
30 FR	+21 44 24	+ 550	+386.49	+2.72	+02	34.1	16	30	10.8
31 SA	+21 53 11	+ 527	+389.09	+2.60	+02	25.7	16	34	07.3
		+ 504		+2.49					

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME				
	DEGREES		MILS		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''	DAILY CHANGE (SEC)							MILS
JUN 1 SU	+22	01	36	+391.58	+2.38	+02	16.8	- 9.3	16	38	03.9
2 MO	+22	09	37	+393.96	+2.26	+02	07.6	- 9.7	16	42	00.4
3 TU	+22	17	15	+396.22	+2.15	+01	57.9	-10.1	16	45	57.0
4 WE	+22	24	30	+398.37	+2.03	+01	47.8	-10.4	16	49	53.5
5 TH	+22	31	22	+400.40	+1.92	+01	37.4	-10.7	16	53	50.1
6 FR	+22	37	49	+402.32	+1.80	+01	26.7	-11.0	16	57	46.6
7 SA	+22	43	53	+404.12	+1.68	+01	15.6	-11.3	17	01	43.2
8 SU	+22	49	33	+405.80	+1.56	+01	04.3	-11.6	17	05	39.8
9 MO	+22	54	50	+407.36	+1.44	+00	52.7	-11.8	17	09	36.3
10 TU	+22	59	41	+408.80	+1.32	+00	40.9	-12.0	17	13	32.9
11 WE	+23	04	09	+410.12	+1.20	+00	28.8	-12.2	17	17	29.4
12 TH	+23	08	12	+411.32	+1.08	+00	16.6	-12.4	17	21	26.0
13 FR	+23	11	51	+412.40	+0.96	+00	04.2	-12.5	17	25	22.5
14 SA	+23	15	05	+413.36	+0.84	-00	08.4	-12.7	17	29	19.1
15 SU	+23	17	55	+414.20	+0.72	-00	21.0	-12.8	17	33	15.7
16 MO	+23	20	19	+414.91	+0.59	-00	33.8	-12.8	17	37	12.2
17 TU	+23	22	19	+415.50	+0.47	-00	46.6	-12.8	17	41	08.8
18 WE	+23	23	55	+415.97	+0.35	-00	59.5	-12.9	17	45	05.3
19 TH	+23	25	05	+416.32	+0.23	-01	12.5	-12.9	17	49	01.9
20 FR	+23	25	51	+416.55	+0.10	-01	25.4	-13.0	17	52	58.4
21 SA	+23	26	12	+416.65	-0.02	-01	38.4	-13.0	17	56	55.0
22 SU	+23	26	08	+416.63	-0.14	-01	51.3	-12.9	18	00	51.6
23 MO	+23	25	40	+416.49	-0.26	-02	04.2	-12.8	18	04	48.1
24 TU	+23	24	46	+416.23	-0.39	-02	17.0	-12.8	18	08	44.7
25 WE	+23	23	28	+415.84	-0.51	-02	29.8	-12.7	18	12	41.2
26 TH	+23	21	45	+415.34	-0.63	-02	42.4	-12.5	18	16	37.8
27 FR	+23	19	38	+414.71	-0.75	-02	55.0	-12.4	18	20	34.3
28 SA	+23	17	06	+413.95	-0.87	-03	07.4	-12.2	18	24	30.9
29 SU	+23	14	09	+413.08	-0.99	-03	19.6	-12.0	18	28	27.4
30 MO	+23	10	48	+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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
JUL 1 TU	+23 07 03		+410.98		-03	43.5	18	36	20.6
2 WE	+23 02 53	- 250	+409.74	-1.23	-03	55.1	18	40	17.1
3 TH	+22 58 19	- 274	+408.39	-1.35	-04	06.4	18	44	13.7
4 FR	+22 53 21	- 298	+406.92	-1.47	-04	17.4	18	48	10.2
5 SA	+22 47 59	- 322	+405.33	-1.59	-04	28.2	18	52	06.8
6 SU	+22 42 14	- 346	+403.62	-1.71	-04	38.6	18	56	03.4
7 MO	+22 36 05	- 369	+401.80	-1.82	-04	48.6	18	59	59.9
8 TU	+22 29 32	- 393	+399.86	-1.94	-04	58.2	19	03	56.5
9 WE	+22 22 36	- 416	+397.81	-2.05	-05	07.5	19	07	53.0
10 TH	+22 15 17	- 439	+395.64	-2.17	-05	16.3	19	11	49.6
11 FR	+22 07 35	- 462	+393.36	-2.28	-05	24.7	19	15	46.1
12 SA	+21 59 30	- 485	+390.96	-2.40	-05	32.6	19	19	42.7
13 SU	+21 51 03	- 507	+388.46	-2.50	-05	40.1	19	23	39.2
14 MO	+21 42 13	- 530	+385.84	-2.62	-05	47.0	19	27	35.8
15 TU	+21 33 01	- 552	+383.11	-2.73	-05	53.5	19	31	32.3
16 WE	+21 23 26	- 574	+380.28	-2.83	-05	59.4	19	35	28.9
17 TH	+21 13 31	- 596	+377.34	-2.94	-06	04.8	19	39	25.5
18 FR	+21 03 13	- 617	+374.29	-3.05	-06	09.7	19	43	22.0
19 SA	+20 52 34	- 639	+371.13	-3.16	-06	14.0	19	47	18.6
20 SU	+20 41 34	- 660	+367.87	-3.26	-06	17.8	19	51	15.1
21 MO	+20 30 14	- 681	+364.51	-3.36	-06	21.0	19	55	11.7
22 TU	+20 18 32	- 701	+361.05	-3.46	-06	23.6	19	59	08.3
23 WE	+20 06 30	- 722	+357.48	-3.57	-06	25.7	20	03	04.8
24 TH	+19 54 08	- 742	+353.82	-3.66	-06	27.2	20	07	01.4
25 FR	+19 41 26	- 762	+350.06	-3.76	-06	28.2	20	10	57.9
26 SA	+19 28 25	- 782	+346.20	-3.86	-06	28.6	20	14	54.5
27 SU	+19 15 04	- 801	+342.24	-3.96	-06	28.4	20	18	51.0
28 MO	+19 01 23	- 820	+338.19	-4.05	-06	27.6	20	22	47.6
29 TU	+18 47 24	- 839	+334.05	-4.14	-06	26.3	20	26	44.1
30 WE	+18 33 07	- 858	+329.81	-4.24	-06	24.3	20	30	40.7
31 TH	+18 18 31	- 876	+325.48	-4.33	-06	21.8	20	34	37.2
		- 894		-4.41					

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

GREENWICH DATE	APPARENT DECLINATION				EQUATION OF TIME		SIDEREAL TIME		
	DEGREES		MILS		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
AUG 1 FR	+18 03 37	- 912	+321.07	-4.50	-06	18.7	20	38	33.8
2 SA	+17 48 25	- 929	+316.57	-4.59	-06	14.9	20	42	30.4
3 SU	+17 32 56	- 946	+311.98	-4.67	-06	10.6	20	46	26.9
4 MO	+17 17 10	- 963	+307.31	-4.76	-06	05.7	20	50	23.5
5 TU	+17 01 07	- 979	+302.55	-4.83	-06	00.1	20	54	20.0
6 WE	+16 44 47	- 996	+297.72	-4.92	-05	54.0	20	58	16.6
7 TH	+16 28 12	-1011	+292.80	-4.99	-05	47.3	21	02	13.1
8 FR	+16 11 20	-1027	+287.80	-5.07	-05	39.9	21	06	09.7
9 SA	+15 54 13	-1042	+282.73	-5.15	-05	32.0	21	10	06.2
10 SU	+15 36 51	-1057	+277.58	-5.22	-05	23.4	21	14	02.8
11 MO	+15 19 14	-1072	+272.36	-5.29	-05	14.3	21	17	59.3
12 TU	+15 01 22	-1086	+267.07	-5.36	-05	04.6	21	21	55.9
13 WE	+14 43 15	-1100	+261.71	-5.43	-04	54.3	21	25	52.4
14 TH	+14 24 55	-1114	+256.27	-5.50	-04	43.4	21	29	49.0
15 FR	+14 06 21	-1127	+250.77	-5.57	-04	32.0	21	33	45.6
16 SA	+13 47 34	-1140	+245.20	-5.63	-04	20.0	21	37	42.1
17 SU	+13 28 34	-1153	+239.57	-5.69	-04	07.5	21	41	38.7
18 MO	+13 09 20	-1166	+233.88	-5.76	-03	54.4	21	45	35.2
19 TU	+12 49 55	-1178	+228.12	-5.82	-03	40.9	21	49	31.8
20 WE	+12 30 17	-1190	+222.31	-5.88	-03	26.9	21	53	28.3
21 TH	+12 10 27	-1201	+216.43	-5.93	-03	12.4	21	57	24.9
22 FR	+11 50 26	-1213	+210.50	-5.99	-02	57.4	22	01	21.4
23 SA	+11 30 13	-1224	+204.51	-6.04	-02	42.0	22	05	18.0
24 SU	+11 09 49	-1234	+198.47	-6.09	-02	26.2	22	09	14.5
25 MO	+10 49 15	-1245	+192.37	-6.15	-02	10.0	22	13	11.1
26 TU	+10 28 30	-1255	+186.22	-6.20	-01	53.4	22	17	07.6
27 WE	+10 07 35	-1265	+180.03	-6.25	-01	36.4	22	21	04.2
28 TH	+ 9 46 31	-1274	+173.78	-6.29	-01	19.1	22	25	00.8
29 FR	+ 9 25 17	-1283	+167.49	-6.34	-01	01.4	22	28	57.3
30 SA	+ 9 03 54	-1292	+161.16	-6.38	-00	43.3	22	32	53.9
31 SU	+ 8 42 22	-1300	+154.78	-6.42	-00	25.0	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		MIN	SEC	HR	MIN	SEC	
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)						DAILY CHANGE (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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	''								DAILY CHANGE (SEC)
OCT 1 WE	- 3	06	53	- 55.37	-6.89	+10	12.8	+19.2	0	39	03.5
2 TH	- 3	30	09	- 62.27	-6.88	+10	32.0	+18.9	0	43	00.1
3 FR	- 3	53	23	- 69.15	-6.87	+10	50.9	+18.6	0	46	56.6
4 SA	- 4	16	34	- 76.02	-6.85	+11	09.5	+18.2	0	50	53.2
5 SU	- 4	39	41	- 82.87	-6.83	+11	27.7	+17.9	0	54	49.7
6 MO	- 5	02	46	- 89.71	-6.82	+11	45.6	+17.5	0	58	46.3
7 TU	- 5	25	46	- 96.53	-6.80	+12	03.1	+17.1	1	02	42.8
8 WE	- 5	48	43	-103.32	-6.78	+12	20.2	+16.7	1	06	39.4
9 TH	- 6	11	34	-110.10	-6.75	+12	36.9	+16.3	1	10	35.9
10 FR	- 6	34	21	-116.85	-6.72	+12	53.2	+15.8	1	14	32.5
11 SA	- 6	57	03	-123.57	-6.70	+13	09.1	+15.4	1	18	29.0
12 SU	- 7	19	38	-130.26	-6.67	+13	24.5	+14.9	1	22	25.6
13 MO	- 7	42	08	-136.93	-6.63	+13	39.4	+14.4	1	26	22.1
14 TU	- 8	04	31	-143.56	-6.60	+13	53.7	+13.9	1	30	18.7
15 WE	- 8	26	48	-150.16	-6.56	+14	07.6	+13.3	1	34	15.2
16 TH	- 8	48	57	-156.72	-6.53	+14	20.9	+12.7	1	38	11.8
17 FR	- 9	10	58	-163.25	-6.49	+14	33.7	+12.2	1	42	08.3
18 SA	- 9	32	52	-169.74	-6.45	+14	45.8	+11.5	1	46	04.9
19 SU	- 9	54	38	-176.19	-6.40	+14	57.4	+10.9	1	50	01.4
20 MO	-10	16	15	-182.59	-6.36	+15	08.3	+10.2	1	53	58.0
21 TU	-10	37	43	-188.95	-6.32	+15	18.5	+ 9.6	1	57	54.6
22 WE	-10	59	01	-195.27	-6.27	+15	28.1	+ 8.9	2	01	51.1
23 TH	-11	20	10	-201.53	-6.22	+15	37.0	+ 8.2	2	05	47.7
24 FR	-11	41	09	-207.75	-6.16	+15	45.1	+ 7.5	2	09	44.2
25 SA	-12	01	57	-213.91	-6.11	+15	52.6	+ 6.7	2	13	40.8
26 SU	-12	22	34	-220.02	-6.05	+15	59.3	+ 6.0	2	17	37.3
27 MO	-12	43	00	-226.07	-6.00	+16	05.3	+ 5.2	2	21	33.9
28 TU	-13	03	14	-232.07	-5.94	+16	10.5	+ 4.5	2	25	30.4
29 WE	-13	23	16	-238.00	-5.87	+16	15.0	+ 3.7	2	29	27.0
30 TH	-13	43	05	-243.88	-5.81	+16	18.7	+ 2.9	2	33	23.5
31 FR	-14	02	41	-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		MIN	SEC	HR	MIN	SEC
	° ' "	DAILY CHANGE (SEC)	MILS	DAILY CHANGE (MILS)					
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		MIN	SEC	DAILY CHANGE (SEC)	HR	MIN	SEC	
	°	'	"	DAILY CHANGE (SEC)							MILS
DEC 1 MO	-21	46	12	-387.02		+11	07.2		4	39	33.3
2 TU	-21	55	24	-389.75	-2.73	+10	44.5	-22.6	4	43	29.9
3 WE	-22	04	11	-392.35	-2.60	+10	21.3	-23.3	4	47	26.4
4 TH	-22	12	32	-394.83	-2.47	+09	57.4	-23.8	4	51	23.0
5 FR	-22	20	28	-397.17	-2.35	+09	33.0	-24.4	4	55	19.5
6 SA	-22	27	57	-399.39	-2.22	+09	08.1	-25.0	4	59	16.1
7 SU	-22	35	01	-401.49	-2.09	+08	42.6	-25.5	5	03	12.7
8 MO	-22	41	37	-403.44	-1.96	+08	16.7	-25.9	5	07	09.2
9 TU	-22	47	47	-405.27	-1.83	+08	16.7	-26.4	5	07	09.2
10 WE	-22	53	30	-406.97	-1.69	+07	50.3	-26.8	5	11	05.8
11 TH	-22	53	30	-406.97	-1.56	+07	23.4	-27.2	5	15	02.3
12 FR	-22	58	46	-408.52	-1.56	+06	56.2	-27.6	5	18	58.9
13 SA	-23	03	35	-409.95	-1.43	+06	28.6	-28.0	5	22	55.4
14 SU	-23	03	35	-409.95	-1.29	+06	00.7	-28.3	5	26	52.0
15 MO	-23	07	56	-411.24	-1.16	+05	32.4	-28.6	5	30	48.5
16 TU	-23	11	50	-412.39	-1.02	+05	03.8	-28.8	5	34	45.1
17 WE	-23	15	15	-413.41	-0.88	+04	35.0	-29.1	5	38	41.7
18 TH	-23	18	14	-414.29	-0.74	+04	05.9	-29.3	5	42	38.2
19 FR	-23	20	44	-415.03	-0.60	+03	36.6	-29.5	5	46	34.8
20 SA	-23	22	46	-415.63	-0.46	+03	07.1	-29.6	5	50	31.3
21 SU	-23	24	20	-416.10	-0.33	+02	37.5	-29.7	5	54	27.9
22 MO	-23	25	26	-416.42	-0.19	+02	07.7	-29.8	5	58	24.5
23 TU	-23	26	03	-416.61	-0.04	+01	37.9	-29.9	6	02	21.0
24 WE	-23	26	13	-416.66	+0.09	+01	08.0	-29.9	6	06	17.6
25 TH	-23	25	54	-416.56	+0.23	+00	38.1	-29.9	6	10	14.1
26 FR	-23	25	07	-416.33	+0.37	+00	08.3	-29.8	6	14	10.7
27 SA	-23	23	52	-415.96	+0.51	-00	21.5	-29.7	6	18	07.2
28 SU	-23	22	08	-415.45	+0.65	-00	51.2	-29.6	6	22	03.8
29 MO	-23	19	56	-414.80	+0.79	-01	20.8	-29.4	6	26	00.3
30 TU	-23	17	17	-414.01	+0.93	-01	50.3	-29.2	6	29	56.9
31 WE	-23	14	09	-413.08	+1.07	-02	19.5	-29.0	6	33	53.5
32 TH	-23	10	33	-412.02	+1.20	-02	48.4	-28.7	6	37	50.0
	-23	06	30	-410.81	+1.34	-03	17.1		6	41	46.6
	-23	01	58	-409.47							

Table 6a. Grid convergence nomograph

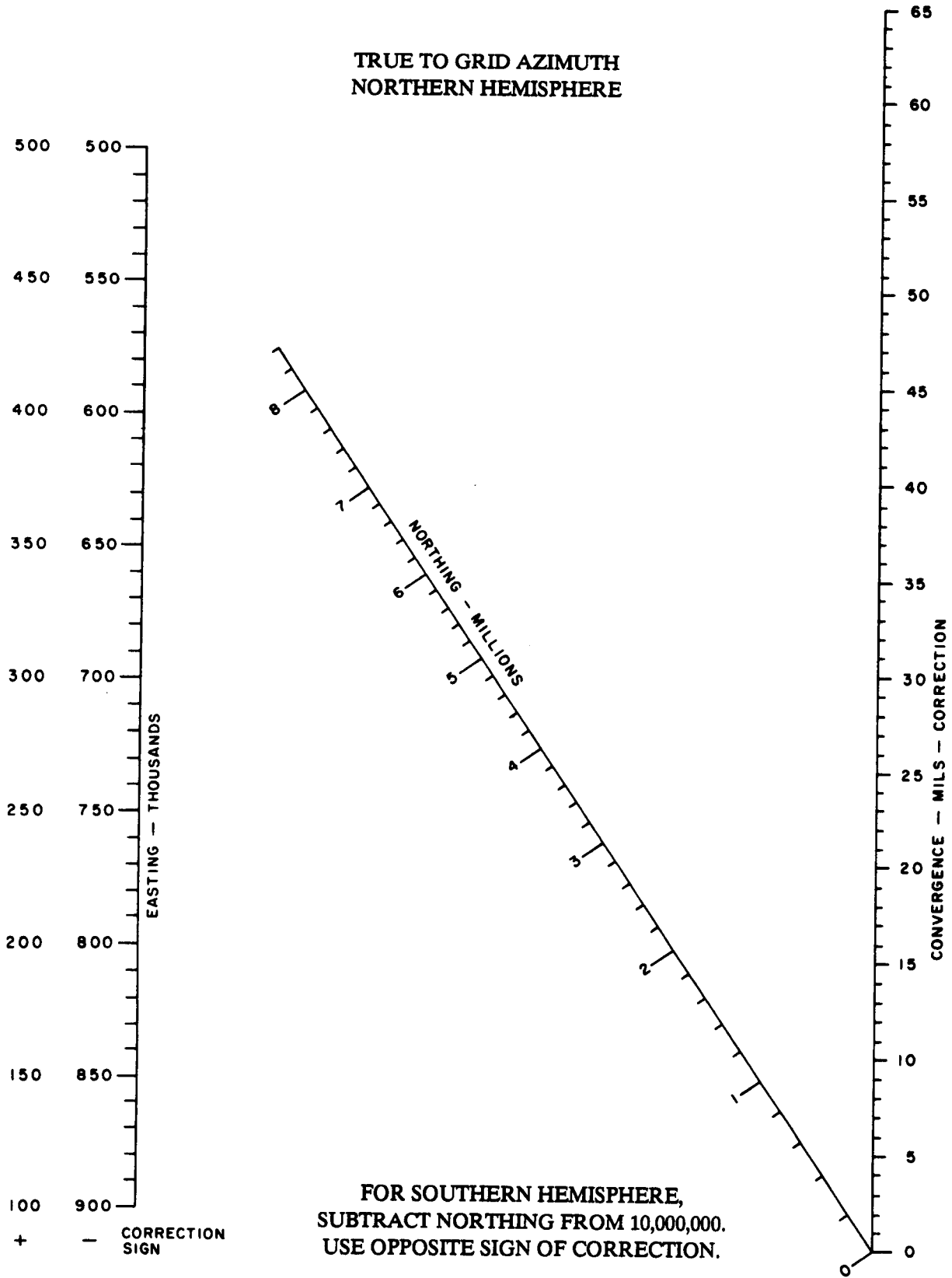


Table 9. Alphabetical star list

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	14	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) Phoenixis**	Phoenix	4	2.4
Antares, Alpha (α) Scorpii	Scorpius	57	1.2
Acturus, 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 (Eltamin), 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	13	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	1.5
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 dimmest 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 DEC	00 08 29 03	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
2	RA DEC	00 08 59 06	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
3	RA DEC	00 25 -77 17	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
4	RA DEC	00 25 -42 20	57.1 47	56.6 45	56.2 40	56.2 32	56.7 23	57.5 14	58.6 08	59.8 05	60.6 07	61.0 13	60.8 20	60.4 26	59.8 28
5	RA DEC	00 40 56 29	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
6	RA DEC	00 43 -18 01	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
7	RA DEC	00 56 60 40	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
8	RA DEC	01 25 60 11	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
9	RA DEC	01 37 -57 15	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
10	See Table 11a. Apparent places of Polaris, 1993														
11	RA DEC	02 06 23 25	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
12	RA DEC	02 57 -40 19	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
13	RA DEC	03 01 04 03	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	59.6 64	59.8 62	59.7 60
14	RA DEC	03 23 49 50	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
15	RA DEC	04 35 16 29	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
16	RA DEC	05 14 -08 12	14.4 37	14.2 41	13.8 44	13.2 44	12.9 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
17	RA DEC	05 16 45 59	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
18	RA DEC	05 24 06 20	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
19	RA DEC	05 25 28 36	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
20	RA DEC	05 35 -01 12	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
21	RA DEC	05 40 -01 56	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
22	RA DEC	05 54 07 24	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
23	RA DEC	06 23 -52 41	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
24	RA DEC	06 37 16 24	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
25	RA DEC	06 44 -16 42	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

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 63	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	20.4 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 03	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	13.4 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 DEC	14 15 19 12	20.9 55	21.9 49	22.7 47	23.3 48	23.6 52	23.6 58	23.3 62	22.9 64	22.5 63	22.1 60	22.1 54	22.6 47	23.4 38
52	RA DEC	14 39 -60 48	7.5 14	9.4 16	10.9 21	12.1 29	12.8 37	12.8 44	12.4 49	11.5 51	10.4 48	9.6 42	9.5 34	10.3 28	11.8 26
53	RA DEC	14 50 -16 00	29.8 47	30.8 52	31.7 56	32.5 59	32.9 61	33.1 61	33.0 60	32.7 59	32.2 57	31.9 55	31.8 55	32.2 56	33.1 60
54	RA DEC	14 50 74 10	40.1 42	42.6 37	44.9 38	46.8 44	47.5 53	46.9 63	45.3 69	43.0 72	40.6 69	38.7 61	37.6 51	37.8 40	39.4 30
55	RA DEC	15 34 26 43	23.2 66	24.2 59	25.1 57	26.0 58	26.5 64	26.7 71	26.6 77	26.2 81	25.6 82	25.1 80	24.8 74	25.0 66	25.6 57
56	RA DEC	15 59 -22 36	55.2 06	56.2 09	57.2 11	58.1 14	58.8 16	59.1 16	59.2 17	59.0 16	58.5 15	58.0 14	57.8 12	58.0 12	58.7 13
57	RA DEC	16 28 -26 24	58.6 58	59.6 60	60.6 62	61.6 64	62.3 66	62.8 67	63.0 67	62.8 68	62.4 68	61.8 66	61.5 64	61.6 63	62.2 63
58	RA DEC	16 47 -69 00	54.0 48	56.0 44	58.2 43	60.6 46	62.5 51	63.6 59	63.9 66	63.3 72	61.9 75	60.4 73	59.3 67	59.2 59	60.4 51
59	RA DEC	17 09 -15 42	58.4 59	59.3 61	60.1 63	61.1 64	61.9 64	62.5 62	62.7 61	62.7 60	62.3 59	61.7 59	61.3 58	61.3 58	61.8 60
60	RA DEC	17 33 -37 05	7.7 54	8.6 52	9.7 52	10.8 52	11.8 54	12.6 56	13.0 58	13.0 60	12.5 62	11.9 61	11.3 59	11.2 56	11.7 53
61	RA DEC	17 34 12 33	36.2 52	36.8 45	37.6 42	38.6 42	39.3 45	39.9 51	40.2 57	40.1 62	39.7 65	39.1 65	38.7 63	38.5 59	38.9 52
62	RA DEC	17 56 51 29	24.9 20	25.6 11	26.6 05	27.8 05	28.9 10	29.7 19	29.9 29	29.6 38	28.7 44	27.7 45	26.7 41	26.2 34	26.2 23
63	RA DEC	18 23 -34 23	42.1 16	42.9 14	43.8 13	44.9 12	45.9 11	46.8 12	47.4 13	47.5 15	47.2 17	46.5 17	45.9 16	45.7 14	46.0 12
64	RA DEC	18 36 38 46	41.0 38	41.5 29	42.3 24	43.4 22	44.3 26	45.1 34	45.5 44	45.5 53	45.0 59	44.2 61	43.5 60	43.0 54	43.0 45
65	RA DEC	18 54 -26 18	49.6 20	50.2 18	51.0 17	52.0 16	53.0 14	53.8 13	54.4 12	54.7 12	54.4 14	53.9 14	53.3 14	53.1 13	53.2 12
66	RA DEC	19 50 08 50	26.2 62	26.5 58	27.0 55	27.9 54	28.7 57	29.6 63	30.2 70	30.5 76	30.4 80	30.0 82	29.4 81	29.1 79	29.0 75
67	RA DEC	20 25 -56 45	5.1 32	5.4 24	6.2 17	7.5 11	9.0 07	10.5 06	11.7 08	12.4 13	12.3 19	11.6 24	10.6 26	9.8 24	9.5 18
68	RA DEC	20 41 45 15	10.7 31	10.7 22	11.1 15	12.0 10	13.1 10	14.2 16	15.1 25	15.5 36	15.4 45	14.8 52	14.0 54	13.3 52	12.8 46
69	RA DEC	21 40 -77 24	40.4 86	39.6 76	40.3 66	42.4 56	45.4 49	48.8 46	51.8 48	54.0 54	54.5 62	53.3 70	50.7 75	48.0 74	46.0 68
70	RA DEC	21 43 09 50	50.6 41	50.6 38	50.8 35	51.3 34	52.1 36	53.1 41	53.9 48	54.6 55	54.8 60	54.6 63	54.2 64	53.8 62	53.5 59
71	RA DEC	22 07 -46 59	47.6 48	47.4 43	47.6 36	48.3 28	49.3 21	50.5 16	51.7 14	52.7 15	53.1 20	52.9 25	52.3 30	51.6 32	51.1 30
72	RA DEC	22 57 -29 39	16.3 38	16.1 35	16.1 32	16.5 25	17.2 18	18.1 12	19.2 07	20.1 05	20.6 06	20.6 10	20.2 14	19.8 17	19.4 18
73	RA DEC	23 04 15 10	25.2 14	25.0 10	25.0 07	25.3 05	25.9 06	26.8 10	27.8 16	28.6 24	29.1 30	29.1 34	28.9 36	28.5 36	28.2 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 DEC 29 03	5.5 41	5.1 37	4.9 33	5.0 28	5.5 27	6.4 28	7.4 33	8.4 40	9.0 48	9.3 54	9.2 59	8.9 60	8.5 60
2	RA 00 08 DEC 59 06	52.5 83	51.6 79	51.0 72	51.1 64	51.9 58	53.2 56	54.8 59	56.2 66	57.2 76	57.6 86	57.3 95	56.7 100	55.8 101
3	RA 00 25 DEC -77 16	25.5 92	22.9 87	21.4 78	20.9 67	21.9 56	24.2 47	27.2 42	30.3 43	32.6 48	33.5 57	32.6 66	30.5 72	27.6 73
4	RA 00 25 DEC -42 19	59.8 88	59.3 87	58.9 82	58.9 74	59.3 65	60.2 56	61.3 50	62.4 47	63.2 49	63.6 55	63.5 62	63.0 68	62.4 71
5	RA 00 40 DEC 56 30	11.4 38	10.5 35	9.9 29	9.8 21	10.4 15	11.6 12	13.0 14	14.5 20	15.6 29	16.1 39	16.1 48	15.6 54	14.9 56
6	RA 00 43 DEC -18 00	18.2 73	17.8 74	17.5 72	17.5 68	17.8 62	18.5 55	19.4 49	20.4 44	21.1 42	21.5 44	21.5 48	21.3 52	20.9 55
7	RA 00 56 DEC 60 40	22.5 86	21.4 84	20.7 78	20.5 70	21.0 63	22.3 59	23.8 60	25.5 66	26.7 74	27.4 84	27.5 93	27.1 100	26.2 103
8	RA 01 25 DEC 60 12	27.5 36	26.4 35	25.6 30	25.2 22	25.6 15	26.8 11	28.3 11	29.9 15	31.3 23	32.2 32	32.5 42	32.2 49	31.5 53
9	RA 01 37 DEC -57 15	30.4 75	29.3 75	28.5 71	28.0 62	28.0 51	28.8 41	29.9 33	31.3 29	32.6 31	33.4 37	33.5 46	33.1 55	32.2 60
10	See Table 11b. Apparent places of Polaris, 1994													
11	RA 02 06 DEC 23 26	51.8 12	51.4 11	50.9 08	50.7 05	50.8 04	51.4 04	52.2 07	53.2 12	54.2 17	54.8 22	55.2 25	55.2 26	55.0 27
12	RA 02 58 DEC -40 19	3.6 54	3.0 57	2.3 56	1.7 51	1.5 43	1.8 33	2.5 25	3.5 18	4.6 16	5.4 19	5.9 27	5.9 35	5.6 42
13	RA 03 01 DEC 04 03	59.7 60	59.4 58	58.9 56	58.6 56	58.5 58	58.9 61	59.6 66	60.5 71	61.4 74	62.1 76	62.5 76	62.7 73	62.7 71
14	RA 03 23 DEC 49 50	56.5 36	55.9 38	55.2 36	54.5 32	54.4 27	54.8 22	55.7 19	57.0 20	58.4 23	59.5 29	60.3 35	60.7 41	60.7 46
15	RA 04 35 DEC 16 29	36.9 51	36.7 50	36.2 49	35.7 48	35.4 47	35.5 48	36.0 49	36.8 52	37.8 54	38.7 56	39.4 56	39.9 56	40.1 55
16	RA 05 14 DEC -08 12	17.2 36	17.0 40	16.5 42	16.0 43	15.6 40	15.6 36	15.9 31	16.6 25	17.4 22	18.3 21	19.0 24	19.6 29	19.8 35
17	RA 05 16 DEC 45 59	18.0 33	17.8 37	17.2 38	16.4 37	15.9 34	15.9 29	16.4 26	17.4 23	18.6 22	19.8 23	20.9 26	21.8 30	22.2 34
18	RA 05 24 DEC 06 20	50.9 36	50.8 33	50.4 32	49.8 32	49.4 32	49.4 34	49.7 37	50.4 41	51.3 43	52.1 44	52.9 42	53.5 39	53.9 36
19	RA 05 25 DEC 28 36	57.5 08	57.3 09	56.9 09	56.3 08	55.9 07	55.8 05	56.2 04	57.0 04	58.0 05	59.0 06	59.9 06	60.6 07	61.0 08
20	RA 05 35 DEC -01 12	56.8 25	56.7 29	56.3 31	55.8 31	55.4 30	55.3 27	55.6 23	56.2 18	57.0 15	57.9 15	58.7 17	59.3 21	59.6 26
21	RA 05 40 DEC -01 56	29.6 50	29.5 54	29.1 56	28.6 57	28.2 55	28.1 52	28.4 48	29.0 43	29.8 40	30.6 40	31.4 42	32.1 46	32.4 51
22	RA 05 54 DEC 07 24	53.2 17	53.2 14	52.8 13	52.3 13	51.8 13	51.7 15	52.0 18	52.6 20	53.4 23	54.3 23	55.1 21	55.8 18	56.2 15
23	RA 06 23 DEC -52 41	51.9 40	51.6 50	50.8 56	49.7 58	48.7 55	48.1 48	48.0 38	48.5 29	49.4 22	50.6 20	51.8 24	52.7 33	53.1 44
24	RA 06 37 DEC 16 24	24.5 10	24.5 09	24.2 09	23.7 09	23.2 09	23.0 09	23.2 10	23.7 11	24.5 11	25.4 11	26.3 09	27.1 07	27.7 04
25	RA 06 44 DEC -16 42	55.3 35	55.3 42	55.0 46	54.4 47	53.9 46	53.6 42	53.7 36	54.1 30	54.8 26	55.7 25	56.5 28	57.3 34	57.8 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	25.4 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	27.4 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 16	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	23.4 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	23.4 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	22.2 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 03	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	53.4 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 43	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	21	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 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 -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 DEC	00 08 29 03	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
2	RA DEC	00 08 59 07	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
3	RA DEC	00 25 -77 16	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
4	RA DEC	00 26 -42 19	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
5	RA DEC	00 40 56 30	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 56	19.4 65	18.9 71	18.1 73
6	RA DEC	00 43 -18 00	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
7	RA DEC	00 56 60 41	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
8	RA DEC	01 25 60 12	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
9	RA DEC	01 37 -57 15	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
10	See Table 11c. Apparent places of Polaris, 1995														
11	RA DEC	02 06 23 26	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
12	RA DEC	02 58 -40 19	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
13	RA DEC	03 02 04 04	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
14	RA DEC	03 23 49 50	60.7 46	60.1 48	59.3 46	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
15	RA DEC	04 35 16 29	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
16	RA DEC	05 14 -08 12	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
17	RA DEC	05 16 45 59	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
18	RA DEC	05 24 06 20	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
19	RA DEC	05 25 28 36	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
20	RA DEC	05 35 -01 12	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
21	RA DEC	05 40 -01 56	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
22	RA DEC	05 54 07 24	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
23	RA DEC	06 23 -52 41	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
24	RA DEC	06 37 16 24	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
25	RA DEC	06 44 -16 42	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

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 53	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	4.4	5.4	6.2
	DEC	28 01	66	67	68	70	71	70	69	68	65	63	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	13.4	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	34.5	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 DEC 19 12	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	
52	RA 14 39 DEC -60 48	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	
53	RA 14 50 DEC -16 01	36.2 11	37.2 16	38.1 20	38.8 23	39.2 25	39.4 25	39.3 24	38.9 23	38.4 21	38.1 20	38.0 19	38.4 20	39.2 24	
54	RA 14 50 DEC 74 10	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	
55	RA 15 34 DEC 26 43	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	29.4 55	29.6 47	30.2 39	
56	RA 16 00 DEC -22 36	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	
57	RA 16 29 DEC -26 25	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	
58	RA 16 48 DEC -69 00	6.4 55	8.4 50	10.5 50	12.8 53	14.6 58	15.8 65	16.1 73	15.4 79	14.0 82	12.5 80	11.3 74	11.2 66	12.2 59	
59	RA 17 10 DEC -15 43	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	
60	RA 17 33 DEC -37 05	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	
61	RA 17 34 DEC 12 33	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	
62	RA 17 56 DEC 51 29	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	
63	RA 18 23 DEC -34 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	
64	RA 18 36 DEC 38 46	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	
65	RA 18 54 DEC -26 17	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	
66	RA 19 50 DEC 08 51	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	
67	RA 20 25 DEC -56 44	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	
68	RA 20 41 DEC 45 15	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	
69	RA 21 40 DEC -77 24	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	
70	RA 21 43 DEC 09 51	56.2 16	56.2 12	56.4 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	
71	RA 22 07 DEC -46 58	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	
72	RA 22 57 DEC -29 38	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	
73	RA 23 04 DEC 15 10	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	

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 DEC	00 08 29 04	11.4 17	11.0 14	10.7 09	10.8 04	11.3 02	12.1 04	13.2 09	14.1 16	14.7 23	15.0 30	14.9 34	14.6 36	14.2 35
2	RA DEC	00 08 59 07	58.9 59	58.0 55	57.4 48	57.4 40	58.1 33	59.5 32	61.0 35	62.4 42	63.3 51	63.7 61	63.5 70	62.8 76	61.8 77
3	RA DEC	00 25 -77 16	30.0 55	27.5 50	26.0 42	25.6 30	26.6 19	28.9 10	31.9 06	35.1 06	37.4 12	38.3 21	37.4 30	35.4 36	32.6 37
4	RA DEC	00 26 -42 19	5.0 53	4.4 52	4.1 47	4.0 39	4.5 30	5.3 21	6.4 15	7.6 13	8.4 15	8.7 20	8.6 27	8.2 33	7.6 36
5	RA DEC	00 40 56 30	18.1 73	17.2 71	16.6 64	16.4 56	17.0 50	18.2 47	19.6 49	21.0 56	22.0 65	22.5 74	22.5 83	22.1 89	21.2 91
6	RA DEC	00 43 -18 00	23.6 37	23.2 38	22.9 37	22.9 33	23.2 27	23.9 20	24.8 14	25.8 09	26.5 07	26.8 09	26.9 13	26.6 17	26.2 20
7	RA DEC	00 56 60 41	29.7 60	28.6 58	27.8 52	27.5 44	28.0 37	29.3 33	30.9 35	32.5 40	33.7 49	34.3 58	34.4 68	33.9 75	33.0 77
8	RA DEC	01 25 60 12	35.2 69	34.2 68	33.3 63	32.9 55	33.2 48	34.3 43	35.9 44	37.5 48	38.8 56	39.6 65	39.9 74	39.6 81	38.8 85
9	RA DEC	01 37 -57 14	34.1 104	33.0 104	32.2 99	31.7 90	31.7 80	32.5 69	33.7 61	35.1 58	36.4 60	37.1 66	37.3 75	36.8 83	36.0 88
10	See Table 11d. Apparent places of Polaris, 1996														
11	RA DEC	02 06 23 26	58.1 41	57.7 39	57.2 37	56.9 34	57.0 32	57.6 33	58.5 36	59.5 41	60.4 46	61.0 50	61.3 54	61.4 56	61.1 56
12	RA DEC	02 58 -40 18	7.6 91	7.0 94	6.3 93	5.7 88	5.5 80	5.8 70	6.5 61	7.5 55	8.6 53	9.4 56	9.9 63	9.9 71	9.6 79
13	RA DEC	03 02 04 04	5.5 22	5.1 20	4.7 19	4.3 19	4.2 20	4.6 24	5.3 29	6.2 34	7.0 38	7.7 39	8.2 39	8.4 37	8.3 34
14	RA DEC	03 24 49 50	4.6 56	4.0 58	3.2 56	2.5 52	2.3 46	2.7 42	3.7 39	5.0 40	6.3 44	7.4 49	8.2 55	8.6 61	8.5 66
15	RA DEC	04 35 16 29	43.2 59	43.0 59	42.5 58	42.0 57	41.7 57	41.8 57	42.3 59	43.1 62	44.0 64	44.9 66	45.6 66	46.1 66	46.3 65
16	RA DEC	05 14 -08 12	22.4 33	22.3 37	21.8 39	21.2 39	20.8 37	20.8 32	21.1 27	21.8 21	22.6 17	23.4 17	24.2 20	24.8 24	25.0 30
17	RA DEC	05 16 45 59	26.2 35	26.0 39	25.4 41	24.5 40	24.0 36	24.0 32	24.5 28	25.5 26	26.6 25	27.8 27	29.0 29	29.8 33	30.1 38
18	RA DEC	05 24 06 20	56.8 37	56.7 35	56.2 34	55.7 34	55.3 34	55.2 36	55.6 39	56.3 43	57.1 46	57.9 46	58.7 45	59.3 42	59.6 39
19	RA DEC	05 26 28 36	4.4 09	4.3 10	3.8 10	3.2 10	2.7 08	2.7 07	3.1 06	3.9 06	4.8 07	5.8 08	6.7 08	7.4 09	7.8 11
20	RA DEC	05 36 -01 12	2.4 26	2.3 29	1.9 31	1.3 31	0.9 30	0.8 27	1.1 22	1.7 18	2.5 14	3.4 14	4.2 16	4.8 20	5.1 25
21	RA DEC	05 40 -01 56	35.1 51	35.1 55	34.7 57	34.1 57	33.6 55	33.5 52	33.8 48	34.5 43	35.2 40	36.1 39	36.9 42	37.5 46	37.8 50
22	RA DEC	05 54 07 24	59.1 14	59.1 11	58.7 10	58.2 10	57.7 11	57.6 12	57.9 15	58.5 18	59.3 20	60.1 21	61.0 19	61.6 16	62.0 13
23	RA DEC	06 23 -52 41	54.3 47	54.0 57	53.2 63	52.1 65	51.1 62	50.5 55	50.4 46	50.9 36	51.9 29	53.1 27	54.3 31	55.2 39	55.5 50
24	RA DEC	06 37 16 23	30.8 60	30.9 59	30.6 59	30.0 59	29.5 59	29.3 60	29.5 60	30.0 62	30.7 62	31.6 62	32.5 60	33.3 58	33.8 56
25	RA DEC	06 44 -16 42	60.2 48	60.2 55	59.8 59	59.2 60	58.7 59	58.4 54	58.5 49	58.9 42	59.6 38	60.4 37	61.3 40	62.0 46	62.5 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 DEC -28 57	30.1 69	30.2 78	29.8 83	29.1 85	28.4 83	28.1 79	28.1 71	28.4 64	29.1 57	29.9 56	30.9 58	31.7 65	32.2 74
27	RA 07 08 DEC -26 23	15.7 22	15.8 30	15.4 35	14.8 37	14.2 36	13.8 32	13.8 25	14.1 17	14.7 11	15.5 09	16.5 12	17.3 19	17.9 28
28	RA 07 34 DEC 31 53	22.7 38	23.0 39	22.8 42	22.2 44	21.6 44	21.2 43	21.3 41	21.7 39	22.3 37	23.2 34	24.3 31	25.3 30	26.1 30
29	RA 07 39 DEC 05 13	7.3 56	7.6 53	7.4 51	6.9 51	6.4 52	6.1 53	6.1 55	6.4 58	7.0 59	7.7 59	8.6 56	9.5 52	10.1 47
30	RA 07 45 DEC 28 01	6.2 56	6.5 57	6.3 59	5.8 61	5.2 62	4.8 61	4.8 60	5.2 58	5.8 56	6.6 54	7.7 51	8.6 49	9.4 48
31	RA 08 09 DEC -47 19	27.1 33	27.3 44	27.0 53	26.2 58	25.3 59	24.6 55	24.2 49	24.3 39	24.8 31	25.6 27	26.8 27	27.9 33	28.7 43
32	RA 08 22 DEC -59 29	29.1 50	29.4 61	29.0 71	27.9 78	26.7 79	25.6 77	24.9 70	24.8 60	25.3 51	26.4 45	27.9 45	29.3 51	30.3 61
33	RA 09 07 DEC -43 24	53.2 59	53.7 70	53.6 79	53.1 86	52.4 88	51.7 87	51.2 82	51.1 74	51.4 65	52.0 60	53.1 59	54.2 64	55.2 73
34	RA 09 13 DEC -69 41	13.8 59	14.5 71	14.2 81	12.9 90	11.2 95	9.4 94	8.1 89	7.4 80	7.6 71	8.8 63	10.8 61	12.8 64	14.5 73
35	RA 09 27 DEC -08 38	25.0 35	25.5 42	25.6 47	25.4 49	24.9 49	24.5 47	24.3 44	24.3 40	24.5 37	25.0 36	25.8 38	26.7 43	27.6 50
36	RA 10 08 DEC 11 58	10.7 61	11.5 57	11.7 56	11.6 57	11.2 59	10.7 61	10.5 62	10.4 63	10.5 63	10.9 60	11.7 56	12.6 50	13.6 45
37	RA 11 01 DEC 56 23	36.7 52	38.0 54	38.7 60	38.6 68	38.0 74	37.1 78	36.3 76	35.8 72	35.7 64	36.0 55	37.0 45	38.3 38	39.9 35
38	RA 11 03 DEC 61 45	29.6 59	31.1 61	31.8 67	31.7 76	30.9 83	29.8 86	28.9 84	28.2 79	28.0 71	28.4 61	29.5 51	31.0 44	32.8 41
39	RA 11 48 DEC 14 35	51.9 30	52.8 26	53.4 24	53.5 26	53.4 29	53.0 32	52.7 34	52.4 35	52.2 33	52.3 30	52.8 25	53.6 18	54.6 12
40	RA 11 53 DEC 53 42	37.3 41	38.7 41	39.5 45	39.7 53	39.3 60	38.6 65	37.8 66	37.2 63	36.8 56	36.9 47	37.5 37	38.6 28	40.1 23
41	RA 12 15 DEC -17 31	36.7 08	37.7 15	38.3 21	38.6 26	38.5 28	38.2 28	37.9 27	37.5 24	37.3 21	37.3 18	37.7 18	38.5 20	39.5 26
42	RA 12 26 DEC -63 04	24.2 21	25.9 28	27.0 37	27.4 48	27.2 57	26.5 63	25.5 65	24.4 62	23.6 55	23.4 47	24.1 40	25.5 36	27.3 38
43	RA 12 30 DEC -57 05	58.0 12	59.5 19	60.4 28	60.8 38	60.7 46	60.2 52	59.4 54	58.5 51	57.9 44	57.7 37	58.3 30	59.5 27	61.0 30
44	RA 12 47 DEC -59 39	30.5 45	32.1 51	33.2 60	33.7 70	33.7 79	33.2 85	32.4 87	31.4 85	30.6 79	30.3 71	30.9 64	32.1 60	33.7 62
45	RA 12 53 DEC 55 58	50.5 35	52.0 33	53.1 36	53.6 44	53.5 52	52.8 59	52.0 62	51.2 60	50.5 54	50.2 46	50.5 35	51.4 25	52.8 18
46	RA 13 23 DEC 54 56	44.9 30	46.4 26	47.5 29	48.2 36	48.2 44	47.7 52	46.9 56	46.1 55	45.3 50	44.9 42	45.0 32	45.8 21	47.1 13
47	RA 13 24 DEC -11 08	59.2 23	60.2 29	60.9 34	61.4 37	61.5 38	61.4 37	61.2 36	60.8 34	60.4 32	60.3 30	60.5 31	61.1 34	62.0 39
48	RA 13 47 DEC 49 19	22.0 45	23.4 41	24.4 42	25.1 48	25.2 56	24.9 64	24.3 69	23.6 69	22.9 66	22.4 59	22.4 49	23.0 38	24.1 29
49	RA 14 03 DEC -60 20	32.8 56	34.6 59	36.0 65	37.0 74	37.4 83	37.4 90	36.8 95	35.8 95	34.8 91	34.2 85	34.2 77	35.1 72	36.7 71
50	RA 14 06 DEC -36 20	27.0 49	28.2 54	29.1 60	29.8 66	30.1 71	30.1 75	29.9 77	29.4 76	28.8 73	28.5 69	28.5 65	29.1 63	30.2 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	78	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	46	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	85
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	-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	6.5	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 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 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	6.4	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	29.3	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	36	36	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	51	48	44	39
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 28 01	48	49	51	53	54	53	52	50	48	46	43	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	27.8	26.7	26.0	25.9	26.4	27.4	28.9	30.3	31.4
	DEC -59 29	61	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	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 14 34	72	68	67	68	71	74	76	77	76	73	67	61	54
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 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	00
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 DEC	14 15 19 11	30.8 50	31.7 44	32.5 42	33.2 43	33.4 47	33.4 53	33.1 57	32.7 59	32.3 58	31.9 55	31.9 49	32.3 41	33.2 33
52	RA DEC	14 39 -60 49	23.2 02	25.0 04	26.4 10	27.6 18	28.2 26	28.2 34	27.7 38	26.7 40	25.6 37	24.8 32	24.6 24	25.3 18	26.8 16
53	RA DEC	14 50 -16 01	42.2 36	43.2 41	44.0 45	44.7 48	45.2 50	45.3 50	45.2 50	44.9 48	44.4 47	44.0 45	43.9 45	44.3 46	45.1 50
54	RA DEC	14 50 74 09	38.3 53	40.8 48	43.2 49	45.1 55	45.8 64	45.3 74	43.7 80	41.5 82	39.2 79	37.3 72	36.3 61	36.6 50	38.2 40
55	RA DEC	15 34 26 43	32.5 28	33.4 21	34.3 19	35.1 20	35.6 25	35.8 33	35.7 39	35.3 43	34.7 43	34.2 41	33.9 35	34.0 27	34.7 17
56	RA DEC	16 00 -22 36	8.4 36	9.4 39	10.3 42	11.2 45	11.8 46	12.2 47	12.3 48	12.0 48	11.5 47	11.0 45	10.7 44	10.9 44	11.6 45
57	RA DEC	16 29 -26 25	12.3 20	13.2 21	14.2 23	15.1 26	15.9 28	16.3 29	16.5 30	16.3 31	15.8 30	15.2 29	14.8 27	14.9 26	15.6 27
58	RA DEC	16 48 -69 00	18.0 64	19.9 59	22.0 59	24.3 62	26.2 68	27.3 75	27.5 83	26.9 89	25.4 92	23.8 90	22.6 84	22.5 77	23.6 69
59	RA DEC	17 10 -15 43	11.2 07	11.9 09	12.8 11	13.7 12	14.5 12	15.0 11	15.3 10	15.2 09	14.8 09	14.2 09	13.8 08	13.7 09	14.2 11
60	RA DEC	17 33 -37 05	22.8 55	23.7 53	24.6 53	25.8 54	26.7 56	27.5 58	27.9 60	27.8 63	27.3 64	26.6 64	26.1 62	26.0 60	26.4 57
61	RA DEC	17 34 12 33	46.4 50	47.1 44	47.8 40	48.7 40	49.5 43	50.1 48	50.3 54	50.2 59	49.8 62	49.2 62	48.7 60	48.6 55	48.9 48
62	RA DEC	17 56 51 29	30.0 27	30.7 17	31.7 11	32.9 10	34.0 15	34.7 24	34.9 34	34.6 43	33.8 48	32.7 49	31.7 45	31.2 37	31.3 26
63	RA DEC	18 23 -34 22	56.8 61	57.5 59	58.3 58	59.4 57	60.4 57	61.3 58	61.8 59	61.9 62	61.6 64	60.9 65	60.3 64	60.0 62	60.3 60
64	RA DEC	18 36 38 46	48.6 59	49.1 50	49.8 44	50.8 42	51.8 46	52.6 54	53.0 63	52.9 72	52.4 77	51.6 79	50.9 77	50.4 71	50.4 62
65	RA DEC	18 55 -26 17	3.3 55	3.8 54	4.5 53	5.5 52	6.5 50	7.3 49	7.9 49	8.1 49	7.9 51	7.3 52	6.7 52	6.4 52	6.6 51
66	RA DEC	19 50 08 51	37.0 45	37.3 40	37.8 37	38.6 36	39.5 39	40.3 44	40.9 50	41.2 56	41.1 60	40.6 62	40.0 61	39.7 58	39.6 54
67	RA DEC	20 25 -56 44	22.0 42	22.3 35	23.0 28	24.3 22	25.8 18	27.3 18	28.5 20	29.1 25	29.1 31	28.4 37	27.3 39	26.5 37	26.2 32
68	RA DEC	20 41 45 16	18.6 25	18.5 15	18.9 08	19.8 03	20.8 03	21.9 08	22.8 17	23.2 27	23.0 37	22.4 43	21.6 45	20.8 43	20.4 36
69	RA DEC	21 41 -77 23	2.4 82	1.7 72	2.3 63	4.4 53	7.4 46	10.8 43	13.9 45	16.1 51	16.6 60	15.5 68	13.0 73	10.3 73	8.3 68
70	RA DEC	21 44 09 51	1.5 47	1.5 43	1.7 40	2.2 39	3.0 41	3.9 46	4.7 52	5.3 58	5.5 63	5.3 66	4.9 67	4.4 65	4.1 62
71	RA DEC	22 08 -46 58	1.0 40	0.8 35	1.0 29	1.6 21	2.6 14	3.8 09	5.0 07	6.0 09	6.4 13	6.2 19	5.5 25	4.8 27	4.3 25
72	RA DEC	22 57 -29 37	28.2 85	27.9 83	27.9 79	28.3 73	29.0 67	29.9 60	30.9 56	31.8 54	32.3 56	32.3 59	32.0 64	31.5 67	31.1 68
73	RA DEC	23 04 15 11	36.4 27	36.1 23	36.1 19	36.3 17	37.0 18	37.8 22	38.8 28	39.6 35	40.0 41	40.0 45	39.8 47	39.4 47	39.0 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 DEC 516	2.4 0.55	2.0 0.53	1.8 0.51	1.9 0.49	2.4 0.48	3.3 0.49	4.4 0.51	5.4 0.55	6.0 0.59	6.3 0.62	6.2 0.64	6.0 0.65	5.5 0.65
2	RA 00 08 DEC 1050	49.0 0.98	48.1 0.96	47.6 0.93	47.7 0.89	48.5 0.86	49.8 0.85	51.4 0.86	52.9 0.90	53.9 0.95	54.2 1.00	54.0 1.04	53.4 1.07	52.5 1.08
3	RA 00 25 DEC - 1373	23.3 1.18	20.7 1.15	19.2 1.11	18.8 1.05	19.8 1.00	22.1 0.96	25.0 0.93	28.1 0.93	30.5 0.96	31.3 1.00	30.4 1.05	28.2 1.08	25.5 1.08
4	RA 00 25 DEC - 752	57.1 0.82	56.6 0.81	56.2 0.79	56.2 0.75	56.7 0.71	57.5 0.66	58.6 0.63	59.8 0.62	60.6 0.63	61.0 0.66	60.8 0.69	60.4 0.72	59.8 0.73
5	RA 00 40 DEC 1004	7.8 0.54	6.9 0.53	6.4 0.50	6.3 0.46	6.9 0.43	8.0 0.41	9.5 0.42	11.0 0.46	12.1 0.50	12.6 0.55	12.6 0.59	12.2 0.62	11.4 0.63
6	RA 00 43 DEC - 320	15.3 0.45	14.9 0.45	14.7 0.45	14.7 0.42	15.0 0.40	15.7 0.36	16.7 0.33	17.6 0.31	18.4 0.30	18.7 0.31	18.7 0.33	18.5 0.35	18.2 0.36
7	RA 00 56 DEC 1078	18.6 0.85	17.6 0.84	16.8 0.81	16.6 0.78	17.2 0.74	18.5 0.72	20.1 0.73	21.7 0.76	23.0 0.80	23.7 0.85	23.8 0.89	23.4 0.93	22.5 0.94
8	RA 01 25 DEC 1070	23.3 0.32	22.3 0.31	21.5 0.29	21.2 0.25	21.5 0.22	22.7 0.19	24.2 0.19	25.9 0.22	27.3 0.26	28.2 0.30	28.5 0.35	28.2 0.38	27.5 0.40
9	RA 01 37 DEC - 1018	28.5 0.23	27.4 0.23	26.6 0.21	26.1 0.16	26.2 0.11	26.9 0.06	28.1 0.02	29.5 0.00	30.8 0.01	31.5 0.04	31.7 0.09	31.2 0.13	30.4 0.15
10	See Table 11a. Apparent places of Polaris, 1993													
11	RA 02 06 DEC 416	48.4 0.58	48.0 0.57	47.6 0.56	47.4 0.55	47.5 0.54	48.1 0.54	49.0 0.55	50.0 0.58	50.9 0.61	51.6 0.63	51.9 0.64	52.0 0.65	51.8 0.65
12	RA 02 57 DEC - 716	61.5 1.07	60.9 1.08	60.2 1.08	59.6 1.05	59.4 1.01	59.7 0.96	60.5 0.92	61.5 0.89	62.6 0.88	63.4 0.89	63.9 0.93	63.9 0.97	63.6 1.01
13	RA 03 01 DEC 72	56.7 0.24	56.3 0.23	55.9 0.22	55.6 0.22	55.5 0.23	55.9 0.25	56.6 0.27	57.5 0.29	58.4 0.31	59.1 0.32	59.6 0.32	59.8 0.31	59.7 0.30
14	RA 03 23 DEC 885	52.2 1.05	51.6 1.06	50.9 1.06	50.3 1.03	50.1 1.01	50.5 0.99	51.5 0.97	52.9 0.98	54.2 1.00	55.3 1.02	56.2 1.05	56.6 1.08	56.5 1.10
15	RA 04 35 DEC 293	33.5 0.27	33.3 0.26	32.9 0.26	32.4 0.25	32.1 0.25	32.2 0.25	32.8 0.26	33.6 0.27	34.6 0.29	35.4 0.29	36.2 0.29	36.7 0.29	36.9 0.29
16	RA 05 14 DEC - 145	14.4 0.96	14.2 0.98	13.8 1.00	13.2 1.00	12.9 0.98	12.8 0.96	13.2 0.94	13.9 0.91	14.7 0.89	15.6 0.89	16.3 0.90	16.9 0.93	17.2 0.96
17	RA 05 16 DEC 817	13.7 0.64	13.5 0.66	12.9 0.67	12.2 0.66	11.6 0.64	11.6 0.62	12.2 0.60	13.2 0.59	14.4 0.59	15.6 0.60	16.8 0.60	17.6 0.62	18.0 0.64
18	RA 05 24 DEC 112	47.7 0.77	47.6 0.76	47.3 0.75	46.7 0.75	46.4 0.75	46.3 0.76	46.7 0.78	47.4 0.79	48.3 0.80	49.1 0.81	49.9 0.80	50.5 0.79	50.9 0.77
19	RA 05 25 DEC 508	53.7 0.48	53.7 0.49	53.2 0.49	52.6 0.49	52.2 0.48	52.2 0.47	52.6 0.46	53.4 0.46	54.4 0.47	55.4 0.47	56.3 0.47	57.1 0.48	57.5 0.48
20	RA 05 35 DEC - 21	53.9 0.45	53.8 0.47	53.4 0.48	52.9 0.49	52.5 0.48	52.4 0.46	52.7 0.44	53.4 0.42	54.2 0.41	55.0 0.40	55.8 0.42	56.5 0.44	56.8 0.46
21	RA 05 40 DEC - 34	26.7 0.61	26.6 0.63	26.2 0.64	25.7 0.64	25.3 0.64	25.2 0.62	25.5 0.60	26.1 0.58	27.0 0.56	27.8 0.56	28.6 0.57	29.3 0.59	29.6 0.62
22	RA 05 54 DEC 131	50.0 0.65	50.0 0.64	49.7 0.63	49.2 0.63	48.7 0.63	48.6 0.64	48.9 0.65	49.6 0.67	50.4 0.68	51.2 0.68	52.1 0.67	52.8 0.65	53.2 0.64
23	RA 06 23 DEC - 936	50.5 0.77	50.2 0.81	49.5 0.84	48.4 0.85	47.4 0.84	46.8 0.80	46.7 0.76	47.2 0.71	48.2 0.68	49.3 0.67	50.6 0.69	51.5 0.73	51.9 0.79
24	RA 06 37 DEC 291	21.1 0.63	21.2 0.63	20.9 0.63	20.4 0.63	19.9 0.63	19.7 0.63	19.9 0.63	20.5 0.64	21.2 0.64	22.1 0.64	23.0 0.63	23.9 0.61	24.5 0.60
25	RA 06 44 DEC - 296	52.8 1.02	52.8 1.06	52.5 1.08	51.9 1.08	51.4 1.08	51.1 1.06	51.2 1.03	51.6 1.00	52.3 0.98	53.2 0.97	54.1 0.99	54.8 1.02	55.3 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	0.16	0.17	0.18	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	0.94	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 03	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	13.4	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	52.4	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	23.4
	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 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 - 1080	0.96	0.97	0.99	1.03	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	49.6	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 - 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	15.1	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	40.4	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 - 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 DEC 516	5.5 0.65	5.1 0.63	4.9 0.61	5.0 0.58	5.5 0.58	6.4 0.58	7.4 0.61	8.4 0.64	9.0 0.68	9.3 0.71	9.2 0.74	8.9 0.74	8.5 0.74
2	RA 00 08 DEC 1050	52.5 1.08	51.6 1.06	51.0 1.02	51.1 0.98	51.9 0.95	53.2 0.94	54.8 0.96	56.2 0.99	57.2 1.04	57.6 1.09	57.3 1.14	56.7 1.16	55.8 1.17
3	RA 00 25 DEC - 1373	25.5 1.08	22.9 1.06	21.4 1.01	20.9 0.96	21.9 0.91	24.2 0.86	27.2 0.84	30.3 0.84	32.6 0.87	33.5 0.91	32.6 0.96	30.5 0.99	27.6 0.99
4	RA 00 25 DEC - 752	59.8 0.73	59.3 0.73	58.9 0.70	58.9 0.66	59.3 0.62	60.2 0.57	61.3 0.54	62.4 0.53	63.2 0.54	63.6 0.57	63.5 0.60	63.0 0.63	62.4 0.65
5	RA 00 40 DEC 1004	11.4 0.63	10.5 0.62	9.9 0.59	9.8 0.55	10.4 0.52	11.6 0.50	13.0 0.51	14.5 0.54	15.6 0.59	16.1 0.64	16.1 0.68	15.6 0.71	14.9 0.72
6	RA 00 43 DEC - 320	18.2 0.36	17.8 0.37	17.5 0.36	17.5 0.34	17.8 0.31	18.5 0.27	19.4 0.24	20.4 0.22	21.1 0.21	21.5 0.22	21.5 0.24	21.3 0.26	20.9 0.27
7	RA 00 56 DEC 1078	22.5 0.94	21.4 0.93	20.7 0.90	20.5 0.86	21.0 0.83	22.3 0.81	23.8 0.81	25.5 0.84	26.7 0.88	27.4 0.93	27.5 0.98	27.1 1.01	26.2 1.03
8	RA 01 25 DEC 1070	27.5 0.40	26.4 0.40	25.6 0.37	25.2 0.33	25.6 0.30	26.8 0.28	28.3 0.28	29.9 0.30	31.3 0.34	32.2 0.38	32.5 0.43	32.2 0.46	31.5 0.48
9	RA 01 37 DEC - 1017	30.4 1.15	29.3 1.15	28.5 1.13	28.0 1.08	28.0 1.03	28.8 0.98	29.9 0.94	31.3 0.92	32.6 0.93	33.4 0.96	33.5 1.00	33.1 1.05	32.2 1.07
10	See Table 11b. Apparent places of Polaris, 1994													
11	RA 02 06 DEC 416	51.8 0.65	51.4 0.65	50.9 0.63	50.7 0.62	50.8 0.61	51.4 0.61	52.2 0.63	53.2 0.65	54.2 0.68	54.8 0.70	55.2 0.72	55.2 0.72	55.0 0.73
12	RA 02 58 DEC - 716	3.6 1.01	3.0 1.02	2.3 1.02	1.7 0.99	1.5 0.95	1.8 0.90	2.5 0.86	3.5 0.83	4.6 0.82	5.4 0.83	5.9 0.87	5.9 0.91	5.6 0.95
13	RA 03 01 DEC 72	59.7 0.30	59.4 0.29	58.9 0.28	58.6 0.28	58.5 0.29	58.9 0.30	59.6 0.33	60.5 0.35	61.4 0.37	62.1 0.38	62.5 0.38	62.7 0.36	62.7 0.35
14	RA 03 23 DEC 886	56.5 0.10	55.9 0.11	55.2 0.10	54.5 0.08	54.4 0.06	54.8 0.03	55.7 0.02	57.0 0.02	58.4 0.04	59.5 0.07	60.3 0.10	60.7 0.13	60.7 0.15
15	RA 04 35 DEC 293	36.9 0.29	36.7 0.28	36.2 0.28	35.7 0.27	35.4 0.27	35.5 0.27	36.0 0.28	36.8 0.29	37.8 0.30	38.7 0.31	39.4 0.31	39.9 0.31	40.1 0.31
16	RA 05 14 DEC - 145	17.2 0.96	17.0 0.98	16.5 0.99	16.0 0.99	15.6 0.98	15.6 0.96	15.9 0.93	16.6 0.90	17.4 0.89	18.3 0.88	19.0 0.90	19.6 0.92	19.8 0.95
17	RA 05 16 DEC 817	18.0 0.64	17.8 0.66	17.2 0.67	16.4 0.66	15.9 0.65	15.9 0.62	16.4 0.61	17.4 0.60	18.6 0.59	19.8 0.60	20.9 0.61	21.8 0.63	22.2 0.65
18	RA 05 24 DEC 112	50.9 0.77	50.8 0.76	50.4 0.75	49.8 0.75	49.4 0.75	49.4 0.76	49.7 0.78	50.4 0.80	51.3 0.80	52.1 0.81	52.9 0.80	53.5 0.79	53.9 0.77
19	RA 05 25 DEC 508	57.5 0.48	57.3 0.49	56.9 0.49	56.3 0.48	55.9 0.48	55.8 0.47	56.2 0.46	57.0 0.46	58.0 0.47	59.0 0.47	59.9 0.47	60.6 0.48	61.0 0.48
20	RA 05 35 DEC - 21	56.8 0.46	56.7 0.48	56.3 0.49	55.8 0.49	55.4 0.48	55.3 0.47	55.6 0.45	56.2 0.42	57.0 0.41	57.9 0.41	58.7 0.42	59.3 0.44	59.6 0.46
21	RA 05 40 DEC - 34	29.6 0.62	29.5 0.64	29.1 0.65	28.6 0.65	28.2 0.64	28.1 0.63	28.4 0.61	29.0 0.58	29.8 0.57	30.6 0.57	31.4 0.58	32.1 0.60	32.4 0.62
22	RA 05 54 DEC 131	53.2 0.64	53.2 0.62	52.8 0.62	52.3 0.62	51.8 0.62	51.7 0.63	52.0 0.64	52.6 0.65	53.4 0.67	54.3 0.67	55.1 0.66	55.8 0.64	56.2 0.63
23	RA 06 23 DEC - 936	51.9 0.79	51.6 0.84	50.8 0.87	49.7 0.88	48.7 0.86	48.1 0.83	48.0 0.78	48.5 0.74	49.4 0.70	50.6 0.69	51.8 0.71	52.7 0.76	53.1 0.81
24	RA 06 37 DEC 291	24.5 0.60	24.5 0.60	24.2 0.60	23.7 0.60	23.2 0.60	23.0 0.60	23.2 0.60	23.7 0.61	24.5 0.61	25.4 0.61	26.3 0.60	27.1 0.59	27.7 0.58
25	RA 06 44 DEC - 297	55.3 0.06	55.3 0.10	55.0 0.12	54.4 0.12	53.9 0.12	53.6 0.10	53.7 0.07	54.1 0.04	54.8 0.02	55.7 0.01	56.5 0.03	57.3 0.06	57.8 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 DEC	06 58 - 514	25.8 0.94	25.8 0.98	25.4 1.01	24.8 1.02	24.2 1.02	23.8 0.99	23.8 0.96	24.1 0.92	24.8 0.89	25.7 0.88	26.6 0.89	27.4 0.93	28.0 0.98
27	RA DEC	07 08 - 469	11.2 0.07	11.3 0.11	10.9 0.14	10.3 0.15	9.7 0.15	9.3 0.13	9.3 0.09	9.6 0.06	10.3 0.03	11.1 0.02	12.1 0.03	12.9 0.07	13.5 0.11
28	RA DEC	07 34 567	15.8 0.09	16.1 0.10	15.9 0.11	15.3 0.12	14.8 0.12	14.4 0.12	14.4 0.11	14.8 0.10	15.5 0.08	16.4 0.07	17.4 0.06	18.4 0.05	19.3 0.04
29	RA DEC	07 39 93	1.6 0.12	1.9 0.11	1.7 0.10	1.2 0.09	0.7 0.10	0.4 0.11	0.4 0.12	0.7 0.13	1.3 0.13	2.1 0.13	3.0 0.12	3.8 0.09	4.5 0.07
30	RA DEC	07 44 498	59.6 0.45	59.9 0.45	59.7 0.46	59.2 0.47	58.7 0.47	58.3 0.47	58.3 0.46	58.6 0.45	59.3 0.44	60.1 0.43	61.1 0.42	62.1 0.40	62.9 0.40
31	RA DEC	08 09 - 841	23.5 0.23	23.8 0.29	23.4 0.33	22.7 0.36	21.8 0.37	21.1 0.35	20.7 0.31	20.8 0.27	21.3 0.23	22.2 0.21	23.4 0.21	24.5 0.24	25.3 0.29
32	RA DEC	08 22 - 1057	26.6 0.60	26.9 0.66	26.5 0.71	25.5 0.74	24.3 0.75	23.2 0.74	22.5 0.71	22.4 0.66	22.9 0.62	24.0 0.59	25.4 0.59	26.9 0.61	27.9 0.67
33	RA DEC	09 07 - 771	49.0 0.70	49.5 0.76	49.4 0.80	48.9 0.84	48.2 0.85	47.5 0.84	47.1 0.82	46.9 0.78	47.2 0.74	47.9 0.71	49.0 0.71	50.1 0.73	51.1 0.78
34	RA DEC	09 13 - 1238	12.1 0.96	12.8 1.02	12.5 1.07	11.3 1.12	9.6 1.14	7.8 1.14	6.5 1.11	5.8 1.07	6.1 1.02	7.3 0.99	9.2 0.97	11.3 0.99	13.0 1.04
35	RA DEC	09 27 - 153	19.6 0.50	20.1 0.54	20.2 0.56	20.0 0.57	19.6 0.57	19.2 0.57	18.9 0.55	18.9 0.53	19.2 0.52	19.7 0.51	20.5 0.52	21.4 0.55	22.3 0.58
36	RA DEC	10 08 213	5.0 0.21	5.7 0.20	5.9 0.19	5.8 0.19	5.5 0.20	5.0 0.21	4.8 0.21	4.7 0.22	4.8 0.21	5.3 0.20	6.0 0.18	6.9 0.15	7.9 0.13
37	RA DEC	11 01 1002	30.6 0.81	31.9 0.82	32.5 0.84	32.4 0.88	31.8 0.91	31.0 0.93	30.2 0.92	29.6 0.90	29.5 0.86	29.9 0.81	30.8 0.77	32.1 0.74	33.7 0.72
38	RA DEC	11 03 1098	23.4 0.25	24.9 0.26	25.6 0.29	25.5 0.33	24.7 0.37	23.7 0.38	22.7 0.38	22.0 0.35	21.8 0.31	22.2 0.26	23.2 0.21	24.7 0.17	26.5 0.16
39	RA DEC	11 48 259	46.4 0.59	47.3 0.57	47.9 0.56	48.0 0.57	47.9 0.58	47.6 0.60	47.2 0.61	46.9 0.61	46.8 0.60	46.9 0.59	47.4 0.56	48.2 0.53	49.2 0.50
40	RA DEC	11 53 954	32.0 1.05	33.4 1.05	34.1 1.07	34.3 1.11	34.0 1.14	33.3 1.17	32.5 1.17	31.8 1.16	31.5 1.12	31.5 1.08	32.1 1.03	33.2 0.98	34.7 0.96
41	RA DEC	12 15 - 311	31.0 0.27	32.0 0.30	32.6 0.33	32.9 0.36	32.8 0.37	32.6 0.37	32.2 0.36	31.9 0.35	31.7 0.33	31.7 0.32	32.1 0.32	32.9 0.33	33.9 0.36
42	RA DEC	12 26 - 1121	17.5 0.11	19.2 0.15	20.3 0.19	20.8 0.24	20.6 0.29	20.0 0.32	19.0 0.33	17.9 0.31	17.1 0.28	17.0 0.24	17.6 0.20	19.0 0.19	20.9 0.20
43	RA DEC	12 30 - 1014	51.4 0.70	52.9 0.73	53.9 0.78	54.3 0.82	54.3 0.86	53.8 0.89	53.0 0.90	52.2 0.89	51.5 0.86	51.4 0.82	51.9 0.79	53.2 0.77	54.8 0.79
44	RA DEC	12 47 - 1060	23.6 0.49	25.2 0.52	26.3 0.57	26.9 0.62	26.9 0.66	26.4 0.69	25.6 0.70	24.7 0.69	23.9 0.66	23.7 0.63	24.2 0.59	25.4 0.57	27.1 0.58
45	RA DEC	12 53 995	46.2 0.30	47.6 0.30	48.7 0.31	49.2 0.35	49.1 0.39	48.5 0.42	47.6 0.44	46.8 0.43	46.1 0.40	45.8 0.36	46.1 0.30	46.9 0.25	48.3 0.22
46	RA DEC	13 23 976	40.9 0.90	42.4 0.88	43.5 0.89	44.1 0.93	44.1 0.97	43.7 1.01	42.9 1.03	42.0 1.03	41.2 1.00	40.8 0.96	40.9 0.91	41.6 0.86	42.9 0.82
47	RA DEC	13 24 - 197	53.4 0.88	54.4 0.91	55.1 0.93	55.6 0.95	55.8 0.95	55.7 0.95	55.4 0.94	55.0 0.93	54.7 0.92	54.5 0.92	54.7 0.92	55.3 0.93	56.3 0.96
48	RA DEC	13 47 877	18.1 0.12	19.4 0.10	20.4 0.10	21.1 0.13	21.2 0.17	20.9 0.21	20.3 0.23	19.6 0.23	18.8 0.22	18.4 0.19	18.4 0.14	18.9 0.08	20.1 0.04
49	RA DEC	14 03 - 1072	24.6 0.72	26.3 0.74	27.8 0.77	28.9 0.81	29.4 0.85	29.3 0.89	28.7 0.91	27.8 0.92	26.8 0.90	26.2 0.87	26.3 0.83	27.2 0.80	28.8 0.80
50	RA DEC	14 06 - 646	20.4 0.02	21.5 0.04	22.5 0.07	23.2 0.10	23.6 0.13	23.6 0.15	23.3 0.16	22.9 0.15	22.3 0.14	22.0 0.12	22.0 0.09	22.7 0.08	23.7 0.09

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)												
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 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	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	46.0	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	- 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	16.6	15.9	14.9	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	53.4	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 DEC 516	8.5 0.74	8.1 0.72	7.9 0.70	7.9 0.68	8.4 0.67	9.3 0.67	10.3 0.70	11.3 0.73	11.9 0.77	12.2 0.80	12.1 0.82	11.8 0.83	11.4 0.82
2	RA 00 08 DEC 1051	55.8 0.17	54.9 0.15	54.3 0.12	54.3 0.07	55.0 0.04	56.4 0.03	58.0 0.05	59.4 0.08	60.3 0.13	60.7 0.18	60.5 0.22	59.8 0.25	58.9 0.25
3	RA 00 25 DEC - 1373	27.6 0.99	25.1 0.97	23.6 0.93	23.2 0.87	24.1 0.82	26.4 0.77	29.4 0.75	32.5 0.78	34.9 0.82	35.7 0.82	34.9 0.87	32.8 0.90	30.0 0.90
4	RA 00 26 DEC - 752	2.4 0.65	1.9 0.64	1.5 0.61	1.5 0.57	1.9 0.53	2.7 0.49	3.8 0.45	5.0 0.44	5.8 0.45	6.1 0.48	6.0 0.51	5.6 0.54	5.0 0.56
5	RA 00 40 DEC 1004	14.9 0.72	14.0 0.71	13.4 0.68	13.2 0.64	13.8 0.61	14.9 0.59	16.4 0.60	17.8 0.63	18.9 0.68	19.4 0.72	19.4 0.77	18.9 0.80	18.1 0.80
6	RA 00 43 DEC - 320	20.9 0.27	20.5 0.28	20.3 0.27	20.2 0.25	20.5 0.22	21.2 0.19	22.2 0.15	23.1 0.13	23.8 0.12	24.2 0.13	24.2 0.15	24.0 0.17	23.6 0.18
7	RA 00 56 DEC 1078	26.2 1.03	25.1 1.02	24.4 0.99	24.1 0.95	24.6 0.91	25.9 0.90	27.4 0.90	29.0 0.93	30.3 0.97	31.0 1.02	31.1 1.07	30.6 1.10	29.7 1.11
8	RA 01 25 DEC 1070	31.5 0.48	30.4 0.48	29.6 0.45	29.1 0.41	29.5 0.38	30.6 0.36	32.1 0.36	33.8 0.38	35.1 0.41	36.0 0.46	36.3 0.51	36.0 0.54	35.2 0.56
9	RA 01 37 DEC - 1017	32.2 1.07	31.2 1.07	30.4 1.05	29.8 1.00	29.8 0.96	30.6 0.90	31.8 0.86	33.2 0.85	34.4 0.85	35.2 0.89	35.4 0.93	34.9 0.97	34.1 1.00
10	See Table 11c. Apparent places of Polaris, 1995													
11	RA 02 06 DEC 416	55.0 0.73	54.6 0.72	54.1 0.71	53.8 0.69	53.9 0.68	54.5 0.68	55.4 0.70	56.4 0.72	57.3 0.75	57.9 0.77	58.3 0.79	58.3 0.80	58.1 0.80
12	RA 02 58 DEC - 716	5.6 0.95	5.0 0.97	4.3 0.96	3.7 0.94	3.5 0.90	3.8 0.85	4.5 0.80	5.5 0.78	6.6 0.77	7.4 0.78	7.9 0.81	7.9 0.85	7.6 0.89
13	RA 03 02 DEC 72	2.7 0.35	2.3 0.34	1.9 0.34	1.5 0.33	1.4 0.34	1.7 0.36	2.4 0.38	3.3 0.40	4.2 0.42	4.9 0.43	5.4 0.43	5.6 0.42	5.5 0.40
14	RA 03 23 DEC 886	60.7 0.15	60.1 0.16	59.3 0.15	58.6 0.13	58.4 0.10	58.8 0.08	59.8 0.07	61.1 0.07	62.4 0.09	63.5 0.11	64.4 0.15	64.7 0.18	64.6 0.20
15	RA 04 35 DEC 293	40.1 0.31	39.9 0.30	39.5 0.30	38.9 0.29	38.6 0.29	38.7 0.29	39.2 0.30	40.0 0.32	40.9 0.33	41.8 0.34	42.6 0.34	43.1 0.33	43.2 0.33
16	RA 05 14 DEC - 145	19.8 0.95	19.7 0.97	19.2 0.98	18.6 0.98	18.2 0.97	18.2 0.95	18.5 0.92	19.2 0.90	20.0 0.88	20.9 0.87	21.6 0.89	22.2 0.91	22.4 0.94
17	RA 05 16 DEC 817	22.2 0.65	22.0 0.67	21.4 0.67	20.5 0.67	20.0 0.65	20.0 0.63	20.5 0.61	21.4 0.60	22.6 0.60	23.9 0.60	25.0 0.61	25.8 0.63	26.2 0.65
18	RA 05 24 DEC 112	53.9 0.77	53.8 0.76	53.4 0.76	52.8 0.75	52.4 0.76	52.3 0.77	52.7 0.78	53.3 0.80	54.2 0.81	55.0 0.81	55.9 0.80	56.5 0.80	56.8 0.78
19	RA 05 25 DEC 508	61.0 0.48	60.9 0.49	60.4 0.49	59.8 0.49	59.3 0.48	59.3 0.47	59.7 0.47	60.5 0.47	61.4 0.47	62.4 0.47	63.4 0.48	64.0 0.48	64.4 0.49
20	RA 05 35 DEC - 21	59.6 0.46	59.6 0.48	59.2 0.49	58.6 0.49	58.2 0.48	58.1 0.47	58.4 0.45	59.0 0.42	59.8 0.41	60.6 0.41	61.5 0.42	62.1 0.44	62.4 0.46
21	RA 05 40 DEC - 34	32.4 0.62	32.4 0.64	32.0 0.65	31.4 0.65	30.9 0.65	30.8 0.63	31.1 0.61	31.7 0.59	32.5 0.57	33.4 0.57	34.2 0.58	34.8 0.60	35.1 0.62
22	RA 05 54 DEC 131	56.2 0.63	56.2 0.61	55.8 0.61	55.2 0.61	54.8 0.61	54.7 0.62	55.0 0.63	55.5 0.65	56.3 0.66	57.2 0.66	58.1 0.65	58.7 0.64	59.1 0.62
23	RA 06 23 DEC - 936	53.1 0.81	52.8 0.86	52.1 0.89	50.9 0.90	49.9 0.88	49.3 0.85	49.2 0.80	49.7 0.76	50.7 0.72	51.8 0.71	53.1 0.73	54.0 0.77	54.3 0.82
24	RA 06 37 DEC 291	27.7 0.58	27.8 0.57	27.5 0.57	26.9 0.57	26.4 0.58	26.2 0.58	26.4 0.58	26.9 0.59	27.6 0.59	28.5 0.59	29.4 0.58	30.2 0.57	30.8 0.56
25	RA 06 44 DEC - 297	57.8 0.10	57.8 0.13	57.5 0.15	56.9 0.16	56.3 0.15	56.0 0.13	56.1 0.10	56.5 0.07	57.2 0.05	58.0 0.04	58.9 0.06	59.7 0.09	60.2 0.13

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)												
26	RA 06 58 DEC - 514	28.0 0.98	28.0 1.02	27.6 1.05	27.0 1.06	26.3 1.05	26.0 1.03	25.9 0.99	26.3 0.95	26.9 0.92	27.8 0.91	28.8 0.93	29.6 0.96	30.1 1.01
27	RA 07 08 DEC - 469	13.5 0.11	13.6 0.15	13.2 0.18	12.6 0.19	12.0 0.19	11.6 0.16	11.6 0.13	11.9 0.09	12.5 0.06	13.3 0.05	14.3 0.07	15.1 0.10	15.7 0.15
28	RA 07 34 DEC 567	19.3 0.04	19.6 0.05	19.4 0.06	18.8 0.07	18.2 0.08	17.8 0.07	17.9 0.06	18.2 0.05	18.9 0.04	19.8 0.02	20.9 0.01	21.9 0.00	22.7 0.00
29	RA 07 39 DEC 93	4.5 0.07	4.8 0.05	4.6 0.04	4.1 0.04	3.6 0.04	3.3 0.05	3.3 0.06	3.6 0.07	4.1 0.08	4.9 0.08	5.8 0.06	6.7 0.04	7.3 0.02
30	RA 07 45 DEC 498	2.9 0.40	3.3 0.40	3.1 0.41	2.5 0.42	2.0 0.42	1.6 0.42	1.6 0.41	1.9 0.41	2.5 0.40	3.4 0.39	4.4 0.37	5.4 0.36	6.2 0.35
31	RA 08 09 DEC - 841	25.3 0.29	25.6 0.35	25.3 0.39	24.5 0.42	23.6 0.42	22.9 0.41	22.5 0.37	22.5 0.33	23.1 0.29	23.9 0.26	25.1 0.27	26.2 0.30	27.1 0.35
32	RA 08 22 DEC - 1057	27.9 0.67	28.2 0.73	27.8 0.77	26.7 0.81	25.5 0.82	24.4 0.80	23.8 0.77	23.6 0.72	24.1 0.68	25.2 0.65	26.7 0.65	28.1 0.67	29.1 0.73
33	RA 09 07 DEC - 771	51.1 0.78	51.6 0.83	51.6 0.88	51.0 0.91	50.3 0.92	49.7 0.92	49.2 0.89	49.1 0.85	49.3 0.81	50.0 0.79	51.0 0.78	52.2 0.80	53.2 0.85
34	RA 09 13 DEC - 1239	13.0 0.04	13.7 0.09	13.4 0.15	12.2 0.19	10.5 0.21	8.7 0.21	7.4 0.19	6.7 0.15	6.9 0.10	8.1 0.06	10.0 0.05	12.1 0.06	13.8 0.11
35	RA 09 27 DEC - 153	22.3 0.58	22.9 0.61	23.0 0.63	22.7 0.65	22.3 0.65	21.9 0.64	21.6 0.62	21.6 0.61	21.8 0.59	22.4 0.59	23.2 0.60	24.1 0.62	25.0 0.65
36	RA 10 08 DEC 213	7.9 0.13	8.6 0.11	8.9 0.10	8.7 0.11	8.3 0.12	7.9 0.12	7.7 0.13	7.6 0.14	7.7 0.13	8.1 0.12	8.9 0.10	9.8 0.07	10.7 0.04
37	RA 11 01 DEC 1002	33.7 0.72	35.0 0.73	35.6 0.76	35.5 0.79	34.9 0.82	34.0 0.84	33.3 0.83	32.7 0.81	32.6 0.78	32.9 0.73	33.9 0.68	35.2 0.65	36.7 0.63
38	RA 11 03 DEC 1098	26.5 0.16	28.0 0.17	28.7 0.20	28.6 0.24	27.8 0.27	26.8 0.29	25.8 0.28	25.1 0.26	24.9 0.21	25.3 0.17	26.3 0.12	27.8 0.08	29.6 0.07
39	RA 11 48 DEC 259	49.2 0.50	50.1 0.48	50.7 0.47	50.8 0.48	50.7 0.49	50.3 0.51	50.0 0.52	49.7 0.52	49.5 0.52	49.6 0.50	50.1 0.47	50.9 0.44	51.9 0.41
40	RA 11 53 DEC 954	34.7 0.96	36.0 0.96	36.8 0.98	37.0 1.02	36.6 1.05	35.9 1.08	35.2 1.08	34.5 1.07	34.1 1.03	34.2 0.99	34.8 0.94	35.9 0.89	37.3 0.87
41	RA 12 15 DEC - 311	33.9 0.36	34.9 0.40	35.5 0.42	35.7 0.45	35.7 0.46	35.5 0.46	35.1 0.45	34.8 0.44	34.5 0.42	34.5 0.41	35.0 0.41	35.7 0.42	36.7 0.45
42	RA 12 26 DEC - 1121	20.9 0.20	22.7 0.23	23.7 0.28	24.2 0.33	24.0 0.38	23.3 0.41	22.4 0.42	21.3 0.40	20.4 0.37	20.3 0.33	20.9 0.29	22.3 0.28	24.2 0.29
43	RA 12 30 DEC - 1014	54.8 0.79	56.3 0.82	57.2 0.86	57.6 0.91	57.6 0.95	57.1 0.98	56.3 0.99	55.4 0.98	54.8 0.95	54.6 0.91	55.2 0.87	56.4 0.86	58.0 0.87
44	RA 12 47 DEC - 1060	27.1 0.58	28.7 0.61	29.8 0.65	30.4 0.70	30.4 0.75	29.9 0.78	29.1 0.79	28.1 0.78	27.3 0.75	27.1 0.71	27.6 0.68	28.8 0.66	30.5 0.67
45	RA 12 53 DEC 995	48.3 0.22	49.9 0.21	50.9 0.22	51.4 0.26	51.2 0.30	50.7 0.34	49.9 0.35	49.0 0.34	48.3 0.32	48.0 0.27	48.3 0.22	49.2 0.17	50.5 0.14
46	RA 13 23 DEC 976	42.9 0.82	44.4 0.80	45.5 0.81	46.1 0.85	46.1 0.89	45.7 0.93	44.9 0.95	44.1 0.95	43.3 0.92	42.8 0.88	42.9 0.83	43.7 0.78	44.9 0.74
47	RA 13 24 DEC - 197	56.3 0.96	57.3 0.99	58.0 1.01	58.5 1.02	58.7 1.03	58.6 1.03	58.4 1.02	58.0 1.01	57.6 1.00	57.4 1.00	57.6 1.00	58.2 1.01	59.2 1.04
48	RA 13 47 DEC 876	20.1 1.04	21.4 1.02	22.4 1.02	23.1 1.05	23.2 1.10	22.9 1.13	22.4 1.16	21.6 1.16	20.8 1.15	20.4 1.11	20.4 1.06	21.0 1.01	22.0 0.96
49	RA 14 03 DEC - 1072	28.8 0.80	30.6 0.81	32.0 0.84	33.0 0.88	33.5 0.93	33.4 0.96	32.9 0.99	31.9 0.99	30.9 0.97	30.3 0.94	30.3 0.90	31.2 0.87	32.8 0.87
50	RA 14 06 DEC - 646	23.7 0.09	24.9 0.12	25.9 0.15	26.5 0.18	26.9 0.20	26.9 0.22	26.7 0.23	26.2 0.23	25.6 0.21	25.3 0.19	25.4 0.17	25.9 0.16	27.0 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 15	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	5.2	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	52.3	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	54.4	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 57	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 DEC 516	11.4 0.82	11.0 0.81	10.7 0.79	10.8 0.76	11.3 0.75	12.1 0.76	13.2 0.79	14.1 0.82	14.7 0.85	15.0 0.89	14.9 0.91	14.6 0.92	14.2 0.91
2	RA 00 08 DEC 1051	58.9 0.25	58.0 0.23	57.4 0.20	57.4 0.16	58.1 0.13	59.5 0.12	61.0 0.14	62.4 0.17	63.3 0.21	63.7 0.26	63.5 0.31	62.8 0.34	61.8 0.34
3	RA 00 25 DEC - 1373	30.0 0.90	27.5 0.88	26.0 0.84	25.6 0.78	26.6 0.72	28.9 0.68	31.9 0.66	35.1 0.66	37.4 0.69	38.3 0.73	37.4 0.78	35.4 0.81	32.6 0.81
4	RA 00 26 DEC - 752	5.0 0.56	4.4 0.55	4.1 0.53	4.0 0.49	4.5 0.44	5.3 0.40	6.4 0.37	7.6 0.36	8.4 0.37	8.7 0.40	8.6 0.43	8.2 0.46	7.6 0.47
5	RA 00 40 DEC 1004	18.1 0.80	17.2 0.80	16.6 0.76	16.4 0.72	17.0 0.69	18.2 0.68	19.6 0.69	21.0 0.72	22.0 0.77	22.5 0.81	22.5 0.85	22.1 0.88	21.2 0.89
6	RA 00 43 DEC - 320	23.6 0.18	23.2 0.19	22.9 0.18	22.9 0.16	23.2 0.13	23.9 0.10	24.8 0.07	25.8 0.04	26.5 0.03	26.8 0.04	26.9 0.06	26.6 0.08	26.2 0.10
7	RA 00 56 DEC 1078	29.7 1.11	28.6 1.10	27.8 1.07	27.5 1.03	28.0 1.00	29.3 0.98	30.9 0.99	32.5 1.01	33.7 1.06	34.3 1.10	34.4 1.15	33.9 1.19	33.0 1.20
8	RA 01 25 DEC 1070	35.2 0.56	34.2 0.56	33.3 0.53	32.9 0.49	33.2 0.46	34.3 0.43	35.9 0.44	37.5 0.46	38.8 0.50	39.6 0.54	39.9 0.59	39.6 0.62	38.8 0.64
9	RA 01 37 DEC - 1017	34.1 1.00	33.0 1.00	32.2 0.97	31.7 0.93	31.7 0.88	32.5 0.82	33.7 0.78	35.1 0.77	36.4 0.78	37.1 0.81	37.3 0.85	36.8 0.89	36.0 0.92
10	See Table 11d. Apparent places of Polaris, 1996													
11	RA 02 06 DEC 416	58.1 0.80	57.7 0.79	57.2 0.78	56.9 0.76	57.0 0.75	57.6 0.76	58.5 0.77	59.5 0.80	60.4 0.82	61.0 0.84	61.3 0.86	61.4 0.87	61.1 0.87
12	RA 02 58 DEC - 716	7.6 0.89	7.0 0.91	6.3 0.90	5.7 0.88	5.5 0.84	5.8 0.79	6.5 0.75	7.5 0.72	8.6 0.71	9.4 0.72	9.9 0.76	9.9 0.80	9.6 0.83
13	RA 03 02 DEC 72	5.5 0.40	5.1 0.40	4.7 0.39	4.3 0.39	4.2 0.40	4.6 0.41	5.3 0.44	6.2 0.46	7.0 0.48	7.7 0.49	8.2 0.49	8.4 0.48	8.3 0.46
14	RA 03 24 DEC 886	4.6 0.20	4.0 0.21	3.2 0.20	2.5 0.18	2.3 0.15	2.7 0.13	3.7 0.12	5.0 0.12	6.3 0.14	7.4 0.17	8.2 0.20	8.6 0.23	8.5 0.25
15	RA 04 35 DEC 293	43.2 0.33	43.0 0.33	42.5 0.32	42.0 0.32	41.7 0.32	41.8 0.32	42.3 0.33	43.1 0.34	44.0 0.35	44.9 0.36	45.6 0.36	46.1 0.36	46.3 0.36
16	RA 05 14 DEC - 145	22.4 0.94	22.3 0.96	21.8 0.97	21.2 0.97	20.8 0.96	20.8 0.94	21.1 0.91	21.8 0.88	22.6 0.86	23.4 0.86	24.2 0.88	24.8 0.90	25.0 0.93
17	RA 05 16 DEC 817	26.2 0.65	26.0 0.67	25.4 0.68	24.5 0.68	24.0 0.66	24.0 0.64	24.5 0.62	25.5 0.61	26.6 0.60	27.8 0.61	29.0 0.62	29.8 0.64	30.1 0.67
18	RA 05 24 DEC 112	56.8 0.78	56.7 0.77	56.2 0.76	55.7 0.76	55.3 0.76	55.2 0.77	55.6 0.79	56.3 0.80	57.1 0.82	57.9 0.82	58.7 0.81	59.3 0.80	59.6 0.79
19	RA 05 26 DEC 508	4.4 0.49	4.3 0.49	3.8 0.49	3.2 0.49	2.7 0.48	2.7 0.48	3.1 0.47	3.9 0.47	4.8 0.48	5.8 0.48	6.7 0.48	7.4 0.49	7.8 0.50
20	RA 05 36 DEC - 21	2.4 0.46	2.3 0.48	1.9 0.49	1.3 0.49	0.9 0.48	0.8 0.47	1.1 0.44	1.7 0.42	2.5 0.40	3.4 0.40	4.2 0.41	4.8 0.43	5.1 0.46
21	RA 05 40 DEC - 34	35.1 0.62	35.1 0.64	34.7 0.65	34.1 0.65	33.6 0.64	33.5 0.63	33.8 0.61	34.5 0.58	35.2 0.57	36.1 0.56	36.9 0.58	37.5 0.60	37.8 0.62
22	RA 05 54 DEC 131	59.1 0.62	59.1 0.61	58.7 0.60	58.2 0.60	57.7 0.61	57.6 0.61	57.9 0.63	58.5 0.64	59.3 0.65	60.1 0.66	61.0 0.65	61.6 0.63	62.0 0.62
23	RA 06 23 DEC - 936	54.3 0.82	54.0 0.87	53.2 0.90	52.1 0.91	51.1 0.90	50.5 0.86	50.4 0.82	50.9 0.77	51.9 0.74	53.1 0.73	54.3 0.75	55.2 0.79	55.5 0.84
24	RA 06 37 DEC 291	30.8 0.56	30.9 0.55	30.6 0.55	30.0 0.55	29.5 0.55	29.3 0.56	29.5 0.56	30.0 0.57	30.7 0.57	31.6 0.57	32.5 0.56	33.3 0.55	33.8 0.54
25	RA 06 44 DEC - 297	60.2 0.13	60.2 0.16	59.8 0.18	59.2 0.19	58.7 0.18	58.4 0.16	58.5 0.13	58.9 0.10	59.6 0.08	60.4 0.07	61.3 0.09	62.0 0.12	62.5 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	1.03
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	0.66	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 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	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	24.4	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	51.4	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	46.4	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	37.4	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 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 475	0.16	0.12	0.11	0.11	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 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 - 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	50.8	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	2.2	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 08 DEC 516	14.2 0.91	13.7 0.89	13.5 0.87	13.6 0.85	14.0 0.84	14.9 0.84	15.9 0.87	16.9 0.90	17.5 0.94	17.7 0.97	17.7 1.00	17.3 1.00	16.9 1.00
2	RA 00 09 DEC 1051	1.8 0.34	0.8 0.32	0.3 0.29	0.3 0.24	1.0 0.21	2.3 0.20	3.9 0.22	5.3 0.25	6.2 0.30	6.5 0.35	6.3 0.40	5.6 0.42	4.7 0.43
3	RA 00 25 DEC - 1373	32.6 0.81	30.1 0.79	28.6 0.75	28.3 0.69	29.3 0.63	31.6 0.60	34.6 0.57	37.8 0.57	40.2 0.60	41.1 0.64	40.3 0.69	38.2 0.72	35.5 0.72
4	RA 00 26 DEC - 752	7.6 0.47	7.0 0.47	6.6 0.44	6.6 0.40	7.1 0.36	7.9 0.32	9.0 0.29	10.1 0.27	11.0 0.28	11.3 0.31	11.2 0.35	10.8 0.38	10.2 0.39
5	RA 00 40 DEC 1004	21.2 0.89	20.3 0.88	19.7 0.85	19.5 0.81	20.1 0.78	21.2 0.77	22.6 0.78	24.1 0.80	25.1 0.85	25.6 0.89	25.5 0.94	25.1 0.97	24.2 0.98
6	RA 00 43 DEC - 319	26.2 1.10	25.8 1.10	25.6 1.10	25.5 1.08	25.9 1.05	26.6 1.01	27.5 0.98	28.4 0.96	29.1 0.95	29.5 0.96	29.5 0.98	29.3 1.00	28.9 1.01
7	RA 00 56 DEC 1079	33.0 0.20	31.9 0.19	31.1 0.16	30.8 0.12	31.3 0.08	32.5 0.07	34.1 0.07	35.7 0.10	36.9 0.14	37.5 0.19	37.6 0.23	37.1 0.27	36.2 0.28
8	RA 01 25 DEC 1070	38.8 0.64	37.7 0.64	36.8 0.61	36.4 0.57	36.8 0.54	37.8 0.52	39.3 0.52	41.0 0.54	42.3 0.58	43.1 0.62	43.4 0.67	43.1 0.71	42.3 0.73
9	RA 01 37 DEC - 1017	36.0 0.92	34.9 0.92	34.1 0.89	33.6 0.85	33.7 0.80	34.4 0.74	35.6 0.71	37.0 0.69	38.3 0.69	39.1 0.73	39.2 0.77	38.8 0.81	38.0 0.84
10	See Table 11e. Apparent places of Polaris, 1997													
11	RA 02 06 DEC 416	61.1 0.87	60.7 0.86	60.2 0.84	59.9 0.83	60.0 0.82	60.6 0.83	61.5 0.84	62.5 0.86	63.4 0.89	64.0 0.91	64.3 0.93	64.3 0.94	64.1 0.94
12	RA 02 58 DEC - 716	9.6 0.83	8.9 0.85	8.2 0.84	7.7 0.82	7.5 0.78	7.8 0.73	8.5 0.69	9.5 0.65	10.6 0.64	11.4 0.66	11.9 0.69	11.9 0.74	11.6 0.77
13	RA 03 02 DEC 72	8.3 0.46	7.9 0.45	7.4 0.45	7.1 0.45	7.0 0.45	7.3 0.47	8.0 0.50	8.9 0.52	9.8 0.54	10.5 0.55	11.0 0.55	11.1 0.54	11.1 0.53
14	RA 03 24 DEC 886	8.5 0.25	7.8 0.26	7.1 0.26	6.4 0.24	6.2 0.21	6.6 0.19	7.5 0.17	8.8 0.18	10.1 0.20	11.2 0.22	12.0 0.25	12.4 0.29	12.3 0.31
15	RA 04 35 DEC 293	46.3 0.36	46.0 0.35	45.6 0.35	45.0 0.35	44.7 0.34	44.8 0.35	45.3 0.36	46.2 0.37	47.1 0.39	47.9 0.39	48.7 0.40	49.2 0.39	49.4 0.39
16	RA 05 14 DEC - 145	25.0 0.93	24.8 0.95	24.3 0.96	23.8 0.96	23.4 0.94	23.3 0.92	23.6 0.89	24.3 0.87	25.2 0.85	26.0 0.84	26.7 0.86	27.3 0.88	27.5 0.91
17	RA 05 16 DEC 817	30.1 0.67	29.9 0.68	29.3 0.69	28.5 0.69	27.9 0.67	27.9 0.65	28.4 0.63	29.4 0.62	30.6 0.62	31.7 0.63	32.9 0.64	33.7 0.66	34.1 0.68
18	RA 05 24 DEC 112	59.6 0.79	59.5 0.78	59.1 0.77	58.5 0.77	58.1 0.78	58.1 0.79	58.4 0.80	59.1 0.82	59.9 0.83	60.8 0.83	61.5 0.83	62.2 0.81	62.5 0.80
19	RA 05 26 DEC 508	7.8 0.50	7.6 0.50	7.2 0.50	6.6 0.50	6.1 0.50	6.1 0.49	6.5 0.48	7.2 0.48	8.2 0.49	9.1 0.49	10.1 0.50	10.8 0.50	11.1 0.51
20	RA 05 36 DEC - 21	5.1 0.46	5.0 0.47	4.6 0.48	4.0 0.48	3.6 0.47	3.5 0.46	3.8 0.44	4.4 0.41	5.2 0.40	6.0 0.39	6.8 0.40	7.5 0.42	7.8 0.44
21	RA 05 40 DEC - 34	37.8 0.62	37.7 0.64	37.3 0.65	36.8 0.65	36.3 0.64	36.2 0.62	36.5 0.60	37.1 0.58	37.9 0.56	38.7 0.56	39.5 0.57	40.2 0.59	40.5 0.61
22	RA 05 55 DEC 131	2.0 0.62	2.0 0.61	1.6 0.60	1.0 0.60	0.6 0.61	0.5 0.62	0.7 0.63	1.3 0.64	2.1 0.66	3.0 0.66	3.8 0.65	4.5 0.64	4.9 0.62
23	RA 06 23 DEC - 936	55.5 0.84	55.2 0.89	54.4 0.92	53.3 0.92	52.3 0.91	51.7 0.87	51.6 0.83	52.1 0.78	53.1 0.74	54.2 0.73	55.4 0.75	56.3 0.80	56.7 0.85
24	RA 06 37 DEC 291	33.8 0.54	33.9 0.53	33.6 0.53	33.1 0.54	32.6 0.54	32.3 0.54	32.5 0.54	33.0 0.55	33.8 0.55	34.6 0.55	35.5 0.55	36.3 0.53	36.9 0.53
25	RA 06 45 DEC - 297	2.5 0.16	2.5 0.19	2.2 0.20	1.6 0.21	1.0 0.20	0.7 0.18	0.8 0.15	1.2 0.12	1.9 0.10	2.7 0.09	3.6 0.11	4.4 0.14	4.8 0.18

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)												
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	1.03	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	0.93
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	0.88	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	27.4	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	0.76	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	38.6	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	33.4	33.4	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	0.20	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	0.83	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 11e. 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	+.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, 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

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

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	+.1	+.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

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

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	26.4	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

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

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	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	-16.7	- 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

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

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

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

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

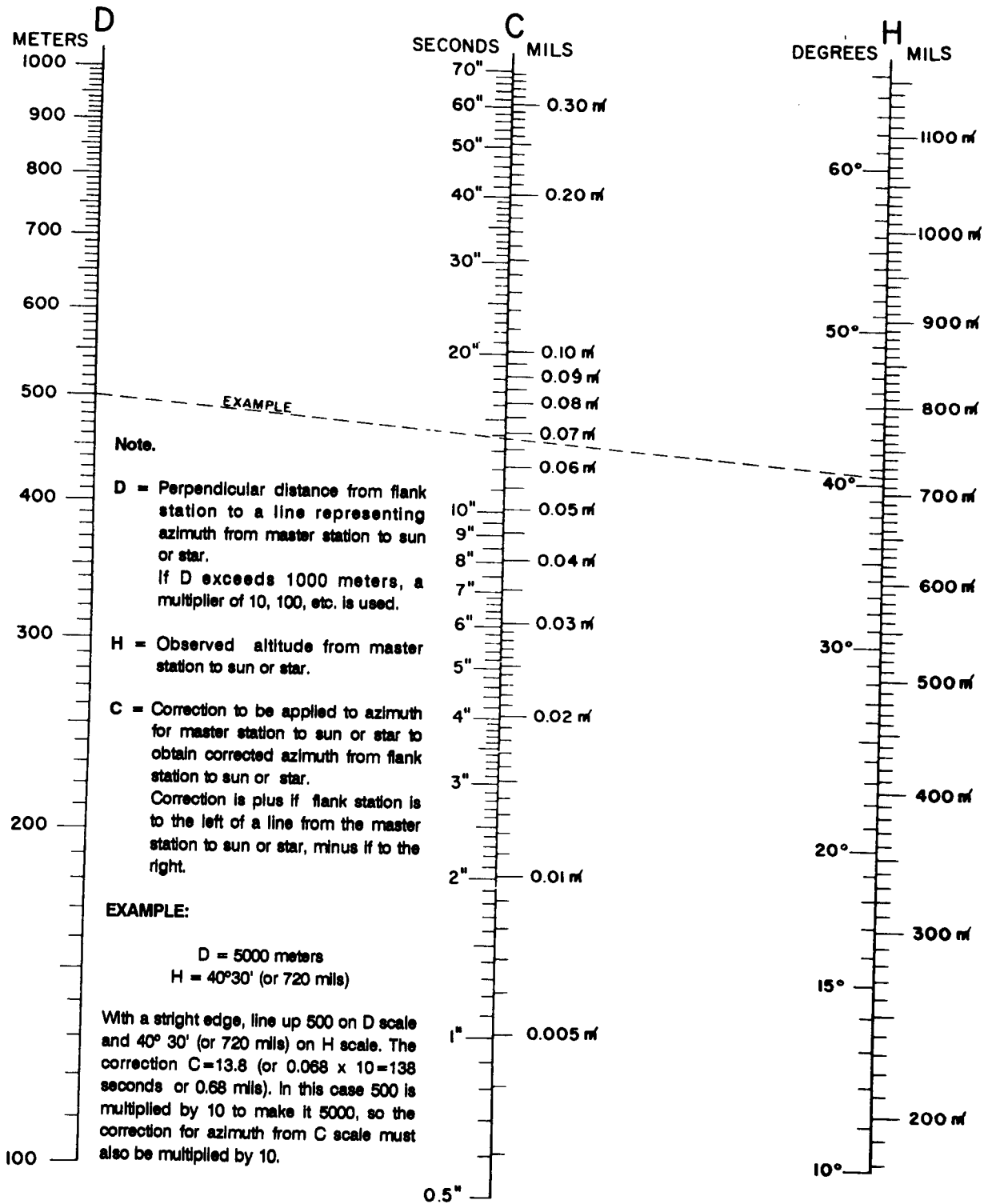
$$\text{Azimuth of Polaris} = \frac{b_0 + b_1 + b_2}{\text{COS (Latitude)}}$$

Table 12e. To determine azimuth from Polaris, 1997 - 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	-16.9	- 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

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

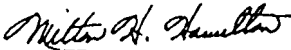
Table 13. Grid azimuth correction, simultaneous observation



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