

Nighttime astronomical calendar program. Select a site: *SELECT SITE* - Enter single-character code: n .. new site (enter all parameters). x .. exit without change (current: Kitt Peak) k .. Kitt Peak s .. Shattuck Observatory c .. Cambridge, MA - Harvard Coll. Obs. h .. Mt. Hopkins, AZ (MMT, FLWO) p .. Palomar Observatory t .. Tololo (Cerro Tololo Interamerican Obs.) r .. Roque de los Muchachos, La Palma, Canary Is. b .. Black Moshannon Obs., Penn State U. d .. Dominion Astrophysical Obs., Victoria, BC m .. Mauna Kea, Hawaii l .. Lick Observatory Any other char .. OTHER (You'll be prompted for params.) Your answer -i The site you've selected is: Kitt Peak. Type 0 for ordinary text, 1 for TeX-style output with one month per page, or 2 for TeX-style output with two months per page: You'll have to edit the TeX output ... look for 'CUT HERE'

This program takes a while to run and produces wide and voluminous output. You probably want to run it in background. See source code or documentation for details of what program will expect. To exit now, give a negative year at the next prompt. Year to print, negative to abort:

***** 2012 Night-time Astronomical Calendar for Kitt Peak *****

By John Thorstensen, Dartmouth College

This calendar is designed to provide information useful for the planning of nighttime observations. The format should minimize confusion; each line gives the phenomena for a single (local!) night, and each line is labeled with both evening and morning (local) day and date. Note that all times given are LOCAL CIVIL (zone) times.

The rise/set times printed are the times at which the center of the object is 50 arcminutes below the geometrical horizon. At the given twilight, the center of the sun is 18.0 degrees below the geometrical horizon.

The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae in the Astronomical Almanac. The Almanac states that the error seldom exceeds 0.3 degrees. Topocentric corrections are included. Comparisons with tables for Kitt Peak in the NOAO Newsletter indicate that the rise-set times are good to +/- 2 min or so. The moon's RA, Dec, and illuminated fraction are given for local midnight, regardless of whether the moon is actually up at that time. Note that the moonrise and moonset times are not printed if they occur near mid-day.

The LST at evening and morning twilight are tabulated. This gives an accurate idea of the range of RA's accessible during the night.

The JD is given (severely rounded off) for local midnight. Again, this avoids any ambiguity.

Some credits: The sidereal time and Julian date routines were originally coded in PL/I by Steve Maker of Dartmouth College. The algorithms originated in the old American Ephemeris. The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

CAUTIONS: I believe that the program which generates these tables is reasonably accurate. However, it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results. Also, in view of the approximations used, the results should not be used when high precision is needed. Extension to dates far from the present (1990) should be done with great caution. The code has not been tested for the eastern or southern hemishpheres. Rise/set times are slightly inaccurate and rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change. I know that the code has many infelicities; if you should find actual errors, please notify John.Thorstensen@dartmouth.edu

[This output comes from a (hopefully) portable, completely self-contained program in the c language. It is available from the author and may be used freely for scientific or educational purposes. If you use it for profit, please contact the author to arrange a (modest!) fee. Source code is copyright John Thorstensen, 1990.]

MOON PHASES FOR 2012, at Kitt Peak

Times and dates are given in local time, zone = 7 hr West.
They are generally better than +/- 2 minutes.

The end of the previous year and the beginning of the next
are included for continuity.

NEW	1ST	FULL	LAST
Dec 24 11 08	Dec 31 23 16	Jan 09 0 32	Jan 16 2 09
Jan 23 0 42	Jan 30 21 12	Feb 07 14 56	Feb 14 10 06
Feb 21 15 37	Feb 29 18 23	Mar 08 2 42	Mar 14 18 27
Mar 22 7 39	Mar 30 12 42	Apr 06 12 20	Apr 13 3 51
Apr 21 0 20	Apr 29 2 58	May 05 20 36	May 12 14 48
May 20 16 48	May 28 13 16	Jun 04 4 12	Jun 11 3 43
Jun 19 8 03	Jun 26 20 31	Jul 03 11 52	Jul 10 18 50
Jul 18 21 25	Jul 26 1 57	Aug 01 20 27	Aug 09 11 57
Aug 17 8 55	Aug 24 6 55	Aug 31 6 58	Sep 08 6 16
Sep 15 19 11	Sep 22 12 43	Sep 29 20 19	Oct 08 0 34
Oct 15 5 03	Oct 21 20 34	Oct 29 12 51	Nov 06 17 37
Nov 13 15 08	Nov 20 7 33	Nov 28 7 47	Dec 06 8 33
Dec 13 1 42	Dec 19 22 20	Dec 28 3 23	Jan 04 20 59

***** 2012 JANUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Jan 01/Mon Jan 02	5928.8	6 18 56	17 38	19 00	6 00	7 22	1 18	12 20	.....	1 38	59	1 13.8	12 08
Mon Jan 02/Tue Jan 03	5929.8	6 22 53	17 39	19 01	6 00	7 22	1 23	12 24	.....	2 32	68	2 00.6	15 44
Tue Jan 03/Wed Jan 04	5930.8	6 26 49	17 40	19 01	6 00	7 22	1 27	12 28	.....	3 27	77	2 49.1	18 43
Wed Jan 04/Thu Jan 05	5931.8	6 30 46	17 40	19 02	6 01	7 22	1 32	12 32	.....	4 21	84	3 39.8	20 54
Thu Jan 05/Fri Jan 06	5932.8	6 34 42	17 41	19 03	6 01	7 23	1 37	12 37	.....	5 15	91	4 32.6	22 08
Fri Jan 06/Sat Jan 07	5933.8	6 38 39	17 42	19 04	6 01	7 23	1 41	12 41	.....	6 06	96	5 27.0	22 17
Sat Jan 07/Sun Jan 08	5934.8	6 42 35	17 43	19 04	6 01	7 23	1 46	12 45	16 21	6 54	99	6 22.2	21 17
Sun Jan 08/Mon Jan 09	5935.8	6 46 32	17 43	19 05	6 01	7 23	1 51	12 49	17 20	7 39	100	7 17.5	19 06
Mon Jan 09/Tue Jan 10	5936.8	6 50 28	17 44	19 06	6 01	7 23	1 55	12 53	18 21	.....	99	8 12.0	15 51
Tue Jan 10/Wed Jan 11	5937.8	6 54 25	17 45	19 07	6 01	7 23	2 00	12 57	19 23	.....	95	9 05.4	11 43
Wed Jan 11/Thu Jan 12	5938.8	6 58 22	17 46	19 07	6 01	7 23	2 05	13 01	20 26	.....	89	9 57.7	6 54
Thu Jan 12/Fri Jan 13	5939.8	7 02 18	17 47	19 08	6 01	7 23	2 10	13 05	21 29	.....	82	10 49.4	1 41
Fri Jan 13/Sat Jan 14	5940.8	7 06 15	17 48	19 09	6 01	7 22	2 14	13 09	22 32	.....	72	11 41.2	- 3 40
Sat Jan 14/Sun Jan 15	5941.8	7 10 11	17 49	19 10	6 01	7 22	2 19	13 13	23 36	.....	61	12 33.7	- 8 51
Sun Jan 15/Mon Jan 16	5942.8	7 14 08	17 49	19 10	6 01	7 22	2 24	13 16	0 41	.....	50	13 27.8	-13 35
Mon Jan 16/Tue Jan 17	5943.8	7 18 04	17 50	19 11	6 01	7 22	2 28	13 20	1 48	.....	39	14 23.9	-17 34
Tue Jan 17/Wed Jan 18	5944.8	7 22 01	17 51	19 12	6 01	7 22	2 33	13 24	2 53	.....	28	15 22.1	-20 33
Wed Jan 18/Thu Jan 19	5945.8	7 25 57	17 52	19 13	6 01	7 21	2 38	13 28	3 57	.....	19	16 21.9	-22 18
Thu Jan 19/Fri Jan 20	5946.8	7 29 54	17 53	19 13	6 01	7 21	2 43	13 32	4 57	.....	11	17 22.3	-22 40
Fri Jan 20/Sat Jan 21	5947.8	7 33 51	17 54	19 14	6 01	7 21	2 47	13 35	5 52	.....	5	18 21.9	-21 40
Sat Jan 21/Sun Jan 22	5948.8	7 37 47	17 55	19 15	6 00	7 20	2 52	13 39	6 40	16 37	1	19 19.4	-19 24
Sun Jan 22/Mon Jan 23	5949.8	7 41 44	17 56	19 16	6 00	7 20	2 57	13 43	7 22	17 40	0	20 14.2	-16 08
Mon Jan 23/Tue Jan 24	5950.8	7 45 40	17 57	19 17	6 00	7 20	3 02	13 46	7 59	18 43	1	21 06.1	-12 07
Tue Jan 24/Wed Jan 25	5951.8	7 49 37	17 58	19 17	5 59	7 19	3 06	13 50	.....	19 43	4	21 55.2	- 7 38
Wed Jan 25/Thu Jan 26	5952.8	7 53 33	17 58	19 18	5 59	7 19	3 11	13 54	.....	20 41	9	22 42.3	- 2 57
Thu Jan 26/Fri Jan 27	5953.8	7 57 30	17 59	19 19	5 59	7 18	3 16	13 57	.....	21 37	16	23 28.0	1 46
Fri Jan 27/Sat Jan 28	5954.8	8 01 26	18 00	19 20	5 58	7 18	3 20	14 01	.....	22 33	23	0 13.1	6 18
Sat Jan 28/Sun Jan 29	5955.8	8 05 23	18 01	19 21	5 58	7 17	3 25	14 04	.....	23 27	32	0 58.4	10 31
Sun Jan 29/Mon Jan 30	5956.8	8 09 20	18 02	19 21	5 57	7 17	3 30	14 08	.....	0 21	41	1 44.5	14 18
Mon Jan 30/Tue Jan 31	5957.8	8 13 16	18 03	19 22	5 57	7 16	3 35	14 11	.....	1 16	50	2 32.0	17 29
Tue Jan 31/Wed Feb 01	5958.8	8 17 13	18 04	19 23	5 56	7 15	3 39	14 15	.....	2 10	60	3 21.3	19 57

***** 2012 FEBRUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Feb 01/Thu Feb 02	5959.8	8 21 09	18 05	19 24	5 56	7 15	3 44	14 18	.....	3 03	69	4 12.5	21 33
Thu Feb 02/Fri Feb 03	5960.8	8 25 06	18 06	19 25	5 55	7 14	3 49	14 21	.....	3 55	78	5 05.6	22 09
Fri Feb 03/Sat Feb 04	5961.8	8 29 02	18 07	19 25	5 55	7 13	3 54	14 25	.....	4 45	85	6 00.0	21 38
Sat Feb 04/Sun Feb 05	5962.8	8 32 59	18 08	19 26	5 54	7 13	3 58	14 28	.....	5 31	92	6 55.2	19 58
Sun Feb 05/Mon Feb 06	5963.8	8 36 55	18 08	19 27	5 54	7 12	4 03	14 31	16 05	6 14	97	7 50.3	17 09
Mon Feb 06/Tue Feb 07	5964.8	8 40 52	18 09	19 28	5 53	7 11	4 08	14 35	17 08	6 54	99	8 44.9	13 19
Tue Feb 07/Wed Feb 08	5965.8	8 44 49	18 10	19 28	5 52	7 10	4 13	14 38	18 12	7 31	100	9 38.9	8 40
Wed Feb 08/Thu Feb 09	5966.8	8 48 45	18 11	19 29	5 52	7 10	4 17	14 41	19 16	.....	97	10 32.4	3 27
Thu Feb 09/Fri Feb 10	5967.8	8 52 42	18 12	19 30	5 51	7 09	4 22	14 44	20 21	.....	92	11 25.9	- 2 02
Fri Feb 10/Sat Feb 11	5968.8	8 56 38	18 13	19 31	5 50	7 08	4 27	14 48	21 27	.....	85	12 19.8	- 7 25
Sat Feb 11/Sun Feb 12	5969.8	9 00 35	18 14	19 32	5 49	7 07	4 31	14 51	22 33	.....	76	13 14.9	-12 24
Sun Feb 12/Mon Feb 13	5970.8	9 04 31	18 15	19 32	5 49	7 06	4 36	14 54	23 40	.....	65	14 11.5	-16 39
Mon Feb 13/Tue Feb 14	5971.8	9 08 28	18 15	19 33	5 48	7 05	4 41	14 57	0 46	.....	54	15 09.6	-19 54
Tue Feb 14/Wed Feb 15	5972.8	9 12 24	18 16	19 34	5 47	7 04	4 46	15 00	1 50	.....	43	16 08.9	-21 56
Wed Feb 15/Thu Feb 16	5973.8	9 16 21	18 17	19 35	5 46	7 03	4 50	15 03	2 51	.....	32	17 08.6	-22 37
Thu Feb 16/Fri Feb 17	5974.8	9 20 18	18 18	19 35	5 45	7 02	4 55	15 06	3 46	.....	22	18 07.4	-21 59
Fri Feb 17/Sat Feb 18	5975.8	9 24 14	18 19	19 36	5 44	7 01	5 00	15 09	4 35	.....	14	19 04.4	-20 06
Sat Feb 18/Sun Feb 19	5976.8	9 28 11	18 20	19 37	5 43	7 00	5 04	15 12	5 18	.....	8	19 58.9	-17 12
Sun Feb 19/Mon Feb 20	5977.8	9 32 07	18 21	19 38	5 42	6 59	5 09	15 15	5 56	16 30	3	20 50.7	-13 29
Mon Feb 20/Tue Feb 21	5978.8	9 36 04	18 21	19 38	5 41	6 58	5 14	15 18	6 31	17 30	1	21 40.1	- 9 14
Tue Feb 21/Wed Feb 22	5979.8	9 40 00	18 22	19 39	5 40	6 57	5 18	15 21	7 04	18 29	0	22 27.5	- 4 40
Wed Feb 22/Thu Feb 23	5980.8	9 43 57	18 23	19 40	5 39	6 56	5 23	15 24	7 35	19 26	2	23 13.5	0 00
Thu Feb 23/Fri Feb 24	5981.8	9 47 53	18 24	19 41	5 38	6 55	5 28	15 27	.....	20 21	5	23 58.8	4 35
Fri Feb 24/Sat Feb 25	5982.8	9 51 50	18 25	19 41	5 37	6 54	5 33	15 30	.....	21 16	10	0 44.1	8 53
Sat Feb 25/Sun Feb 26	5983.8	9 55 47	18 25	19 42	5 36	6 53	5 37	15 33	.....	22 11	17	1 29.8	12 48
Sun Feb 26/Mon Feb 27	5984.8	9 59 43	18 26	19 43	5 35	6 52	5 42	15 36	.....	23 05	24	2 16.6	16 10
Mon Feb 27/Tue Feb 28	5985.8	10 03 40	18 27	19 44	5 34	6 51	5 47	15 39	.....	24 00	33	3 04.9	18 50
Tue Feb 28/Wed Feb 29	5986.8	10 07 36	18 28	19 44	5 33	6 50	5 51	15 42	.....	0 53	42	3 54.7	20 43
Wed Feb 29/Thu Mar 01	5987.8	10 11 33	18 28	19 45	5 32	6 48	5 56	15 44	.....	1 45	52	4 46.1	21 40

***** 2012 MARCH *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Mar 01/Fri Mar 02	5988.8	10 15 29	18 29	19 46	5 31	6 47	6 01	15 47	.....	2 34	61	5 38.8	21 36
Fri Mar 02/Sat Mar 03	5989.8	10 19 26	18 30	19 47	5 30	6 46	6 05	15 50	.....	3 21	71	6 32.4	20 27
Sat Mar 03/Sun Mar 04	5990.8	10 23 22	18 31	19 47	5 28	6 45	6 10	15 53	.....	4 05	80	7 26.5	18 11
Sun Mar 04/Mon Mar 05	5991.8	10 27 19	18 31	19 48	5 27	6 44	6 15	15 55	.....	4 46	88	8 20.7	14 52
Mon Mar 05/Tue Mar 06	5992.8	10 31 16	18 32	19 49	5 26	6 42	6 19	15 58	.....	5 25	94	9 14.8	10 37
Tue Mar 06/Wed Mar 07	5993.8	10 35 12	18 33	19 50	5 25	6 41	6 24	16 01	16 57	6 02	98	10 08.9	5 38
Wed Mar 07/Thu Mar 08	5994.8	10 39 09	18 34	19 50	5 24	6 40	6 29	16 04	18 02	6 39	100	11 03.3	0 11
Thu Mar 08/Fri Mar 09	5995.8	10 43 05	18 34	19 51	5 22	6 39	6 33	16 06	19 10	7 18	99	11 58.6	- 5 23
Fri Mar 09/Sat Mar 10	5996.8	10 47 02	18 35	19 52	5 21	6 38	6 38	16 09	20 18	.....	95	12 55.2	-10 41
Sat Mar 10/Sun Mar 11	5997.8	10 50 58	18 36	19 52	5 20	6 36	6 43	16 12	21 27	.....	88	13 53.5	-15 21
Sun Mar 11/Mon Mar 12	5998.8	10 54 55	18 37	19 53	5 19	6 35	6 47	16 14	22 35	.....	79	14 53.4	-19 01
Mon Mar 12/Tue Mar 13	5999.8	10 58 51	18 37	19 54	5 17	6 34	6 52	16 17	23 42	.....	69	15 54.4	-21 26
Tue Mar 13/Wed Mar 14	6000.8	11 02 48	18 38	19 55	5 16	6 33	6 57	16 20	0 45	.....	58	16 55.3	-22 28
Wed Mar 14/Thu Mar 15	6001.8	11 06 45	18 39	19 55	5 15	6 31	7 02	16 22	1 42	.....	47	17 55.1	-22 07
Thu Mar 15/Fri Mar 16	6002.8	11 10 41	18 39	19 56	5 13	6 30	7 06	16 25	2 32	.....	36	18 52.7	-20 30
Fri Mar 16/Sat Mar 17	6003.8	11 14 38	18 40	19 57	5 12	6 29	7 11	16 28	3 17	.....	26	19 47.5	-17 50
Sat Mar 17/Sun Mar 18	6004.8	11 18 34	18 41	19 58	5 11	6 28	7 16	16 30	3 56	.....	18	20 39.3	-14 21
Sun Mar 18/Mon Mar 19	6005.8	11 22 31	18 41	19 58	5 09	6 26	7 20	16 33	4 32	.....	11	21 28.6	-10 18
Mon Mar 19/Tue Mar 20	6006.8	11 26 27	18 42	19 59	5 08	6 25	7 25	16 35	5 05	.....	5	22 15.8	- 5 54
Tue Mar 20/Wed Mar 21	6007.8	11 30 24	18 43	20 00	5 07	6 24	7 30	16 38	5 36	17 18	2	23 01.7	- 1 20
Wed Mar 21/Thu Mar 22	6008.8	11 34 20	18 44	20 01	5 05	6 22	7 34	16 40	6 07	18 13	0	23 46.8	3 12
Thu Mar 22/Fri Mar 23	6009.8	11 38 17	18 44	20 02	5 04	6 21	7 39	16 43	6 38	19 08	1	0 31.8	7 31
Fri Mar 23/Sat Mar 24	6010.8	11 42 14	18 45	20 02	5 03	6 20	7 44	16 46	7 11	20 03	3	1 17.3	11 30
Sat Mar 24/Sun Mar 25	6011.8	11 46 10	18 46	20 03	5 01	6 19	7 49	16 48	.....	20 57	6	2 03.7	14 59
Sun Mar 25/Mon Mar 26	6012.8	11 50 07	18 46	20 04	5 00	6 17	7 53	16 51	.....	21 51	12	2 51.3	17 49
Mon Mar 26/Tue Mar 27	6013.8	11 54 03	18 47	20 05	4 58	6 16	7 58	16 53	.....	22 45	18	3 40.2	19 54
Tue Mar 27/Wed Mar 28	6014.8	11 58 00	18 48	20 05	4 57	6 15	8 03	16 56	.....	23 37	26	4 30.5	21 06
Wed Mar 28/Thu Mar 29	6015.8	12 01 56	18 48	20 06	4 56	6 13	8 08	16 58	.....	0 27	35	5 21.8	21 21
Thu Mar 29/Fri Mar 30	6016.8	12 05 53	18 49	20 07	4 54	6 12	8 12	17 01	.....	1 14	44	6 13.8	20 35
Fri Mar 30/Sat Mar 31	6017.8	12 09 49	18 50	20 08	4 53	6 11	8 17	17 03	.....	1 57	54	7 06.1	18 47
Sat Mar 31/Sun Apr 01	6018.8	12 13 46	18 50	20 09	4 51	6 10	8 22	17 06	.....	2 39	64	7 58.6	15 58

***** 2012 APRIL *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Apr 01/Mon Apr 02	6019.8	12 17 43	18 51	20 09	4 50	6 08	8 27	17 08	.....	3 17	74	8 51.2	12 14
Mon Apr 02/Tue Apr 03	6020.8	12 21 39	18 52	20 10	4 48	6 07	8 31	17 11	.....	3 55	83	9 43.9	7 41
Tue Apr 03/Wed Apr 04	6021.8	12 25 36	18 52	20 11	4 47	6 06	8 36	17 13	.....	4 32	91	10 37.4	2 33
Wed Apr 04/Thu Apr 05	6022.8	12 29 32	18 53	20 12	4 46	6 05	8 41	17 16	.....	5 09	96	11 32.1	- 2 56
Thu Apr 05/Fri Apr 06	6023.8	12 33 29	18 54	20 13	4 44	6 03	8 46	17 19	17 54	5 49	99	12 28.6	- 8 24
Fri Apr 06/Sat Apr 07	6024.8	12 37 25	18 54	20 14	4 43	6 02	8 51	17 21	19 04	6 32	99	13 27.4	-13 28
Sat Apr 07/Sun Apr 08	6025.8	12 41 22	18 55	20 15	4 41	6 01	8 55	17 24	20 15	.....	96	14 28.6	-17 40
Sun Apr 08/Mon Apr 09	6026.8	12 45 18	18 56	20 15	4 40	6 00	9 00	17 26	21 25	.....	91	15 31.7	-20 41
Mon Apr 09/Tue Apr 10	6027.8	12 49 15	18 57	20 16	4 39	5 58	9 05	17 29	22 32	.....	82	16 35.3	-22 14
Tue Apr 10/Wed Apr 11	6028.8	12 53 12	18 57	20 17	4 37	5 57	9 10	17 31	23 34	.....	73	17 38.0	-22 17
Wed Apr 11/Thu Apr 12	6029.8	12 57 08	18 58	20 18	4 36	5 56	9 15	17 34	0 28	.....	62	18 38.2	-20 56
Thu Apr 12/Fri Apr 13	6030.8	13 01 05	18 59	20 19	4 34	5 55	9 19	17 36	1 15	.....	51	19 35.0	-18 27
Fri Apr 13/Sat Apr 14	6031.8	13 05 01	18 59	20 20	4 33	5 54	9 24	17 39	1 57	.....	41	20 28.3	-15 06
Sat Apr 14/Sun Apr 15	6032.8	13 08 58	19 00	20 21	4 32	5 52	9 29	17 41	2 33	.....	31	21 18.4	-11 08
Sun Apr 15/Mon Apr 16	6033.8	13 12 54	19 01	20 22	4 30	5 51	9 34	17 44	3 07	.....	22	22 06.1	- 6 49
Mon Apr 16/Tue Apr 17	6034.8	13 16 51	19 01	20 23	4 29	5 50	9 39	17 46	3 38	.....	14	22 52.0	- 2 20
Tue Apr 17/Wed Apr 18	6035.8	13 20 47	19 02	20 24	4 27	5 49	9 44	17 49	4 09	.....	8	23 36.9	2 09
Wed Apr 18/Thu Apr 19	6036.8	13 24 44	19 03	20 24	4 26	5 48	9 49	17 52	4 40	.....	4	0 21.6	6 29
Thu Apr 19/Fri Apr 20	6037.8	13 28 41	19 04	20 25	4 25	5 47	9 53	17 54	5 12	17 57	1	1 06.7	10 29
Fri Apr 20/Sat Apr 21	6038.8	13 32 37	19 04	20 26	4 23	5 46	9 58	17 57	5 47	18 51	0	1 52.7	14 03
Sat Apr 21/Sun Apr 22	6039.8	13 36 34	19 05	20 27	4 22	5 44	10 03	17 59	6 24	19 45	1	2 39.9	17 01
Sun Apr 22/Mon Apr 23	6040.8	13 40 30	19 06	20 28	4 21	5 43	10 08	18 02	.....	20 39	3	3 28.4	19 15
Mon Apr 23/Tue Apr 24	6041.8	13 44 27	19 06	20 29	4 19	5 42	10 13	18 05	.....	21 32	7	4 18.1	20 39
Tue Apr 24/Wed Apr 25	6042.8	13 48 23	19 07	20 30	4 18	5 41	10 18	18 07	.....	22 22	13	5 08.7	21 07
Wed Apr 25/Thu Apr 26	6043.8	13 52 20	19 08	20 31	4 17	5 40	10 23	18 10	.....	23 09	20	5 59.9	20 36
Thu Apr 26/Fri Apr 27	6044.8	13 56 16	19 08	20 32	4 16	5 39	10 28	18 13	.....	23 54	29	6 51.1	19 07
Fri Apr 27/Sat Apr 28	6045.8	14 00 13	19 09	20 33	4 14	5 38	10 33	18 15	.....	0 35	38	7 42.2	16 39
Sat Apr 28/Sun Apr 29	6046.8	14 04 10	19 10	20 34	4 13	5 37	10 38	18 18	.....	1 13	48	8 33.0	13 19
Sun Apr 29/Mon Apr 30	6047.8	14 08 06	19 11	20 35	4 12	5 36	10 43	18 21	.....	1 50	59	9 23.8	9 13
Mon Apr 30/Tue May 01	6048.8	14 12 03	19 11	20 36	4 11	5 35	10 48	18 23	.....	2 26	69	10 15.1	4 28

***** 2012 MAY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	Sun: -----				LST twilight:		Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue May 01/Wed May 02	6049.8	14 15 59	19 12	20 37	4 09	5 34	10 52	18 26	.....	3 02	79	11 07.4	- 0 42
Wed May 02/Thu May 03	6050.8	14 19 56	19 13	20 38	4 08	5 33	10 57	18 29	.....	3 40	88	12 01.7	- 6 04
Thu May 03/Fri May 04	6051.8	14 23 52	19 14	20 39	4 07	5 32	11 02	18 31	.....	4 20	95	12 58.5	-11 15
Fri May 04/Sat May 05	6052.8	14 27 49	19 14	20 40	4 06	5 32	11 07	18 34	17 49	5 06	99	13 58.5	-15 53
Sat May 05/Sun May 06	6053.8	14 31 45	19 15	20 41	4 05	5 31	11 12	18 37	19 00	5 57	100	15 01.6	-19 31
Sun May 06/Mon May 07	6054.8	14 35 42	19 16	20 42	4 03	5 30	11 17	18 40	20 10	.....	98	16 06.7	-21 47
Mon May 07/Tue May 08	6055.8	14 39 39	19 16	20 43	4 02	5 29	11 22	18 43	21 17	.....	93	17 12.1	-22 28
Tue May 08/Wed May 09	6056.8	14 43 35	19 17	20 44	4 01	5 28	11 27	18 46	22 17	.....	86	18 15.8	-21 36
Wed May 09/Thu May 10	6057.8	14 47 32	19 18	20 45	4 00	5 27	11 32	18 48	23 09	.....	77	19 16.3	-19 24
Thu May 10/Fri May 11	6058.8	14 51 28	19 19	20 46	3 59	5 27	11 37	18 51	23 54	.....	66	20 12.7	-16 10
Fri May 11/Sat May 12	6059.8	14 55 25	19 19	20 47	3 58	5 26	11 42	18 54	0 33	.....	56	21 05.3	-12 14
Sat May 12/Sun May 13	6060.8	14 59 21	19 20	20 48	3 57	5 25	11 47	18 57	1 08	.....	46	21 54.6	- 7 53
Sun May 13/Mon May 14	6061.8	15 03 18	19 21	20 49	3 56	5 25	11 52	19 00	1 41	.....	36	22 41.6	- 3 21
Mon May 14/Tue May 15	6062.8	15 07 14	19 21	20 50	3 55	5 24	11 57	19 03	2 12	.....	27	23 27.1	1 10
Tue May 15/Wed May 16	6063.8	15 11 11	19 22	20 51	3 54	5 23	12 02	19 06	2 43	.....	19	0 11.9	5 32
Wed May 16/Thu May 17	6064.8	15 15 08	19 23	20 52	3 53	5 23	12 07	19 09	3 14	.....	12	0 56.9	9 37
Thu May 17/Fri May 18	6065.8	15 19 04	19 23	20 53	3 52	5 22	12 12	19 12	3 48	.....	6	1 42.5	13 16
Fri May 18/Sat May 19	6066.8	15 23 01	19 24	20 54	3 52	5 21	12 16	19 15	4 24	17 40	3	2 29.4	16 21
Sat May 19/Sun May 20	6067.8	15 26 57	19 25	20 55	3 51	5 21	12 21	19 18	5 03	18 34	0	3 17.5	18 45
Sun May 20/Mon May 21	6068.8	15 30 54	19 26	20 56	3 50	5 20	12 26	19 21	5 47	19 27	0	4 07.0	20 19
Mon May 21/Tue May 22	6069.8	15 34 50	19 26	20 57	3 49	5 20	12 31	19 25	.....	20 19	1	4 57.5	21 00
Tue May 22/Wed May 23	6070.8	15 38 47	19 27	20 58	3 48	5 19	12 36	19 28	.....	21 07	5	5 48.5	20 42
Wed May 23/Thu May 24	6071.8	15 42 43	19 27	20 59	3 48	5 19	12 41	19 31	.....	21 53	10	6 39.5	19 25
Thu May 24/Fri May 25	6072.8	15 46 40	19 28	20 59	3 47	5 18	12 46	19 34	.....	22 35	16	7 30.2	17 12
Fri May 25/Sat May 26	6073.8	15 50 37	19 29	21 00	3 46	5 18	12 50	19 38	.....	23 13	24	8 20.3	14 07
Sat May 26/Sun May 27	6074.8	15 54 33	19 29	21 01	3 46	5 18	12 55	19 41	.....	23 50	33	9 09.9	10 17
Sun May 27/Mon May 28	6075.8	15 58 30	19 30	21 02	3 45	5 17	13 00	19 44	.....	0 25	44	9 59.5	5 51
Mon May 28/Tue May 29	6076.8	16 02 26	19 31	21 03	3 45	5 17	13 05	19 48	.....	0 59	54	10 49.6	0 58
Tue May 29/Wed May 30	6077.8	16 06 23	19 31	21 04	3 44	5 17	13 10	19 51	.....	1 35	65	11 41.1	- 4 09
Wed May 30/Thu May 31	6078.8	16 10 19	19 32	21 05	3 43	5 16	13 14	19 54	.....	2 13	76	12 34.8	- 9 15
Thu May 31/Fri Jun 01	6079.8	16 14 16	19 32	21 05	3 43	5 16	13 19	19 58	.....	2 55	85	13 31.5	-14 00

***** 2012 JUNE *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Jun 01/Sat Jun 02	6080.8	16 18 12	19 33	21 06	3 43	5 16	13 24	20 01	.....	3 42	93	14 31.8	-18 02
Sat Jun 02/Sun Jun 03	6081.8	16 22 09	19 34	21 07	3 42	5 16	13 29	20 05	17 46	4 35	98	15 35.3	-20 57
Sun Jun 03/Mon Jun 04	6082.8	16 26 06	19 34	21 08	3 42	5 15	13 33	20 08	18 54	5 35	100	16 40.9	-22 24
Mon Jun 04/Tue Jun 05	6083.8	16 30 02	19 35	21 08	3 41	5 15	13 38	20 12	19 58	.....	99	17 46.5	-22 15
Tue Jun 05/Wed Jun 06	6084.8	16 33 59	19 35	21 09	3 41	5 15	13 42	20 16	20 56	.....	95	18 50.2	-20 35
Wed Jun 06/Thu Jun 07	6085.8	16 37 55	19 36	21 10	3 41	5 15	13 47	20 19	21 45	.....	89	19 50.2	-17 39
Thu Jun 07/Fri Jun 08	6086.8	16 41 52	19 36	21 10	3 41	5 15	13 52	20 23	22 29	.....	80	20 46.2	-13 49
Fri Jun 08/Sat Jun 09	6087.8	16 45 48	19 37	21 11	3 40	5 15	13 56	20 27	23 07	.....	71	21 38.5	- 9 26
Sat Jun 09/Sun Jun 10	6088.8	16 49 45	19 37	21 11	3 40	5 15	14 01	20 31	23 41	.....	61	22 27.6	- 4 47
Sun Jun 10/Mon Jun 11	6089.8	16 53 41	19 37	21 12	3 40	5 15	14 05	20 34	0 13	.....	51	23 14.6	- 0 08
Mon Jun 11/Tue Jun 12	6090.8	16 57 38	19 38	21 12	3 40	5 15	14 10	20 38	0 44	.....	41	0 00.4	4 23
Tue Jun 12/Wed Jun 13	6091.8	17 01 35	19 38	21 13	3 40	5 15	14 14	20 42	1 16	.....	32	0 45.8	8 36
Wed Jun 13/Thu Jun 14	6092.8	17 05 31	19 39	21 13	3 40	5 15	14 18	20 46	1 49	.....	23	1 31.6	12 23
Thu Jun 14/Fri Jun 15	6093.8	17 09 28	19 39	21 14	3 40	5 15	14 23	20 50	2 24	.....	16	2 18.2	15 38
Fri Jun 15/Sat Jun 16	6094.8	17 13 24	19 39	21 14	3 40	5 15	14 27	20 54	3 02	.....	10	3 06.1	18 13
Sat Jun 16/Sun Jun 17	6095.8	17 17 21	19 40	21 15	3 40	5 15	14 31	20 58	3 44	.....	5	3 55.4	20 01
Sun Jun 17/Mon Jun 18	6096.8	17 21 17	19 40	21 15	3 40	5 15	14 36	21 02	4 31	18 14	2	4 45.8	20 54
Mon Jun 18/Tue Jun 19	6097.8	17 25 14	19 40	21 15	3 40	5 15	14 40	21 06	5 21	19 04	0	5 36.9	20 51
Tue Jun 19/Wed Jun 20	6098.8	17 29 10	19 40	21 15	3 41	5 16	14 44	21 10	6 15	19 51	0	6 28.3	19 47
Wed Jun 20/Thu Jun 21	6099.8	17 33 07	19 41	21 16	3 41	5 16	14 48	21 14	.....	20 34	3	7 19.3	17 47
Thu Jun 21/Fri Jun 22	6100.8	17 37 04	19 41	21 16	3 41	5 16	14 53	21 19	.....	21 15	7	8 09.7	14 53
Fri Jun 22/Sat Jun 23	6101.8	17 41 00	19 41	21 16	3 41	5 16	14 57	21 23	.....	21 52	13	8 59.3	11 13
Sat Jun 23/Sun Jun 24	6102.8	17 44 57	19 41	21 16	3 42	5 17	15 01	21 27	.....	22 27	21	9 48.5	6 57
Sun Jun 24/Mon Jun 25	6103.8	17 48 53	19 41	21 16	3 42	5 17	15 05	21 31	.....	23 01	30	10 37.6	2 15
Mon Jun 25/Tue Jun 26	6104.8	17 52 50	19 41	21 16	3 42	5 17	15 09	21 36	.....	23 36	40	11 27.4	- 2 42
Tue Jun 26/Wed Jun 27	6105.8	17 56 46	19 41	21 16	3 43	5 18	15 13	21 40	.....	0 12	51	12 18.8	- 7 41
Wed Jun 27/Thu Jun 28	6106.8	18 00 43	19 42	21 16	3 43	5 18	15 17	21 45	.....	0 50	62	13 12.5	-12 24
Thu Jun 28/Fri Jun 29	6107.8	18 04 39	19 42	21 16	3 44	5 18	15 20	21 49	.....	1 33	73	14 09.3	-16 35
Fri Jun 29/Sat Jun 30	6108.8	18 08 36	19 42	21 16	3 44	5 19	15 24	21 53	.....	2 22	83	15 09.5	-19 52
Sat Jun 30/Sun Jul 01	6109.8	18 12 33	19 42	21 16	3 45	5 19	15 28	21 58	.....	3 18	91	16 12.5	-21 55

***** 2012 JULY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Jul 01/Mon Jul 02	6110.8	18 16 29	19 42	21 16	3 45	5 20	15 32	22 02	17 39	4 19	97	17 17.1	-22 30
Mon Jul 02/Tue Jul 03	6111.8	18 20 26	19 41	21 16	3 46	5 20	15 36	22 07	18 39	5 25	100	18 21.3	-21 31
Tue Jul 03/Wed Jul 04	6112.8	18 24 22	19 41	21 15	3 46	5 20	15 39	22 11	19 33	.....	100	19 23.4	-19 09
Wed Jul 04/Thu Jul 05	6113.8	18 28 19	19 41	21 15	3 47	5 21	15 43	22 16	20 20	.....	97	20 22.1	-15 39
Thu Jul 05/Fri Jul 06	6114.8	18 32 15	19 41	21 15	3 48	5 21	15 47	22 21	21 01	.....	92	21 17.2	-11 23
Fri Jul 06/Sat Jul 07	6115.8	18 36 12	19 41	21 15	3 48	5 22	15 50	22 25	21 38	.....	84	22 08.9	- 6 42
Sat Jul 07/Sun Jul 08	6116.8	18 40 08	19 41	21 14	3 49	5 22	15 54	22 30	22 12	.....	76	22 58.1	- 1 54
Sun Jul 08/Mon Jul 09	6117.8	18 44 05	19 41	21 14	3 50	5 23	15 57	22 34	22 44	.....	67	23 45.5	2 48
Mon Jul 09/Tue Jul 10	6118.8	18 48 02	19 40	21 13	3 50	5 24	16 01	22 39	23 16	.....	57	0 32.0	7 14
Tue Jul 10/Wed Jul 11	6119.8	18 51 58	19 40	21 13	3 51	5 24	16 04	22 44	23 49	.....	47	1 18.4	11 14
Wed Jul 11/Thu Jul 12	6120.8	18 55 55	19 40	21 12	3 52	5 25	16 08	22 49	0 23	.....	38	2 05.2	14 42
Thu Jul 12/Fri Jul 13	6121.8	18 59 51	19 39	21 12	3 53	5 25	16 11	22 53	1 00	.....	29	2 53.0	17 31
Fri Jul 13/Sat Jul 14	6122.8	19 03 48	19 39	21 11	3 54	5 26	16 15	22 58	1 41	.....	21	3 42.1	19 33
Sat Jul 14/Sun Jul 15	6123.8	19 07 44	19 39	21 11	3 54	5 26	16 18	23 03	2 26	.....	14	4 32.3	20 43
Sun Jul 15/Mon Jul 16	6124.8	19 11 41	19 38	21 10	3 55	5 27	16 21	23 08	3 15	.....	8	5 23.4	20 57
Mon Jul 16/Tue Jul 17	6125.8	19 15 37	19 38	21 09	3 56	5 28	16 24	23 12	4 08	17 47	4	6 15.0	20 11
Tue Jul 17/Wed Jul 18	6126.8	19 19 34	19 37	21 09	3 57	5 28	16 28	23 17	5 04	18 32	1	7 06.5	18 25
Wed Jul 18/Thu Jul 19	6127.8	19 23 31	19 37	21 08	3 58	5 29	16 31	23 22	6 02	19 14	0	7 57.6	15 45
Thu Jul 19/Fri Jul 20	6128.8	19 27 27	19 36	21 07	3 59	5 29	16 34	23 27	.....	19 52	2	8 48.0	12 15
Fri Jul 20/Sat Jul 21	6129.8	19 31 24	19 36	21 06	4 00	5 30	16 37	23 32	.....	20 29	5	9 37.8	8 06
Sat Jul 21/Sun Jul 22	6130.8	19 35 20	19 35	21 05	4 01	5 31	16 40	23 37	.....	21 04	10	10 27.2	3 28
Sun Jul 22/Mon Jul 23	6131.8	19 39 17	19 35	21 05	4 01	5 31	16 43	23 41	.....	21 39	18	11 17.0	- 1 25
Mon Jul 23/Tue Jul 24	6132.8	19 43 13	19 34	21 04	4 02	5 32	16 46	23 46	.....	22 14	27	12 07.6	- 6 22
Tue Jul 24/Wed Jul 25	6133.8	19 47 10	19 33	21 03	4 03	5 33	16 50	23 51	.....	22 51	37	12 59.9	-11 05
Wed Jul 25/Thu Jul 26	6134.8	19 51 06	19 33	21 02	4 04	5 33	16 53	23 56	.....	23 32	49	13 54.6	-15 20
Thu Jul 26/Fri Jul 27	6135.8	19 55 03	19 32	21 01	4 05	5 34	16 56	0 01	.....	0 18	60	14 52.1	-18 47
Fri Jul 27/Sat Jul 28	6136.8	19 59 00	19 31	21 00	4 06	5 35	16 58	0 06	.....	1 09	71	15 52.2	-21 11
Sat Jul 28/Sun Jul 29	6137.8	20 02 56	19 31	20 59	4 07	5 35	17 01	0 11	.....	2 06	81	16 54.2	-22 16
Sun Jul 29/Mon Jul 30	6138.8	20 06 53	19 30	20 58	4 08	5 36	17 04	0 16	.....	3 08	89	17 56.8	-21 55
Mon Jul 30/Tue Jul 31	6139.8	20 10 49	19 29	20 57	4 09	5 37	17 07	0 20	.....	4 13	95	18 58.4	-20 09
Tue Jul 31/Wed Aug 01	6140.8	20 14 46	19 28	20 56	4 10	5 37	17 10	0 25	18 11	5 19	99	19 57.8	-17 10

***** 2012 AUGUST *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Aug 01/Thu Aug 02	6141.8	20 18 42	19 28	20 55	4 11	5 38	17 13	0 30	18 55	6 23	100	20 54.2	-13 15
Thu Aug 02/Fri Aug 03	6142.8	20 22 39	19 27	20 54	4 12	5 39	17 16	0 35	19 34	.....	98	21 47.6	- 8 43
Fri Aug 03/Sat Aug 04	6143.8	20 26 35	19 26	20 53	4 13	5 39	17 19	0 40	20 09	.....	94	22 38.5	- 3 55
Sat Aug 04/Sun Aug 05	6144.8	20 30 32	19 25	20 51	4 14	5 40	17 21	0 45	20 43	.....	88	23 27.4	0 55
Sun Aug 05/Mon Aug 06	6145.8	20 34 29	19 24	20 50	4 15	5 41	17 24	0 50	21 15	.....	81	0 15.2	5 32
Mon Aug 06/Tue Aug 07	6146.8	20 38 25	19 23	20 49	4 16	5 41	17 27	0 55	21 48	.....	73	1 02.5	9 46
Tue Aug 07/Wed Aug 08	6147.8	20 42 22	19 22	20 48	4 17	5 42	17 30	1 00	22 22	.....	64	1 49.9	13 30
Wed Aug 08/Thu Aug 09	6148.8	20 46 18	19 21	20 47	4 18	5 43	17 32	1 05	22 58	.....	54	2 38.0	16 34
Thu Aug 09/Fri Aug 10	6149.8	20 50 15	19 20	20 45	4 18	5 43	17 35	1 09	23 38	.....	45	3 26.9	18 53
Fri Aug 10/Sat Aug 11	6150.8	20 54 11	19 20	20 44	4 19	5 44	17 38	1 14	0 21	.....	35	4 16.9	20 21
Sat Aug 11/Sun Aug 12	6151.8	20 58 08	19 19	20 43	4 20	5 45	17 40	1 19	1 08	.....	27	5 07.8	20 54
Sun Aug 12/Mon Aug 13	6152.8	21 02 04	19 17	20 42	4 21	5 45	17 43	1 24	1 59	.....	19	5 59.2	20 28
Mon Aug 13/Tue Aug 14	6153.8	21 06 01	19 16	20 40	4 22	5 46	17 46	1 29	2 53	.....	12	6 50.8	19 03
Tue Aug 14/Wed Aug 15	6154.8	21 09 58	19 15	20 39	4 23	5 47	17 48	1 34	3 51	.....	6	7 42.3	16 41
Wed Aug 15/Thu Aug 16	6155.8	21 13 54	19 14	20 38	4 24	5 47	17 51	1 39	4 50	17 49	2	8 33.3	13 26
Thu Aug 16/Fri Aug 17	6156.8	21 17 51	19 13	20 36	4 25	5 48	17 54	1 43	5 51	18 27	0	9 23.9	9 28
Fri Aug 17/Sat Aug 18	6157.8	21 21 47	19 12	20 35	4 26	5 49	17 56	1 48	.....	19 04	1	10 14.2	4 56
Sat Aug 18/Sun Aug 19	6158.8	21 25 44	19 11	20 34	4 27	5 49	17 59	1 53	.....	19 39	3	11 04.7	0 03
Sun Aug 19/Mon Aug 20	6159.8	21 29 40	19 10	20 32	4 28	5 50	18 01	1 58	.....	20 15	8	11 55.9	- 4 56
Mon Aug 20/Tue Aug 21	6160.8	21 33 37	19 09	20 31	4 28	5 51	18 04	2 03	.....	20 53	16	12 48.4	- 9 45
Tue Aug 21/Wed Aug 22	6161.8	21 37 33	19 08	20 29	4 29	5 51	18 06	2 08	.....	21 33	25	13 42.8	-14 07
Wed Aug 22/Thu Aug 23	6162.8	21 41 30	19 07	20 28	4 30	5 52	18 09	2 12	.....	22 17	35	14 39.4	-17 45
Thu Aug 23/Fri Aug 24	6163.8	21 45 27	19 05	20 27	4 31	5 52	18 12	2 17	.....	23 06	46	15 38.1	-20 22
Fri Aug 24/Sat Aug 25	6164.8	21 49 23	19 04	20 25	4 32	5 53	18 14	2 22	.....	0 01	58	16 38.4	-21 46
Sat Aug 25/Sun Aug 26	6165.8	21 53 20	19 03	20 24	4 33	5 54	18 17	2 27	.....	1 00	69	17 39.3	-21 49
Sun Aug 26/Mon Aug 27	6166.8	21 57 16	19 02	20 22	4 34	5 54	18 19	2 32	.....	2 02	79	18 39.5	-20 32
Mon Aug 27/Tue Aug 28	6167.8	22 01 13	19 01	20 21	4 34	5 55	18 22	2 36	.....	3 06	87	19 38.0	-18 02
Tue Aug 28/Wed Aug 29	6168.8	22 05 09	18 59	20 20	4 35	5 56	18 24	2 41	.....	4 09	94	20 34.1	-14 33
Wed Aug 29/Thu Aug 30	6169.8	22 09 06	18 58	20 18	4 36	5 56	18 27	2 46	17 30	5 11	98	21 27.7	-10 21
Thu Aug 30/Fri Aug 31	6170.8	22 13 02	18 57	20 17	4 37	5 57	18 29	2 51	18 06	6 12	100	22 19.0	- 5 42
Fri Aug 31/Sat Sep 01	6171.8	22 16 59	18 56	20 15	4 38	5 58	18 32	2 56	18 41	.....	99	23 08.6	- 0 55

***** 2012 SEPTEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	Sun: -----				LST twilight:		Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Sep 01/Sun Sep 02	6172.8	22 20 56	18 54	20 14	4 39	5 58	18 34	3 00	19 14	.....	97	23 57.1	3 47
Sun Sep 02/Mon Sep 03	6173.8	22 24 52	18 53	20 12	4 39	5 59	18 37	3 05	19 47	.....	92	0 45.1	8 12
Mon Sep 03/Tue Sep 04	6174.8	22 28 49	18 52	20 11	4 40	5 59	18 39	3 10	20 21	.....	86	1 33.1	12 08
Tue Sep 04/Wed Sep 05	6175.8	22 32 45	18 50	20 09	4 41	6 00	18 42	3 14	20 56	.....	79	2 21.5	15 28
Wed Sep 05/Thu Sep 06	6176.8	22 36 42	18 49	20 08	4 42	6 01	18 44	3 19	21 34	.....	70	3 10.6	18 04
Thu Sep 06/Fri Sep 07	6177.8	22 40 38	18 48	20 07	4 42	6 01	18 47	3 24	22 16	.....	61	4 00.5	19 50
Fri Sep 07/Sat Sep 08	6178.8	22 44 35	18 47	20 05	4 43	6 02	18 49	3 29	23 01	.....	52	4 51.1	20 41
Sat Sep 08/Sun Sep 09	6179.8	22 48 31	18 45	20 04	4 44	6 02	18 52	3 33	23 50	.....	42	5 42.2	20 36
Sun Sep 09/Mon Sep 10	6180.8	22 52 28	18 44	20 02	4 45	6 03	18 54	3 38	0 42	.....	33	6 33.4	19 33
Mon Sep 10/Tue Sep 11	6181.8	22 56 25	18 43	20 01	4 46	6 04	18 57	3 43	1 38	.....	24	7 24.6	17 32
Tue Sep 11/Wed Sep 12	6182.8	23 00 21	18 41	19 59	4 46	6 04	18 59	3 47	2 36	.....	16	8 15.5	14 39
Wed Sep 12/Thu Sep 13	6183.8	23 04 18	18 40	19 58	4 47	6 05	19 02	3 52	3 36	.....	9	9 06.2	10 58
Thu Sep 13/Fri Sep 14	6184.8	23 08 14	18 39	19 56	4 48	6 05	19 04	3 57	4 37	16 59	4	9 56.8	6 38
Fri Sep 14/Sat Sep 15	6185.8	23 12 11	18 37	19 55	4 48	6 06	19 07	4 01	5 40	17 36	1	10 47.8	1 51
Sat Sep 15/Sun Sep 16	6186.8	23 16 07	18 36	19 54	4 49	6 07	19 09	4 06	6 44	18 12	0	11 39.6	- 3 10
Sun Sep 16/Mon Sep 17	6187.8	23 20 04	18 35	19 52	4 50	6 07	19 12	4 11	.....	18 50	2	12 32.9	- 8 07
Mon Sep 17/Tue Sep 18	6188.8	23 24 00	18 33	19 51	4 51	6 08	19 14	4 15	.....	19 31	6	13 27.9	-12 41
Tue Sep 18/Wed Sep 19	6189.8	23 27 57	18 32	19 49	4 51	6 09	19 17	4 20	.....	20 15	13	14 25.1	-16 35
Wed Sep 19/Thu Sep 20	6190.8	23 31 54	18 31	19 48	4 52	6 09	19 19	4 25	.....	21 03	22	15 24.2	-19 29
Thu Sep 20/Fri Sep 21	6191.8	23 35 50	18 29	19 46	4 53	6 10	19 22	4 29	.....	21 57	32	16 24.7	-21 11
Fri Sep 21/Sat Sep 22	6192.8	23 39 47	18 28	19 45	4 53	6 10	19 24	4 34	.....	22 55	43	17 25.5	-21 33
Sat Sep 22/Sun Sep 23	6193.8	23 43 43	18 27	19 44	4 54	6 11	19 27	4 39	.....	23 56	55	18 25.3	-20 35
Sun Sep 23/Mon Sep 24	6194.8	23 47 40	18 25	19 42	4 55	6 12	19 29	4 43	.....	0 59	66	19 23.3	-18 25
Mon Sep 24/Tue Sep 25	6195.8	23 51 36	18 24	19 41	4 55	6 12	19 32	4 48	.....	2 02	76	20 18.9	-15 16
Tue Sep 25/Wed Sep 26	6196.8	23 55 33	18 23	19 40	4 56	6 13	19 34	4 52	.....	3 03	84	21 11.9	-11 22
Wed Sep 26/Thu Sep 27	6197.8	23 59 29	18 22	19 38	4 57	6 14	19 37	4 57	.....	4 03	91	22 02.9	- 6 58
Thu Sep 27/Fri Sep 28	6198.8	0 03 26	18 20	19 37	4 57	6 14	19 40	5 02	16 40	5 01	96	22 52.2	- 2 20
Fri Sep 28/Sat Sep 29	6199.8	0 07 23	18 19	19 35	4 58	6 15	19 42	5 06	17 13	5 58	99	23 40.5	2 19
Sat Sep 29/Sun Sep 30	6200.8	0 11 19	18 18	19 34	4 59	6 15	19 45	5 11	17 46	6 55	100	0 28.4	6 47
Sun Sep 30/Mon Oct 01	6201.8	0 15 16	18 16	19 33	5 00	6 16	19 47	5 16	18 20	.....	99	1 16.4	10 52

***** 2012 OCTOBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	Sun: -----				LST twilight:		Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Oct 01/Tue Oct 02	6202.8	0 19 12	18 15	19 32	5 00	6 17	19 50	5 20	18 55	.....	95	2 04.9	14 24
Tue Oct 02/Wed Oct 03	6203.8	0 23 09	18 14	19 30	5 01	6 17	19 53	5 25	19 32	.....	91	2 54.1	17 14
Wed Oct 03/Thu Oct 04	6204.8	0 27 05	18 12	19 29	5 02	6 18	19 55	5 29	20 12	.....	84	3 44.1	19 17
Thu Oct 04/Fri Oct 05	6205.8	0 31 02	18 11	19 28	5 02	6 19	19 58	5 34	20 56	.....	77	4 34.6	20 26
Fri Oct 05/Sat Oct 06	6206.8	0 34 58	18 10	19 26	5 03	6 19	20 01	5 39	21 43	.....	68	5 25.6	20 38
Sat Oct 06/Sun Oct 07	6207.8	0 38 55	18 09	19 25	5 04	6 20	20 03	5 43	22 33	.....	59	6 16.5	19 54
Sun Oct 07/Mon Oct 08	6208.8	0 42 52	18 07	19 24	5 04	6 21	20 06	5 48	23 26	.....	50	7 07.2	18 14
Mon Oct 08/Tue Oct 09	6209.8	0 46 48	18 06	19 23	5 05	6 21	20 09	5 52	0 22	.....	40	7 57.5	15 42
Tue Oct 09/Wed Oct 10	6210.8	0 50 45	18 05	19 22	5 06	6 22	20 12	5 57	1 20	.....	30	8 47.4	12 22
Wed Oct 10/Thu Oct 11	6211.8	0 54 41	18 04	19 20	5 06	6 23	20 14	6 02	2 19	.....	21	9 37.4	8 21
Thu Oct 11/Fri Oct 12	6212.8	0 58 38	18 03	19 19	5 07	6 24	20 17	6 06	3 21	.....	13	10 27.7	3 48
Fri Oct 12/Sat Oct 13	6213.8	1 02 34	18 01	19 18	5 08	6 24	20 20	6 11	4 24	.....	7	11 19.0	- 1 06
Sat Oct 13/Sun Oct 14	6214.8	1 06 31	18 00	19 17	5 08	6 25	20 23	6 16	5 29	16 43	2	12 11.9	- 6 05
Sun Oct 14/Mon Oct 15	6215.8	1 10 27	17 59	19 16	5 09	6 26	20 25	6 20	6 37	17 22	0	13 07.0	-10 52
Mon Oct 15/Tue Oct 16	6216.8	1 14 24	17 58	19 15	5 10	6 26	20 28	6 25	.....	18 06	1	14 04.6	-15 05
Tue Oct 16/Wed Oct 17	6217.8	1 18 21	17 57	19 14	5 10	6 27	20 31	6 29	.....	18 54	5	15 04.6	-18 25
Wed Oct 17/Thu Oct 18	6218.8	1 22 17	17 56	19 12	5 11	6 28	20 34	6 34	.....	19 48	11	16 06.4	-20 32
Thu Oct 18/Fri Oct 19	6219.8	1 26 14	17 55	19 11	5 12	6 29	20 37	6 39	.....	20 46	19	17 08.7	-21 17
Fri Oct 19/Sat Oct 20	6220.8	1 30 10	17 53	19 10	5 12	6 29	20 40	6 43	.....	21 49	29	18 10.1	-20 39
Sat Oct 20/Sun Oct 21	6221.8	1 34 07	17 52	19 09	5 13	6 30	20 43	6 48	.....	22 52	40	19 09.3	-18 44
Sun Oct 21/Mon Oct 22	6222.8	1 38 03	17 51	19 08	5 14	6 31	20 46	6 53	.....	23 56	51	20 05.7	-15 48
Mon Oct 22/Tue Oct 23	6223.8	1 42 00	17 50	19 07	5 14	6 32	20 49	6 57	.....	0 57	62	20 59.1	-12 05
Tue Oct 23/Wed Oct 24	6224.8	1 45 56	17 49	19 06	5 15	6 32	20 52	7 02	.....	1 57	72	21 50.0	- 7 51
Wed Oct 24/Thu Oct 25	6225.8	1 49 53	17 48	19 06	5 16	6 33	20 55	7 06	.....	2 55	81	22 38.9	- 3 21
Thu Oct 25/Fri Oct 26	6226.8	1 53 50	17 47	19 05	5 16	6 34	20 58	7 11	.....	3 52	88	23 26.7	1 13
Fri Oct 26/Sat Oct 27	6227.8	1 57 46	17 46	19 04	5 17	6 35	21 01	7 16	.....	4 48	94	0 14.0	5 39
Sat Oct 27/Sun Oct 28	6228.8	2 01 43	17 45	19 03	5 18	6 35	21 04	7 20	16 20	5 43	98	1 01.5	9 47
Sun Oct 28/Mon Oct 29	6229.8	2 05 39	17 44	19 02	5 19	6 36	21 07	7 25	16 54	6 38	100	1 49.5	13 27
Mon Oct 29/Tue Oct 30	6230.8	2 09 36	17 43	19 01	5 19	6 37	21 10	7 30	17 31	7 33	100	2 38.5	16 30
Tue Oct 30/Wed Oct 31	6231.8	2 13 32	17 43	19 00	5 20	6 38	21 13	7 34	18 10	.....	98	3 28.4	18 47
Wed Oct 31/Thu Nov 01	6232.8	2 17 29	17 42	19 00	5 21	6 39	21 16	7 39	18 52	.....	94	4 19.0	20 12

***** 2012 NOVEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Nov 01/Fri Nov 02	6233.8	2 21 25	17 41	18 59	5 21	6 40	21 19	7 44	19 38	.....	89	5 10.1	20 41
Fri Nov 02/Sat Nov 03	6234.8	2 25 22	17 40	18 58	5 22	6 40	21 23	7 48	20 27	.....	83	6 01.1	20 13
Sat Nov 03/Sun Nov 04	6235.8	2 29 18	17 39	18 57	5 23	6 41	21 26	7 53	21 19	.....	75	6 51.7	18 50
Sun Nov 04/Mon Nov 05	6236.8	2 33 15	17 38	18 57	5 24	6 42	21 29	7 58	22 13	.....	66	7 41.7	16 34
Mon Nov 05/Tue Nov 06	6237.8	2 37 12	17 38	18 56	5 24	6 43	21 32	8 02	23 09	.....	57	8 31.0	13 32
Tue Nov 06/Wed Nov 07	6238.8	2 41 08	17 37	18 55	5 25	6 44	21 36	8 07	0 06	.....	47	9 19.9	9 49
Wed Nov 07/Thu Nov 08	6239.8	2 45 05	17 36	18 55	5 26	6 45	21 39	8 12	1 04	.....	36	10 08.9	5 33
Thu Nov 08/Fri Nov 09	6240.8	2 49 01	17 35	18 54	5 27	6 45	21 42	8 16	2 04	.....	26	10 58.6	0 53
Fri Nov 09/Sat Nov 10	6241.8	2 52 58	17 35	18 54	5 27	6 46	21 46	8 21	3 07	.....	17	11 49.7	- 3 59
Sat Nov 10/Sun Nov 11	6242.8	2 56 54	17 34	18 53	5 28	6 47	21 49	8 26	4 13	.....	10	12 43.1	- 8 48
Sun Nov 11/Mon Nov 12	6243.8	3 00 51	17 33	18 53	5 29	6 48	21 53	8 31	5 21	15 54	4	13 39.3	-13 16
Mon Nov 12/Tue Nov 13	6244.8	3 04 47	17 33	18 52	5 30	6 49	21 56	8 35	6 31	16 39	1	14 38.6	-17 01
Tue Nov 13/Wed Nov 14	6245.8	3 08 44	17 32	18 52	5 30	6 50	22 00	8 40	7 41	17 31	0	15 40.7	-19 42
Wed Nov 14/Thu Nov 15	6246.8	3 12 41	17 32	18 51	5 31	6 51	22 03	8 45	.....	18 29	3	16 44.5	-21 02
Thu Nov 15/Fri Nov 16	6247.8	3 16 37	17 31	18 51	5 32	6 52	22 07	8 49	.....	19 32	8	17 48.2	-20 53
Fri Nov 16/Sat Nov 17	6248.8	3 20 34	17 31	18 51	5 33	6 52	22 10	8 54	.....	20 38	16	18 50.1	-19 20
Sat Nov 17/Sun Nov 18	6249.8	3 24 30	17 30	18 50	5 33	6 53	22 14	8 59	.....	21 44	25	19 49.0	-16 37
Sun Nov 18/Mon Nov 19	6250.8	3 28 27	17 30	18 50	5 34	6 54	22 17	9 03	.....	22 48	35	20 44.5	-13 01
Mon Nov 19/Tue Nov 20	6251.8	3 32 23	17 29	18 50	5 35	6 55	22 21	9 08	.....	23 50	46	21 36.8	- 8 51
Tue Nov 20/Wed Nov 21	6252.8	3 36 20	17 29	18 49	5 36	6 56	22 25	9 13	.....	0 50	56	22 26.6	- 4 22
Wed Nov 21/Thu Nov 22	6253.8	3 40 16	17 29	18 49	5 36	6 57	22 28	9 18	.....	1 47	66	23 14.6	0 11
Thu Nov 22/Fri Nov 23	6254.8	3 44 13	17 28	18 49	5 37	6 58	22 32	9 22	.....	2 43	76	0 01.6	4 38
Fri Nov 23/Sat Nov 24	6255.8	3 48 10	17 28	18 49	5 38	6 59	22 36	9 27	.....	3 38	84	0 48.6	8 49
Sat Nov 24/Sun Nov 25	6256.8	3 52 06	17 28	18 49	5 39	6 59	22 40	9 32	.....	4 33	90	1 36.0	12 35
Sun Nov 25/Mon Nov 26	6257.8	3 56 03	17 28	18 48	5 39	7 00	22 44	9 36	.....	5 27	95	2 24.3	15 47
Mon Nov 26/Tue Nov 27	6258.8	3 59 59	17 27	18 48	5 40	7 01	22 47	9 41	16 09	6 21	98	3 13.7	18 16
Tue Nov 27/Wed Nov 28	6259.8	4 03 56	17 27	18 48	5 41	7 02	22 51	9 46	16 50	7 13	100	4 04.2	19 57
Wed Nov 28/Thu Nov 29	6260.8	4 07 52	17 27	18 48	5 42	7 03	22 55	9 50	17 35	8 02	100	4 55.3	20 42
Thu Nov 29/Fri Nov 30	6261.8	4 11 49	17 27	18 48	5 42	7 04	22 59	9 55	18 23	.....	97	5 46.7	20 31
Fri Nov 30/Sat Dec 01	6262.8	4 15 45	17 27	18 48	5 43	7 04	23 03	10 00	19 14	.....	93	6 37.8	19 22

***** 2012 DECEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2012 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Dec 01/Sun Dec 02	6263.8	4 19 42	17 27	18 48	5 44	7 05	23 07	10 04	20 07	.....	88	7 28.1	17 20
Sun Dec 02/Mon Dec 03	6264.8	4 23 39	17 27	18 48	5 44	7 06	23 11	10 09	21 02	.....	81	8 17.5	14 30
Mon Dec 03/Tue Dec 04	6265.8	4 27 35	17 27	18 48	5 45	7 07	23 15	10 14	21 58	.....	72	9 06.2	11 00
Tue Dec 04/Wed Dec 05	6266.8	4 31 32	17 27	18 48	5 46	7 08	23 19	10 18	22 54	.....	63	9 54.3	6 56
Wed Dec 05/Thu Dec 06	6267.8	4 35 28	17 27	18 49	5 47	7 08	23 23	10 23	23 52	.....	53	10 42.7	2 29
Thu Dec 06/Fri Dec 07	6268.8	4 39 25	17 27	18 49	5 47	7 09	23 27	10 28	0 52	.....	42	11 31.8	- 2 12
Fri Dec 07/Sat Dec 08	6269.8	4 43 21	17 27	18 49	5 48	7 10	23 31	10 32	1 53	.....	32	12 22.7	- 6 56
Sat Dec 08/Sun Dec 09	6270.8	4 47 18	17 27	18 49	5 49	7 11	23 36	10 37	2 58	.....	22	13 16.1	-11 26
Sun Dec 09/Mon Dec 10	6271.8	4 51 14	17 27	18 49	5 49	7 11	23 40	10 41	4 05	.....	13	14 12.7	-15 27
Mon Dec 10/Tue Dec 11	6272.8	4 55 11	17 28	18 50	5 50	7 12	23 44	10 46	5 14	.....	6	15 12.7	-18 36
Tue Dec 11/Wed Dec 12	6273.8	4 59 08	17 28	18 50	5 51	7 13	23 48	10 51	6 22	16 08	2	16 15.5	-20 34
Wed Dec 12/Thu Dec 13	6274.8	5 03 04	17 28	18 50	5 51	7 13	23 52	10 55	7 27	17 08	0	17 19.8	-21 06
Thu Dec 13/Fri Dec 14	6275.8	5 07 01	17 28	18 51	5 52	7 14	23 57	11 00	.....	18 14	1	18 23.7	-20 10
Fri Dec 14/Sat Dec 15	6276.8	5 10 57	17 29	18 51	5 52	7 15	0 01	11 04	.....	19 22	5	19 25.5	-17 52
Sat Dec 15/Sun Dec 16	6277.8	5 14 54	17 29	18 51	5 53	7 15	0 05	11 09	.....	20 30	12	20 24.0	-14 29
Sun Dec 16/Mon Dec 17	6278.8	5 18 50	17 29	18 52	5 54	7 16	0 10	11 13	.....	21 36	20	21 19.1	-10 23
Mon Dec 17/Tue Dec 18	6279.8	5 22 47	17 30	18 52	5 54	7 16	0 14	11 18	.....	22 38	30	22 11.0	- 5 52
Tue Dec 18/Wed Dec 19	6280.8	5 26 43	17 30	18 53	5 55	7 17	0 18	11 22	.....	23 38	40	23 00.6	- 1 13
Wed Dec 19/Thu Dec 20	6281.8	5 30 40	17 31	18 53	5 55	7 17	0 23	11 27	.....	0 36	50	23 48.5	3 20
Thu Dec 20/Fri Dec 21	6282.8	5 34 37	17 31	18 54	5 56	7 18	0 27	11 31	.....	1 32	60	0 35.7	7 39
Fri Dec 21/Sat Dec 22	6283.8	5 38 33	17 32	18 54	5 56	7 18	0 32	11 36	.....	2 27	69	1 23.0	11 33
Sat Dec 22/Sun Dec 23	6284.8	5 42 30	17 32	18 55	5 57	7 19	0 36	11 40	.....	3 22	78	2 10.8	14 54
Sun Dec 23/Mon Dec 24	6285.8	5 46 26	17 33	18 55	5 57	7 19	0 41	11 44	.....	4 15	85	2 59.6	17 36
Mon Dec 24/Tue Dec 25	6286.8	5 50 23	17 33	18 56	5 57	7 20	0 45	11 49	.....	5 08	91	3 49.5	19 32
Tue Dec 25/Wed Dec 26	6287.8	5 54 19	17 34	18 56	5 58	7 20	0 50	11 53	.....	5 58	96	4 40.4	20 34
Wed Dec 26/Thu Dec 27	6288.8	5 58 16	17 35	18 57	5 58	7 21	0 54	11 58	16 19	6 46	99	5 31.8	20 41
Thu Dec 27/Fri Dec 28	6289.8	6 02 12	17 35	18 57	5 59	7 21	0 59	12 02	17 09	7 31	100	6 23.3	19 49
Fri Dec 28/Sat Dec 29	6290.8	6 06 09	17 36	18 58	5 59	7 21	1 03	12 06	18 02	8 13	99	7 14.4	18 02
Sat Dec 29/Sun Dec 30	6291.8	6 10 06	17 36	18 59	5 59	7 21	1 08	12 10	18 57	.....	96	8 04.6	15 25
Sun Dec 30/Mon Dec 31	6292.8	6 14 02	17 37	18 59	6 00	7 22	1 13	12 15	19 53	.....	92	8 53.9	12 03
Mon Dec 31/Tue Jan 01	6293.8	6 17 59	17 38	19 00	6 00	7 22	1 17	12 19	20 49	.....	86	9 42.5	8 07