

I slightly modified Thorstensen's code to print out the time between evening twilight and morning twilight. For Okie-Tex site (site code = o) near Kenton OK I used same time zone as for Oklahoma City.

W. Romanishin- August 2013 - email: wromanishin at ou.edu - Here is stuff from John T. intro:

\*\*\*\*\* 2015 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 -1.6 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 hemispheres. 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 2015, 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 21	18 36	Dec 28	11 33	Jan 04	21 54	Jan 13	2 49
Jan 20	6 15	Jan 26	21 50	Feb 03	16 10	Feb 11	20 52
Feb 18	16 49	Feb 25	10 15	Mar 05	11 07	Mar 13	10 49
Mar 20	2 39	Mar 27	0 44	Apr 04	5 07	Apr 11	20 45
Apr 18	11 59	Apr 25	16 57	May 03	20 45	May 11	3 37
May 17	21 16	May 25	10 21	Jun 02	9 22	Jun 09	8 43
Jun 16	7 08	Jun 24	4 04	Jul 01	19 22	Jul 08	13 26
Jul 15	18 26	Jul 23	21 05	Jul 31	3 46	Aug 06	19 06
Aug 14	7 55	Aug 22	12 32	Aug 29	11 38	Sep 05	2 57
Sep 12	23 43	Sep 21	2 00	Sep 27	19 52	Oct 04	14 08
Oct 12	17 07	Oct 20	13 32	Oct 27	5 06	Nov 03	5 26
Nov 11	10 48	Nov 18	23 28	Nov 25	15 45	Dec 03	0 42
Dec 11	3 30	Dec 18	8 15	Dec 25	4 12	Jan 01	22 32

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 JANUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Thu Jan 01/Fri Jan 02	6 20	17 37	19 00	6 00	7 23	1 19	12 21	.....	5 06	91	4 24.0	17 23	11.0
Fri Jan 02/Sat Jan 03	6 24	17 38	19 01	6 00	7 24	1 24	12 25	15 48	6 00	96	5 18.6	18 20	11.0
Sat Jan 03/Sun Jan 04	6 28	17 39	19 02	6 01	7 24	1 29	12 29	16 38	6 50	99	6 12.8	18 18	11.0
Sun Jan 04/Mon Jan 05	6 32	17 39	19 02	6 01	7 24	1 33	12 34	17 31	7 36	100	7 05.8	17 20	11.0
Mon Jan 05/Tue Jan 06	6 36	17 40	19 03	6 01	7 24	1 38	12 38	18 25	8 18	99	7 57.2	15 32	11.0
Tue Jan 06/Wed Jan 07	6 40	17 41	19 04	6 01	7 24	1 43	12 42	19 18	.....	96	8 46.9	13 03	11.0
Wed Jan 07/Thu Jan 08	6 44	17 42	19 05	6 01	7 24	1 47	12 46	20 12	.....	91	9 34.7	10 02	10.9
Thu Jan 08/Fri Jan 09	6 48	17 42	19 05	6 01	7 24	1 52	12 50	21 04	.....	85	10 21.2	6 38	10.9
Fri Jan 09/Sat Jan 10	6 51	17 43	19 06	6 01	7 24	1 57	12 54	21 56	.....	77	11 06.7	2 58	10.9
Sat Jan 10/Sun Jan 11	6 55	17 44	19 07	6 01	7 24	2 01	12 58	22 49	.....	69	11 51.8	- 0 48	10.9
Sun Jan 11/Mon Jan 12	6 59	17 45	19 08	6 01	7 24	2 06	13 02	23 41	.....	60	12 37.2	- 4 34	10.9
Mon Jan 12/Tue Jan 13	7 03	17 46	19 08	6 01	7 24	2 11	13 06	0 35	.....	50	13 23.5	- 8 12	10.9
Tue Jan 13/Wed Jan 14	7 07	17 47	19 09	6 01	7 24	2 16	13 10	1 30	.....	41	14 11.5	-11 34	10.9
Wed Jan 14/Thu Jan 15	7 11	17 48	19 10	6 01	7 24	2 20	13 14	2 26	.....	31	15 01.8	-14 30	10.9
Thu Jan 15/Fri Jan 16	7 15	17 48	19 11	6 01	7 23	2 25	13 17	3 25	.....	22	15 54.8	-16 49	10.8
Fri Jan 16/Sat Jan 17	7 19	17 49	19 11	6 01	7 23	2 30	13 21	4 24	.....	14	16 50.5	-18 19	10.8
Sat Jan 17/Sun Jan 18	7 23	17 50	19 12	6 01	7 23	2 34	13 25	5 22	.....	7	17 48.7	-18 49	10.8
Sun Jan 18/Mon Jan 19	7 27	17 51	19 13	6 01	7 23	2 39	13 29	6 19	16 18	2	18 48.6	-18 11	10.8
Mon Jan 19/Tue Jan 20	7 31	17 52	19 14	6 01	7 22	2 44	13 33	7 12	17 22	0	19 49.0	-16 21	10.8
Tue Jan 20/Wed Jan 21	7 35	17 53	19 15	6 01	7 22	2 49	13 36	8 02	18 29	1	20 48.9	-13 28	10.8
Wed Jan 21/Thu Jan 22	7 39	17 54	19 15	6 00	7 22	2 53	13 40	.....	19 38	4	21 47.5	- 9 42	10.7
Thu Jan 22/Fri Jan 23	7 43	17 55	19 16	6 00	7 21	2 58	13 44	.....	20 46	10	22 44.7	- 5 22	10.7
Fri Jan 23/Sat Jan 24	7 47	17 56	19 17	6 00	7 21	3 03	13 47	.....	21 53	19	23 40.3	- 0 46	10.7
Sat Jan 24/Sun Jan 25	7 51	17 57	19 18	5 59	7 20	3 08	13 51	.....	22 58	28	0 34.9	3 46	10.7
Sun Jan 25/Mon Jan 26	7 55	17 58	19 19	5 59	7 20	3 12	13 55	.....	0 02	39	1 28.9	7 59	10.7
Mon Jan 26/Tue Jan 27	7 59	17 58	19 19	5 59	7 19	3 17	13 58	.....	1 04	50	2 22.7	11 39	10.7
Tue Jan 27/Wed Jan 28	8 02	17 59	19 20	5 58	7 19	3 22	14 02	.....	2 04	61	3 16.5	14 37	10.6
Wed Jan 28/Thu Jan 29	8 06	18 00	19 21	5 58	7 18	3 27	14 05	.....	3 01	71	4 10.5	16 45	10.6
Thu Jan 29/Fri Jan 30	8 10	18 01	19 22	5 57	7 18	3 31	14 09	.....	3 55	80	5 04.4	17 57	10.6
Fri Jan 30/Sat Jan 31	8 14	18 02	19 22	5 57	7 17	3 36	14 12	.....	4 46	87	5 57.8	18 14	10.6
Sat Jan 31/Sun Feb 01	8 18	18 03	19 23	5 56	7 16	3 41	14 16	.....	5 33	93	6 50.4	17 35	10.6

\*\*\*\*\* 2015 FEBRUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sun Feb 01/Mon Feb 02	8 22	18 04	19 24	5 56	7 16	3 45	14 19	16 19	6 16	97	7 41.8	16 05	10.5
Mon Feb 02/Tue Feb 03	8 26	18 05	19 25	5 55	7 15	3 50	14 22	17 12	6 56	99	8 31.7	13 52	10.5
Tue Feb 03/Wed Feb 04	8 30	18 06	19 26	5 55	7 14	3 55	14 26	18 05	7 32	100	9 20.1	11 02	10.5
Wed Feb 04/Thu Feb 05	8 34	18 07	19 26	5 54	7 14	4 00	14 29	18 58	.....	98	10 07.2	7 46	10.5
Thu Feb 05/Fri Feb 06	8 38	18 08	19 27	5 53	7 13	4 04	14 32	19 50	.....	95	10 53.2	4 12	10.4
Fri Feb 06/Sat Feb 07	8 42	18 08	19 28	5 53	7 12	4 09	14 36	20 42	.....	90	11 38.6	0 27	10.4
Sat Feb 07/Sun Feb 08	8 46	18 09	19 29	5 52	7 11	4 14	14 39	21 35	.....	84	12 24.0	- 3 19	10.4
Sun Feb 08/Mon Feb 09	8 50	18 10	19 30	5 51	7 11	4 19	14 42	22 27	.....	76	13 09.9	- 6 59	10.4
Mon Feb 09/Tue Feb 10	8 54	18 11	19 30	5 51	7 10	4 23	14 45	23 21	.....	67	13 56.9	-10 24	10.3
Tue Feb 10/Wed Feb 11	8 58	18 12	19 31	5 50	7 09	4 28	14 49	0 15	.....	58	14 45.6	-13 26	10.3
Wed Feb 11/Thu Feb 12	9 02	18 13	19 32	5 49	7 08	4 33	14 52	1 11	.....	48	15 36.5	-15 56	10.3
Thu Feb 12/Fri Feb 13	9 06	18 14	19 33	5 48	7 07	4 37	14 55	2 08	.....	38	16 29.9	-17 44	10.3
Fri Feb 13/Sat Feb 14	9 09	18 15	19 33	5 48	7 06	4 42	14 58	3 05	.....	28	17 25.6	-18 38	10.2
Sat Feb 14/Sun Feb 15	9 13	18 15	19 34	5 47	7 05	4 47	15 01	4 01	.....	18	18 23.5	-18 31	10.2
Sun Feb 15/Mon Feb 16	9 17	18 16	19 35	5 46	7 04	4 52	15 04	4 55	.....	10	19 22.7	-17 16	10.2
Mon Feb 16/Tue Feb 17	9 21	18 17	19 36	5 45	7 03	4 56	15 07	5 47	.....	4	20 22.5	-14 54	10.2
Tue Feb 17/Wed Feb 18	9 25	18 18	19 36	5 44	7 02	5 01	15 10	6 35	17 12	1	21 21.9	-11 32	10.1
Wed Feb 18/Thu Feb 19	9 29	18 19	19 37	5 43	7 01	5 06	15 13	7 20	18 22	0	22 20.5	- 7 25	10.1
Thu Feb 19/Fri Feb 20	9 33	18 20	19 38	5 42	7 00	5 10	15 16	.....	19 31	2	23 18.1	- 2 51	10.1
Fri Feb 20/Sat Feb 21	9 37	18 20	19 39	5 41	6 59	5 15	15 19	.....	20 39	8	0 14.8	1 50	10.0
Sat Feb 21/Sun Feb 22	9 41	18 21	19 39	5 40	6 58	5 20	15 22	.....	21 46	15	1 10.7	6 18	10.0
Sun Feb 22/Mon Feb 23	9 45	18 22	19 40	5 39	6 57	5 24	15 25	.....	22 52	24	2 06.2	10 17	10.0
Mon Feb 23/Tue Feb 24	9 49	18 23	19 41	5 38	6 56	5 29	15 28	.....	23 54	34	3 01.3	13 33	10.0
Tue Feb 24/Wed Feb 25	9 53	18 24	19 42	5 37	6 55	5 34	15 31	.....	0 54	45	3 56.2	15 58	9.9
Wed Feb 25/Thu Feb 26	9 57	18 24	19 42	5 36	6 54	5 38	15 34	.....	1 51	55	4 50.6	17 27	9.9
Thu Feb 26/Fri Feb 27	10 01	18 25	19 43	5 35	6 53	5 43	15 37	.....	2 43	65	5 44.2	17 59	9.9
Fri Feb 27/Sat Feb 28	10 05	18 26	19 44	5 34	6 52	5 48	15 39	.....	3 31	74	6 36.8	17 35	9.8
Sat Feb 28/Sun Mar 01	10 09	18 27	19 45	5 33	6 50	5 53	15 42	.....	4 15	83	7 28.1	16 21	9.8

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 MARCH \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Sun Mar 01/Mon Mar 02	10 13	18 28	19 45	5 32	6 49	5 57	15 45	.....	4 56	89	8 18.0	14 22	9.8	
Mon Mar 02/Tue Mar 03	10 17	18 28	19 46	5 31	6 48	6 02	15 48	.....	5 33	94	9 06.5	11 45	9.7	
Tue Mar 03/Wed Mar 04	10 20	18 29	19 47	5 29	6 47	6 07	15 51	16 53	6 08	98	9 53.7	8 38	9.7	
Wed Mar 04/Thu Mar 05	10 24	18 30	19 48	5 28	6 46	6 11	15 53	17 45	6 41	100	10 40.0	5 10	9.7	
Thu Mar 05/Fri Mar 06	10 28	18 31	19 48	5 27	6 45	6 16	15 56	18 37	7 14	100	11 25.7	1 29	9.6	
Fri Mar 06/Sat Mar 07	10 32	18 31	19 49	5 26	6 43	6 21	15 59	19 30	.....	98	12 11.4	- 2 17	9.6	
Sat Mar 07/Sun Mar 08	10 36	18 32	19 50	5 25	6 42	6 25	16 02	20 22	.....	94	12 57.4	- 6 00	9.6	
Sun Mar 08/Mon Mar 09	10 40	18 33	19 51	5 23	6 41	6 30	16 04	21 15	.....	89	13 44.3	- 9 30	9.5	
Mon Mar 09/Tue Mar 10	10 44	18 34	19 51	5 22	6 40	6 35	16 07	22 09	.....	82	14 32.6	-12 39	9.5	
Tue Mar 10/Wed Mar 11	10 48	18 34	19 52	5 21	6 38	6 39	16 10	23 04	.....	74	15 22.6	-15 17	9.5	
Wed Mar 11/Thu Mar 12	10 52	18 35	19 53	5 20	6 37	6 44	16 12	23 59	.....	64	16 14.5	-17 15	9.4	
Thu Mar 12/Fri Mar 13	10 56	18 36	19 53	5 18	6 36	6 49	16 15	0 55	.....	54	17 08.4	-18 25	9.4	
Fri Mar 13/Sat Mar 14	11 00	18 36	19 54	5 17	6 35	6 53	16 18	1 49	.....	43	18 04.1	-18 39	9.4	
Sat Mar 14/Sun Mar 15	11 04	18 37	19 55	5 16	6 33	6 58	16 20	2 42	.....	33	19 01.2	-17 50	9.3	
Sun Mar 15/Mon Mar 16	11 08	18 38	19 56	5 14	6 32	7 03	16 23	3 33	.....	23	19 59.0	-15 58	9.3	
Mon Mar 16/Tue Mar 17	11 12	18 39	19 56	5 13	6 31	7 07	16 26	4 22	.....	14	20 57.1	-13 06	9.3	
Tue Mar 17/Wed Mar 18	11 16	18 39	19 57	5 12	6 30	7 12	16 28	5 08	.....	7	21 55.1	- 9 22	9.2	
Wed Mar 18/Thu Mar 19	11 20	18 40	19 58	5 10	6 28	7 17	16 31	5 52	17 05	2	22 52.6	- 5 02	9.2	
Thu Mar 19/Fri Mar 20	11 24	18 41	19 59	5 09	6 27	7 22	16 33	6 35	18 14	0	23 49.8	- 0 23	9.2	
Fri Mar 20/Sat Mar 21	11 27	18 41	19 59	5 08	6 26	7 26	16 36	7 19	19 22	1	0 46.7	4 15	9.1	
Sat Mar 21/Sun Mar 22	11 31	18 42	20 00	5 06	6 25	7 31	16 39	.....	20 30	5	1 43.6	8 32	9.1	
Sun Mar 22/Mon Mar 23	11 35	18 43	20 01	5 05	6 23	7 36	16 41	.....	21 37	11	2 40.3	12 11	9.1	
Mon Mar 23/Tue Mar 24	11 39	18 43	20 02	5 04	6 22	7 40	16 44	.....	22 40	19	3 36.9	15 00	9.0	
Tue Mar 24/Wed Mar 25	11 43	18 44	20 03	5 02	6 21	7 45	16 46	.....	23 40	29	4 32.9	16 51	9.0	
Wed Mar 25/Thu Mar 26	11 47	18 45	20 03	5 01	6 19	7 50	16 49	.....	0 36	39	5 27.9	17 42	9.0	
Thu Mar 26/Fri Mar 27	11 51	18 45	20 04	4 59	6 18	7 55	16 51	.....	1 27	49	6 21.6	17 35	8.9	
Fri Mar 27/Sat Mar 28	11 55	18 46	20 05	4 58	6 17	7 59	16 54	.....	2 13	59	7 13.7	16 35	8.9	
Sat Mar 28/Sun Mar 29	11 59	18 47	20 06	4 57	6 16	8 04	16 56	.....	2 55	68	8 04.1	14 49	8.8	
Sun Mar 29/Mon Mar 30	12 03	18 47	20 07	4 55	6 14	8 09	16 59	.....	3 33	77	8 52.8	12 23	8.8	
Mon Mar 30/Tue Mar 31	12 07	18 48	20 07	4 54	6 13	8 14	17 02	.....	4 09	85	9 40.2	9 25	8.8	
Tue Mar 31/Wed Apr 01	12 11	18 49	20 08	4 52	6 12	8 18	17 04	.....	4 43	91	10 26.5	6 04	8.7	

\*\*\*\*\* 2015 APRIL \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Wed Apr 01/Thu Apr 02	12 15	18 49	20 09	4 51	6 10	8 23	17 07	.....	5 16	96	11 12.3	2 26	8.7	
Thu Apr 02/Fri Apr 03	12 19	18 50	20 10	4 50	6 09	8 28	17 09	17 25	5 48	99	11 58.0	- 1 19	8.7	
Fri Apr 03/Sat Apr 04	12 23	18 51	20 11	4 48	6 08	8 33	17 12	18 17	6 22	100	12 44.2	- 5 04	8.6	
Sat Apr 04/Sun Apr 05	12 27	18 52	20 11	4 47	6 07	8 37	17 14	19 11	6 57	99	13 31.2	- 8 40	8.6	
Sun Apr 05/Mon Apr 06	12 31	18 52	20 12	4 45	6 05	8 42	17 17	20 05	.....	97	14 19.6	-11 58	8.6	
Mon Apr 06/Tue Apr 07	12 34	18 53	20 13	4 44	6 04	8 47	17 19	21 00	.....	92	15 09.7	-14 46	8.5	
Tue Apr 07/Wed Apr 08	12 38	18 54	20 14	4 43	6 03	8 52	17 22	21 55	.....	86	16 01.5	-16 56	8.5	
Wed Apr 08/Thu Apr 09	12 42	18 54	20 15	4 41	6 02	8 57	17 24	22 50	.....	78	16 55.0	-18 19	8.4	
Thu Apr 09/Fri Apr 10	12 46	18 55	20 16	4 40	6 00	9 01	17 27	23 44	.....	69	17 50.0	-18 47	8.4	
Fri Apr 10/Sat Apr 11	12 50	18 56	20 17	4 38	5 59	9 06	17 29	0 37	.....	59	18 45.9	-18 16	8.4	
Sat Apr 11/Sun Apr 12	12 54	18 56	20 17	4 37	5 58	9 11	17 32	1 27	.....	48	19 42.4	-16 44	8.3	
Sun Apr 12/Mon Apr 13	12 58	18 57	20 18	4 36	5 57	9 16	17 34	2 14	.....	37	20 38.9	-14 13	8.3	
Mon Apr 13/Tue Apr 14	13 02	18 58	20 19	4 34	5 56	9 21	17 37	2 59	.....	26	21 35.1	-10 52	8.2	
Tue Apr 14/Wed Apr 15	13 06	18 58	20 20	4 33	5 54	9 26	17 39	3 43	.....	17	22 31.1	- 6 50	8.2	
Wed Apr 15/Thu Apr 16	13 10	18 59	20 21	4 31	5 53	9 30	17 42	4 25	.....	9	23 27.0	- 2 23	8.2	
Thu Apr 16/Fri Apr 17	13 14	19 00	20 22	4 30	5 52	9 35	17 45	5 08	.....	3	0 23.0	2 13	8.1	
Fri Apr 17/Sat Apr 18	13 18	19 00	20 23	4 29	5 51	9 40	17 47	5 51	18 07	0	1 19.4	6 39	8.1	
Sat Apr 18/Sun Apr 19	13 22	19 01	20 24	4 27	5 50	9 45	17 50	6 36	19 14	0	2 16.2	10 37	8.1	
Sun Apr 19/Mon Apr 20	13 26	19 02	20 25	4 26	5 49	9 50	17 52	.....	20 20	3	3 13.5	13 50	8.0	
Mon Apr 20/Tue Apr 21	13 30	19 03	20 26	4 24	5 48	9 55	17 55	.....	21 23	8	4 10.7	16 08	8.0	
Tue Apr 21/Wed Apr 22	13 34	19 03	20 27	4 23	5 46	10 00	17 57	.....	22 23	15	5 07.4	17 25	7.9	
Wed Apr 22/Thu Apr 23	13 38	19 04	20 28	4 22	5 45	10 05	18 00	.....	23 17	24	6 02.8	17 40	7.9	
Thu Apr 23/Fri Apr 24	13 42	19 05	20 29	4 20	5 44	10 09	18 03	.....	0 07	33	6 56.5	16 57	7.9	
Fri Apr 24/Sat Apr 25	13 45	19 05	20 30	4 19	5 43	10 14	18 05	.....	0 51	43	7 48.1	15 24	7.8	
Sat Apr 25/Sun Apr 26	13 49	19 06	20 30	4 18	5 42	10 19	18 08	.....	1 32	52	8 37.8	13 09	7.8	
Sun Apr 26/Mon Apr 27	13 53	19 07	20 31	4 17	5 41	10 24	18 11	.....	2 09	62	9 25.7	10 19	7.8	
Mon Apr 27/Tue Apr 28	13 57	19 08	20 32	4 15	5 40	10 29	18 13	.....	2 43	71	10 12.2	7 05	7.7	
Tue Apr 28/Wed Apr 29	14 01	19 08	20 33	4 14	5 39	10 34	18 16	.....	3 16	79	10 58.0	3 32	7.7	
Wed Apr 29/Thu Apr 30	14 05	19 09	20 34	4 13	5 38	10 39	18 19	.....	3 49	86	11 43.5	- 0 12	7.6	
Thu Apr 30/Fri May 01	14 09	19 10	20 35	4 12	5 37	10 44	18 21	.....	4 22	92	12 29.4	- 3 59	7.6	

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 MAY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----					Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri May 01/Sat May 02	14 13	19 10	20 36	4 10	5 36	10 49	18 24	.....	4 56	97	13 16.3	- 7 40	7.6
Sat May 02/Sun May 03	14 17	19 11	20 37	4 09	5 35	10 54	18 27	17 58	5 33	99	14 04.5	-11 07	7.5
Sun May 03/Mon May 04	14 21	19 12	20 38	4 08	5 34	10 59	18 30	18 53	6 12	100	14 54.6	-14 08	7.5
Mon May 04/Tue May 05	14 25	19 13	20 39	4 07	5 34	11 04	18 32	19 49	.....	98	15 46.7	-16 34	7.5
Tue May 05/Wed May 06	14 29	19 13	20 40	4 06	5 33	11 09	18 35	20 45	.....	95	16 40.7	-18 13	7.4
Wed May 06/Thu May 07	14 33	19 14	20 41	4 04	5 32	11 14	18 38	21 41	.....	89	17 36.3	-18 58	7.4
Thu May 07/Fri May 08	14 37	19 15	20 42	4 03	5 31	11 19	18 41	22 34	.....	82	18 32.7	-18 42	7.3
Fri May 08/Sat May 09	14 41	19 15	20 43	4 02	5 30	11 23	18 44	23 25	.....	73	19 29.4	-17 23	7.3
Sat May 09/Sun May 10	14 45	19 16	20 44	4 01	5 29	11 28	18 46	0 13	.....	62	20 25.7	-15 07	7.3
Sun May 10/Mon May 11	14 49	19 17	20 45	4 00	5 29	11 33	18 49	0 58	.....	51	21 21.4	-11 59	7.2
Mon May 11/Tue May 12	14 52	19 18	20 46	3 59	5 28	11 38	18 52	1 40	.....	40	22 16.3	- 8 11	7.2
Tue May 12/Wed May 13	14 56	19 18	20 47	3 58	5 27	11 43	18 55	2 21	.....	29	23 10.7	- 3 55	7.2
Wed May 13/Thu May 14	15 00	19 19	20 48	3 57	5 26	11 48	18 58	3 02	.....	19	0 05.1	0 34	7.1
Thu May 14/Fri May 15	15 04	19 20	20 49	3 56	5 26	11 53	19 01	3 43	.....	11	0 59.8	5 00	7.1
Fri May 15/Sat May 16	15 08	19 20	20 50	3 55	5 25	11 58	19 04	4 27	.....	5	1 55.2	9 06	7.1
Sat May 16/Sun May 17	15 12	19 21	20 51	3 54	5 24	12 03	19 07	5 12	18 00	1	2 51.5	12 37	7.0
Sun May 17/Mon May 18	15 16	19 22	20 52	3 53	5 24	12 08	19 10	6 01	19 04	0	3 48.4	15 19	7.0
Mon May 18/Tue May 19	15 20	19 22	20 53	3 52	5 23	12 13	19 13	.....	20 06	2	4 45.4	17 02	7.0
Tue May 19/Wed May 20	15 24	19 23	20 54	3 51	5 23	12 18	19 16	.....	21 04	6	5 41.8	17 42	7.0
Wed May 20/Thu May 21	15 28	19 24	20 55	3 51	5 22	12 23	19 19	.....	21 57	11	6 36.9	17 22	6.9
Thu May 21/Fri May 22	15 32	19 24	20 56	3 50	5 21	12 28	19 22	.....	22 45	19	7 30.0	16 06	6.9
Fri May 22/Sat May 23	15 36	19 25	20 57	3 49	5 21	12 32	19 26	.....	23 28	27	8 21.0	14 04	6.9
Sat May 23/Sun May 24	15 40	19 26	20 58	3 48	5 21	12 37	19 29	.....	0 07	36	9 09.9	11 24	6.8
Sun May 24/Mon May 25	15 44	19 26	20 59	3 48	5 20	12 42	19 32	.....	0 43	45	9 57.1	8 17	6.8
Mon May 25/Tue May 26	15 48	19 27	21 00	3 47	5 20	12 47	19 35	.....	1 16	55	10 43.1	4 49	6.8
Tue May 26/Wed May 27	15 52	19 28	21 01	3 46	5 19	12 52	19 39	.....	1 49	64	11 28.4	1 08	6.8
Wed May 27/Thu May 28	15 56	19 28	21 02	3 46	5 19	12 57	19 42	.....	2 22	73	12 13.8	- 2 38	6.7
Thu May 28/Fri May 29	16 00	19 29	21 02	3 45	5 18	13 01	19 45	.....	2 55	81	12 59.9	- 6 22	6.7
Fri May 29/Sat May 30	16 03	19 30	21 03	3 44	5 18	13 06	19 49	.....	3 30	88	13 47.4	- 9 56	6.7
Sat May 30/Sun May 31	16 07	19 30	21 04	3 44	5 18	13 11	19 52	.....	4 09	94	14 36.9	-13 10	6.7
Sun May 31/Mon Jun 01	16 11	19 31	21 05	3 43	5 18	13 16	19 55	17 39	4 50	98	15 28.6	-15 53	6.6

\*\*\*\*\* 2015 JUNE \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----					Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Jun 01/Tue Jun 02	16 15	19 31	21 06	3 43	5 17	13 20	19 59	18 36	5 37	100	16 22.6	-17 53	6.6
Tue Jun 02/Wed Jun 03	16 19	19 32	21 06	3 43	5 17	13 25	20 02	19 33	6 28	99	17 18.8	-18 59	6.6
Wed Jun 03/Thu Jun 04	16 23	19 32	21 07	3 42	5 17	13 30	20 06	20 29	.....	97	18 16.3	-19 04	6.6
Thu Jun 04/Fri Jun 05	16 27	19 33	21 08	3 42	5 17	13 34	20 10	21 22	.....	92	19 14.4	-18 04	6.6
Fri Jun 05/Sat Jun 06	16 31	19 33	21 09	3 41	5 17	13 39	20 13	22 11	.....	84	20 12.1	-16 00	6.5
Sat Jun 06/Sun Jun 07	16 35	19 34	21 09	3 41	5 16	13 44	20 17	22 58	.....	75	21 08.9	-13 02	6.5
Sun Jun 07/Mon Jun 08	16 39	19 34	21 10	3 41	5 16	13 48	20 20	23 41	.....	65	22 04.4	- 9 20	6.5
Mon Jun 08/Tue Jun 09	16 43	19 35	21 10	3 41	5 16	13 53	20 24	0 22	.....	54	22 58.9	- 5 09	6.5
Tue Jun 09/Wed Jun 10	16 47	19 35	21 11	3 41	5 16	13 57	20 28	1 02	.....	42	23 52.7	- 0 43	6.5
Wed Jun 10/Thu Jun 11	16 51	19 36	21 12	3 40	5 16	14 02	20 32	1 42	.....	31	0 46.4	3 42	6.5
Thu Jun 11/Fri Jun 12	16 55	19 36	21 12	3 40	5 16	14 06	20 36	2 23	.....	21	1 40.4	7 51	6.5
Fri Jun 12/Sat Jun 13	16 59	19 37	21 13	3 40	5 16	14 11	20 39	3 06	.....	13	2 35.1	11 31	6.5
Sat Jun 13/Sun Jun 14	17 03	19 37	21 13	3 40	5 16	14 15	20 43	3 52	.....	6	3 30.5	14 28	6.4
Sun Jun 14/Mon Jun 15	17 07	19 37	21 14	3 40	5 16	14 20	20 47	4 41	17 52	2	4 26.6	16 31	6.4
Mon Jun 15/Tue Jun 16	17 10	19 38	21 14	3 40	5 16	14 24	20 51	5 34	18 51	0	5 22.7	17 35	6.4
Tue Jun 16/Wed Jun 17	17 14	19 38	21 14	3 40	5 16	14 28	20 55	6 28	19 46	1	6 18.0	17 38	6.4
Wed Jun 17/Thu Jun 18	17 18	19 38	21 15	3 40	5 17	14 33	20 59	.....	20 37	3	7 11.9	16 44	6.4
Thu Jun 18/Fri Jun 19	17 22	19 39	21 15	3 40	5 17	14 37	21 03	.....	21 22	8	8 03.9	14 58	6.4
Fri Jun 19/Sat Jun 20	17 26	19 39	21 15	3 41	5 17	14 41	21 07	.....	22 03	14	8 53.8	12 31	6.4
Sat Jun 20/Sun Jun 21	17 30	19 39	21 16	3 41	5 17	14 45	21 12	.....	22 41	21	9 41.8	9 33	6.4
Sun Jun 21/Mon Jun 22	17 34	19 39	21 16	3 41	5 17	14 49	21 16	.....	23 16	30	10 28.2	6 11	6.4
Mon Jun 22/Tue Jun 23	17 38	19 40	21 16	3 41	5 18	14 54	21 20	.....	23 49	39	11 13.6	2 35	6.4
Tue Jun 23/Wed Jun 24	17 42	19 40	21 16	3 42	5 18	14 58	21 24	.....	0 21	48	11 58.6	- 1 09	6.4
Wed Jun 24/Thu Jun 25	17 46	19 40	21 16	3 42	5 18	15 02	21 28	.....	0 54	57	12 43.9	- 4 53	6.4
Thu Jun 25/Fri Jun 26	17 50	19 40	21 16	3 42	5 18	15 06	21 33	.....	1 28	67	13 30.2	- 8 30	6.4
Fri Jun 26/Sat Jun 27	17 54	19 40	21 16	3 43	5 19	15 10	21 37	.....	2 05	76	14 18.2	-11 51	6.4
Sat Jun 27/Sun Jun 28	17 58	19 40	21 16	3 43	5 19	15 14	21 41	.....	2 44	84	15 08.5	-14 47	6.4
Sun Jun 28/Mon Jun 29	18 02	19 40	21 16	3 43	5 20	15 18	21 46	.....	3 28	91	16 01.3	-17 07	6.5
Mon Jun 29/Tue Jun 30	18 06	19 40	21 16	3 44	5 20	15 21	21 50	.....	4 17	96	16 56.8	-18 39	6.5
Tue Jun 30/Wed Jul 01	18 10	19 40	21 16	3 44	5 20	15 25	21 55	18 17	5 12	99	17 54.5	-19 12	6.5

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 JULY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Wed Jul 01/Thu Jul 02	18 14	19 40	21 16	3 45	5 21	15 29	21 59	19 13	6 11	100	18 53.6	-18 38	6.5
Thu Jul 02/Fri Jul 03	18 17	19 40	21 16	3 45	5 21	15 33	22 04	20 05	.....	98	19 53.1	-16 57	6.5
Fri Jul 03/Sat Jul 04	18 21	19 40	21 16	3 46	5 22	15 37	22 08	20 54	.....	93	20 52.0	-14 12	6.5
Sat Jul 04/Sun Jul 05	18 25	19 40	21 15	3 47	5 22	15 40	22 13	21 40	.....	87	21 49.7	-10 37	6.5
Sun Jul 05/Mon Jul 06	18 29	19 40	21 15	3 47	5 23	15 44	22 17	22 23	.....	78	22 45.9	- 6 27	6.5
Mon Jul 06/Tue Jul 07	18 33	19 40	21 15	3 48	5 23	15 48	22 22	23 04	.....	67	23 40.9	- 1 59	6.6
Tue Jul 07/Wed Jul 08	18 37	19 40	21 14	3 49	5 23	15 51	22 26	23 44	.....	56	0 35.1	2 31	6.6
Wed Jul 08/Thu Jul 09	18 41	19 39	21 14	3 49	5 24	15 55	22 31	0 24	.....	44	1 29.1	6 47	6.6
Thu Jul 09/Fri Jul 10	18 45	19 39	21 14	3 50	5 25	15 58	22 36	1 06	.....	34	2 23.2	10 34	6.6
Fri Jul 10/Sat Jul 11	18 49	19 39	21 13	3 51	5 25	16 02	22 40	1 50	.....	24	3 17.8	13 41	6.6
Sat Jul 11/Sun Jul 12	18 53	19 39	21 13	3 52	5 26	16 05	22 45	2 37	.....	15	4 12.8	15 59	6.6
Sun Jul 12/Mon Jul 13	18 57	19 38	21 12	3 52	5 26	16 09	22 50	3 27	.....	8	5 07.9	17 20	6.7
Mon Jul 13/Tue Jul 14	19 01	19 38	21 12	3 53	5 27	16 12	22 55	4 19	17 38	4	6 02.6	17 42	6.7
Tue Jul 14/Wed Jul 15	19 05	19 38	21 11	3 54	5 27	16 15	22 59	5 14	18 30	1	6 56.4	17 07	6.7
Wed Jul 15/Thu Jul 16	19 09	19 37	21 10	3 55	5 28	16 19	23 04	6 09	19 17	0	7 48.6	15 40	6.7
Thu Jul 16/Fri Jul 17	19 13	19 37	21 10	3 56	5 29	16 22	23 09	.....	20 00	2	8 39.0	13 28	6.8
Fri Jul 17/Sat Jul 18	19 17	19 36	21 09	3 56	5 29	16 25	23 14	.....	20 39	5	9 27.5	10 40	6.8
Sat Jul 18/Sun Jul 19	19 21	19 36	21 08	3 57	5 30	16 29	23 19	.....	21 15	10	10 14.4	7 27	6.8
Sun Jul 19/Mon Jul 20	19 25	19 36	21 08	3 58	5 30	16 32	23 23	.....	21 49	16	11 00.0	3 56	6.8
Mon Jul 20/Tue Jul 21	19 28	19 35	21 07	3 59	5 31	16 35	23 28	.....	22 22	24	11 44.9	0 16	6.9
Tue Jul 21/Wed Jul 22	19 32	19 34	21 06	4 00	5 32	16 38	23 33	.....	22 54	32	12 29.6	- 3 26	6.9
Wed Jul 22/Thu Jul 23	19 36	19 34	21 05	4 01	5 32	16 41	23 38	.....	23 27	41	13 14.9	- 7 03	6.9
Thu Jul 23/Fri Jul 24	19 40	19 33	21 04	4 02	5 33	16 44	23 43	.....	0 02	51	14 01.4	-10 27	7.0
Fri Jul 24/Sat Jul 25	19 44	19 33	21 04	4 03	5 34	16 47	23 48	.....	0 40	60	14 49.7	-13 30	7.0
Sat Jul 25/Sun Jul 26	19 48	19 32	21 03	4 04	5 34	16 50	23 53	.....	1 21	70	15 40.4	-16 04	7.0
Sun Jul 26/Mon Jul 27	19 52	19 31	21 02	4 05	5 35	16 53	23 57	.....	2 07	79	16 33.8	-17 56	7.0
Mon Jul 27/Tue Jul 28	19 56	19 31	21 01	4 06	5 36	16 56	0 02	.....	2 58	87	17 29.9	-18 56	7.1
Tue Jul 28/Wed Jul 29	20 00	19 30	21 00	4 06	5 36	16 59	0 07	.....	3 54	94	18 28.2	-18 55	7.1
Wed Jul 29/Thu Jul 30	20 04	19 29	20 59	4 07	5 37	17 02	0 12	17 53	4 56	98	19 27.9	-17 45	7.1
Thu Jul 30/Fri Jul 31	20 08	19 29	20 58	4 08	5 37	17 05	0 17	18 44	6 01	100	20 28.1	-15 27	7.2
Fri Jul 31/Sat Aug 01	20 12	19 28	20 57	4 09	5 38	17 08	0 22	19 33	.....	99	21 27.8	-12 08	7.2

\*\*\*\*\* 2015 AUGUST \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sat Aug 01/Sun Aug 02	20 16	19 27	20 56	4 10	5 39	17 11	0 27	20 18	.....	95	22 26.5	- 8 04	7.2
Sun Aug 02/Mon Aug 03	20 20	19 26	20 54	4 11	5 39	17 14	0 32	21 02	.....	88	23 23.9	- 3 32	7.3
Mon Aug 03/Tue Aug 04	20 24	19 25	20 53	4 12	5 40	17 17	0 37	21 43	.....	80	0 20.2	1 07	7.3
Tue Aug 04/Wed Aug 05	20 28	19 25	20 52	4 13	5 41	17 19	0 41	22 25	.....	69	1 15.9	5 35	7.3
Wed Aug 05/Thu Aug 06	20 32	19 24	20 51	4 14	5 41	17 22	0 46	23 06	.....	58	2 11.1	9 35	7.4
Thu Aug 06/Fri Aug 07	20 35	19 23	20 50	4 15	5 42	17 25	0 51	23 50	.....	47	3 06.3	12 55	7.4
Fri Aug 07/Sat Aug 08	20 39	19 22	20 49	4 16	5 43	17 28	0 56	0 36	.....	36	4 01.4	15 26	7.5
Sat Aug 08/Sun Aug 09	20 43	19 21	20 48	4 17	5 43	17 30	1 01	1 24	.....	26	4 56.3	17 01	7.5
Sun Aug 09/Mon Aug 10	20 47	19 20	20 46	4 18	5 44	17 33	1 06	2 15	.....	18	5 50.7	17 38	7.5
Mon Aug 10/Tue Aug 11	20 51	19 19	20 45	4 19	5 45	17 36	1 11	3 08	.....	11	6 44.1	17 18	7.6
Tue Aug 11/Wed Aug 12	20 55	19 18	20 44	4 20	5 45	17 38	1 16	4 02	.....	5	7 36.1	16 06	7.6
Wed Aug 12/Thu Aug 13	20 59	19 17	20 43	4 21	5 46	17 41	1 21	4 57	17 58	2	8 26.5	14 08	7.6
Thu Aug 13/Fri Aug 14	21 03	19 16	20 41	4 22	5 47	17 44	1 25	5 51	18 38	0	9 15.2	11 32	7.7
Fri Aug 14/Sat Aug 15	21 07	19 15	20 40	4 23	5 47	17 46	1 30	6 45	19 15	1	10 02.3	8 28	7.7
Sat Aug 15/Sun Aug 16	21 11	19 14	20 39	4 23	5 48	17 49	1 35	.....	19 50	3	10 48.1	5 03	7.7
Sun Aug 16/Mon Aug 17	21 15	19 13	20 37	4 24	5 49	17 52	1 40	.....	20 23	6	11 33.0	1 28	7.8
Mon Aug 17/Tue Aug 18	21 19	19 12	20 36	4 25	5 49	17 54	1 45	.....	20 55	12	12 17.5	- 2 12	7.8
Tue Aug 18/Wed Aug 19	21 23	19 11	20 35	4 26	5 50	17 57	1 50	.....	21 28	18	13 02.3	- 5 48	7.9
Wed Aug 19/Thu Aug 20	21 27	19 10	20 33	4 27	5 51	17 59	1 55	.....	22 02	26	13 47.7	- 9 13	7.9
Thu Aug 20/Fri Aug 21	21 31	19 08	20 32	4 28	5 51	18 02	1 59	.....	22 38	35	14 34.5	-12 19	7.9
Fri Aug 21/Sat Aug 22	21 35	19 07	20 31	4 29	5 52	18 05	2 04	.....	23 16	44	15 23.2	-15 00	8.0
Sat Aug 22/Sun Aug 23	21 39	19 06	20 29	4 30	5 53	18 07	2 09	.....	23 59	54	16 14.1	-17 05	8.0
Sun Aug 23/Mon Aug 24	21 43	19 05	20 28	4 31	5 53	18 10	2 14	.....	0 46	64	17 07.5	-18 24	8.0
Mon Aug 24/Tue Aug 25	21 46	19 04	20 26	4 31	5 54	18 12	2 19	.....	1 39	74	18 03.4	-18 50	8.1
Tue Aug 25/Wed Aug 26	21 50	19 03	20 25	4 32	5 55	18 15	2 23	.....	2 37	83	19 01.2	-18 12	8.1
Wed Aug 26/Thu Aug 27	21 54	19 01	20 24	4 33	5 55	18 17	2 28	.....	3 39	91	20 00.4	-16 28	8.2
Thu Aug 27/Fri Aug 28	21 58	19 00	20 22	4 34	5 56	18 20	2 33	17 20	4 45	97	21 00.2	-13 40	8.2
Fri Aug 28/Sat Aug 29	22 02	18 59	20 21	4 35	5 56	18 22	2 38	18 08	5 53	100	21 59.9	- 9 55	8.2
Sat Aug 29/Sun Aug 30	22 06	18 58	20 19	4 36	5 57	18 25	2 43	18 53	.....	100	22 59.1	- 5 30	8.3
Sun Aug 30/Mon Aug 31	22 10	18 57	20 18	4 36	5 58	18 27	2 47	19 36	.....	96	23 57.7	- 0 46	8.3
Mon Aug 31/Tue Sep 01	22 14	18 55	20 16	4 37	5 58	18 30	2 52	20 19	.....	91	0 55.7	3 57	8.3

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 SEPTEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twilight		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Tue Sep 01/Wed Sep 02	22 18	18 54	20 15	4 38	5 59	18 32	2 57	21 03	.....	82	1 53.2	8 18	8.4
Wed Sep 02/Thu Sep 03	22 22	18 53	20 13	4 39	6 00	18 35	3 02	21 47	.....	72	2 50.5	11 59	8.4
Thu Sep 03/Fri Sep 04	22 26	18 52	20 12	4 40	6 00	18 37	3 06	22 33	.....	62	3 47.4	14 49	8.5
Fri Sep 04/Sat Sep 05	22 30	18 50	20 11	4 40	6 01	18 40	3 11	23 22	.....	51	4 43.6	16 41	8.5
Sat Sep 05/Sun Sep 06	22 34	18 49	20 09	4 41	6 01	18 42	3 16	0 12	.....	40	5 39.0	17 32	8.5
Sun Sep 06/Mon Sep 07	22 38	18 48	20 08	4 42	6 02	18 45	3 20	1 05	.....	30	6 33.0	17 25	8.6
Mon Sep 07/Tue Sep 08	22 42	18 46	20 06	4 43	6 03	18 47	3 25	1 58	.....	21	7 25.3	16 25	8.6
Tue Sep 08/Wed Sep 09	22 46	18 45	20 05	4 44	6 03	18 50	3 30	2 52	.....	14	8 15.9	14 38	8.6
Wed Sep 09/Thu Sep 10	22 50	18 44	20 03	4 44	6 04	18 52	3 35	3 46	.....	8	9 04.6	12 12	8.7
Thu Sep 10/Fri Sep 11	22 53	18 43	20 02	4 45	6 04	18 55	3 39	4 40	17 16	4	9 51.8	9 16	8.7
Fri Sep 11/Sat Sep 12	22 57	18 41	20 00	4 46	6 05	18 57	3 44	5 32	17 51	1	10 37.7	5 57	8.8
Sat Sep 12/Sun Sep 13	23 01	18 40	19 59	4 47	6 06	19 00	3 49	6 25	18 24	0	11 22.6	2 26	8.8
Sun Sep 13/Mon Sep 14	23 05	18 39	19 58	4 47	6 06	19 02	3 53	.....	18 57	1	12 07.1	- 1 12	8.8
Mon Sep 14/Tue Sep 15	23 09	18 37	19 56	4 48	6 07	19 05	3 58	.....	19 30	4	12 51.7	- 4 48	8.9
Tue Sep 15/Wed Sep 16	23 13	18 36	19 55	4 49	6 08	19 07	4 03	.....	20 03	8	13 36.7	- 8 15	8.9
Wed Sep 16/Thu Sep 17	23 17	18 35	19 53	4 49	6 08	19 10	4 07	.....	20 38	14	14 22.8	-11 24	8.9
Thu Sep 17/Fri Sep 18	23 21	18 33	19 52	4 50	6 09	19 12	4 12	.....	21 15	21	15 10.3	-14 09	9.0
Fri Sep 18/Sat Sep 19	23 25	18 32	19 50	4 51	6 09	19 15	4 17	.....	21 56	29	15 59.5	-16 22	9.0
Sat Sep 19/Sun Sep 20	23 29	18 31	19 49	4 52	6 10	19 17	4 21	.....	22 40	38	16 50.8	-17 53	9.0
Sun Sep 20/Mon Sep 21	23 33	18 29	19 48	4 52	6 11	19 20	4 26	.....	23 29	48	17 44.1	-18 36	9.1
Mon Sep 21/Tue Sep 22	23 37	18 28	19 46	4 53	6 11	19 22	4 31	.....	0 23	59	18 39.2	-18 23	9.1
Tue Sep 22/Wed Sep 23	23 41	18 27	19 45	4 54	6 12	19 25	4 35	.....	1 22	69	19 35.8	-17 08	9.1
Wed Sep 23/Thu Sep 24	23 45	18 25	19 43	4 54	6 12	19 27	4 40	.....	2 24	79	20 33.5	-14 52	9.2
Thu Sep 24/Fri Sep 25	23 49	18 24	19 42	4 55	6 13	19 30	4 45	.....	3 29	88	21 31.8	-11 37	9.2
Fri Sep 25/Sat Sep 26	23 53	18 23	19 41	4 56	6 14	19 33	4 49	16 41	4 37	95	22 30.5	- 7 34	9.3
Sat Sep 26/Sun Sep 27	23 57	18 21	19 39	4 56	6 14	19 35	4 54	17 25	5 45	99	23 29.2	- 2 58	9.3
Sun Sep 27/Mon Sep 28	0 01	18 20	19 38	4 57	6 15	19 38	4 58	18 09	6 55	100	0 28.2	1 51	9.3
Mon Sep 28/Tue Sep 29	0 04	18 19	19 37	4 58	6 16	19 40	5 03	18 53	.....	98	1 27.4	6 31	9.4
Tue Sep 29/Wed Sep 30	0 08	18 17	19 35	4 58	6 16	19 43	5 08	19 38	.....	93	2 26.8	10 38	9.4
Wed Sep 30/Thu Oct 01	0 12	18 16	19 34	4 59	6 17	19 45	5 12	20 25	.....	85	3 26.1	13 57	9.4

\*\*\*\*\* 2015 OCTOBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twilight		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Oct 01/Fri Oct 02	0 16	18 15	19 33	5 00	6 18	19 48	5 17	21 14	.....	76	4 24.9	16 15	9.5
Fri Oct 02/Sat Oct 03	0 20	18 14	19 31	5 00	6 18	19 51	5 21	22 06	.....	66	5 22.6	17 28	9.5
Sat Oct 03/Sun Oct 04	0 24	18 12	19 30	5 01	6 19	19 53	5 26	22 59	.....	55	6 18.7	17 38	9.5
Sun Oct 04/Mon Oct 05	0 28	18 11	19 29	5 02	6 19	19 56	5 31	23 53	.....	45	7 12.7	16 50	9.6
Mon Oct 05/Tue Oct 06	0 32	18 10	19 27	5 02	6 20	19 59	5 35	0 48	.....	35	8 04.5	15 12	9.6
Tue Oct 06/Wed Oct 07	0 36	18 09	19 26	5 03	6 21	20 01	5 40	1 42	.....	26	8 54.0	12 53	9.6
Wed Oct 07/Thu Oct 08	0 40	18 07	19 25	5 04	6 21	20 04	5 45	2 35	.....	18	9 41.6	10 03	9.6
Thu Oct 08/Fri Oct 09	0 44	18 06	19 24	5 04	6 22	20 07	5 49	3 28	.....	11	10 27.7	6 49	9.7
Fri Oct 09/Sat Oct 10	0 48	18 05	19 22	5 05	6 23	20 10	5 54	4 20	16 26	6	11 12.8	3 20	9.7
Sat Oct 10/Sun Oct 11	0 52	18 04	19 21	5 06	6 24	20 12	5 58	5 12	16 59	2	11 57.3	- 0 17	9.7
Sun Oct 11/Mon Oct 12	0 56	18 02	19 20	5 06	6 24	20 15	6 03	6 04	17 32	0	12 41.8	- 3 54	9.8
Mon Oct 12/Tue Oct 13	1 00	18 01	19 19	5 07	6 25	20 18	6 08	6 57	18 05	0	13 26.7	- 7 24	9.8
Tue Oct 13/Wed Oct 14	1 04	18 00	19 18	5 08	6 26	20 21	6 12	.....	18 39	2	14 12.6	-10 39	9.8
Wed Oct 14/Thu Oct 15	1 08	17 59	19 17	5 08	6 26	20 23	6 17	.....	19 16	5	14 59.7	-13 31	9.9
Thu Oct 15/Fri Oct 16	1 11	17 58	19 16	5 09	6 27	20 26	6 21	.....	19 55	10	15 48.4	-15 51	9.9
Fri Oct 16/Sat Oct 17	1 15	17 57	19 14	5 10	6 28	20 29	6 26	.....	20 38	16	16 38.7	-17 32	9.9
Sat Oct 17/Sun Oct 18	1 19	17 55	19 13	5 10	6 29	20 32	6 31	.....	21 25	24	17 30.7	-18 26	10.0
Sun Oct 18/Mon Oct 19	1 23	17 54	19 12	5 11	6 29	20 35	6 35	.....	22 16	33	18 24.0	-18 28	10.0
Mon Oct 19/Tue Oct 20	1 27	17 53	19 11	5 12	6 30	20 38	6 40	.....	23 12	43	19 18.5	-17 34	10.0
Tue Oct 20/Wed Oct 21	1 31	17 52	19 10	5 13	6 31	20 41	6 45	.....	0 10	54	20 13.8	-15 41	10.0
Wed Oct 21/Thu Oct 22	1 35	17 51	19 09	5 13	6 32	20 43	6 49	.....	1 12	65	21 09.6	-12 54	10.1
Thu Oct 22/Fri Oct 23	1 39	17 50	19 08	5 14	6 32	20 46	6 54	.....	2 16	75	22 05.8	- 9 16	10.1
Fri Oct 23/Sat Oct 24	1 43	17 49	19 07	5 15	6 33	20 49	6 58	.....	3 22	85	23 02.5	- 5 00	10.1
Sat Oct 24/Sun Oct 25	1 47	17 48	19 06	5 15	6 34	20 52	7 03	.....	4 30	93	23 59.9	- 0 21	10.2
Sun Oct 25/Mon Oct 26	1 51	17 47	19 05	5 16	6 35	20 55	7 08	16 40	5 38	98	0 58.2	4 23	10.2
Mon Oct 26/Tue Oct 27	1 55	17 46	19 04	5 17	6 35	20 58	7 12	17 25	6 47	100	1 57.5	8 50	10.2
Tue Oct 27/Wed Oct 28	1 59	17 45	19 04	5 17	6 36	21 02	7 17	18 11	7 55	99	2 57.7	12 39	10.2
Wed Oct 28/Thu Oct 29	2 03	17 44	19 03	5 18	6 37	21 05	7 22	19 00	.....	95	3 58.4	15 31	10.3
Thu Oct 29/Fri Oct 30	2 07	17 43	19 02	5 19	6 38	21 08	7 26	19 52	.....	89	4 58.7	17 17	10.3
Fri Oct 30/Sat Oct 31	2 11	17 42	19 01	5 20	6 39	21 11	7 31	20 47	.....	81	5 57.8	17 54	10.3
Sat Oct 31/Sun Nov 01	2 15	17 41	19 00	5 20	6 39	21 14	7 36	21 42	.....	71	6 54.6	17 25	10.3

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 28, latitude (d.m) = 31 57.2  
 Rise/set times in Mountain time ( 7 hr W), for 500 m above surroundings, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2015 NOVEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sun Nov 01/Mon Nov 02	2 18	17 40	18 59	5 21	6 40	21 17	7 40	22 39	.....	61	7 48.9	16 00	10.4
Mon Nov 02/Tue Nov 03	2 22	17 39	18 59	5 22	6 41	21 20	7 45	23 34	.....	51	8 40.4	13 49	10.4
Tue Nov 03/Wed Nov 04	2 26	17 39	18 58	5 22	6 42	21 24	7 50	0 29	.....	42	9 29.4	11 02	10.4
Wed Nov 04/Thu Nov 05	2 30	17 38	18 57	5 23	6 43	21 27	7 54	1 22	.....	32	10 16.4	7 51	10.4
Thu Nov 05/Fri Nov 06	2 34	17 37	18 57	5 24	6 44	21 30	7 59	2 15	.....	24	11 01.9	4 23	10.5
Fri Nov 06/Sat Nov 07	2 38	17 36	18 56	5 25	6 44	21 33	8 04	3 07	.....	16	11 46.6	0 46	10.5
Sat Nov 07/Sun Nov 08	2 42	17 36	18 55	5 25	6 45	21 37	8 08	3 59	.....	10	12 31.1	- 2 54	10.5
Sun Nov 08/Mon Nov 09	2 46	17 35	18 55	5 26	6 46	21 40	8 13	4 51	16 06	5	13 16.0	- 6 28	10.5
Mon Nov 09/Tue Nov 10	2 50	17 34	18 54	5 27	6 47	21 43	8 18	5 44	16 40	2	14 01.7	- 9 49	10.5
Tue Nov 10/Wed Nov 11	2 54	17 33	18 54	5 28	6 48	21 47	8 22	6 38	17 16	0	14 48.7	-12 50	10.6
Wed Nov 11/Thu Nov 12	2 58	17 33	18 53	5 28	6 49	21 50	8 27	7 32	17 54	0	15 37.3	-15 21	10.6
Thu Nov 12/Fri Nov 13	3 02	17 32	18 53	5 29	6 50	21 54	8 32	.....	18 37	2	16 27.6	-17 13	10.6
Fri Nov 13/Sat Nov 14	3 06	17 32	18 52	5 30	6 50	21 57	8 37	.....	19 23	6	17 19.5	-18 20	10.6
Sat Nov 14/Sun Nov 15	3 10	17 31	18 52	5 31	6 51	22 01	8 41	.....	20 13	12	18 12.6	-18 35	10.6
Sun Nov 15/Mon Nov 16	3 14	17 30	18 51	5 31	6 52	22 04	8 46	.....	21 07	19	19 06.5	-17 55	10.7
Mon Nov 16/Tue Nov 17	3 18	17 30	18 51	5 32	6 53	22 08	8 51	.....	22 04	28	20 00.7	-16 18	10.7
Tue Nov 17/Wed Nov 18	3 22	17 29	18 50	5 33	6 54	22 11	8 55	.....	23 03	39	20 55.1	-13 47	10.7
Wed Nov 18/Thu Nov 19	3 26	17 29	18 50	5 34	6 55	22 15	9 00	.....	0 05	49	21 49.4	-10 29	10.7
Thu Nov 19/Fri Nov 20	3 29	17 29	18 50	5 34	6 56	22 18	9 05	.....	1 08	61	22 43.7	- 6 33	10.7
Fri Nov 20/Sat Nov 21	3 33	17 28	18 50	5 35	6 57	22 22	9 09	.....	2 12	72	23 38.5	- 2 09	10.8
Sat Nov 21/Sun Nov 22	3 37	17 28	18 49	5 36	6 57	22 26	9 14	.....	3 18	82	0 34.1	2 26	10.8
Sun Nov 22/Mon Nov 23	3 41	17 27	18 49	5 37	6 58	22 30	9 19	.....	4 24	90	1 31.0	6 56	10.8
Mon Nov 23/Tue Nov 24	3 45	17 27	18 49	5 37	6 59	22 33	9 23	15 59	5 32	96	2 29.4	11 02	10.8
Tue Nov 24/Wed Nov 25	3 49	17 27	18 49	5 38	7 00	22 37	9 28	16 46	6 38	99	3 29.3	14 23	10.8
Wed Nov 25/Thu Nov 26	3 53	17 27	18 49	5 39	7 01	22 41	9 33	17 36	7 43	100	4 30.1	16 45	10.8
Thu Nov 26/Fri Nov 27	3 57	17 26	18 48	5 40	7 02	22 45	9 38	18 30	.....	97	5 30.8	17 58	10.9
Fri Nov 27/Sat Nov 28	4 01	17 26	18 48	5 40	7 03	22 48	9 42	19 26	.....	92	6 30.2	17 59	10.9
Sat Nov 28/Sun Nov 29	4 05	17 26	18 48	5 41	7 03	22 52	9 47	20 24	.....	86	7 27.3	16 56	10.9
Sun Nov 29/Mon Nov 30	4 09	17 26	18 48	5 42	7 04	22 56	9 52	21 21	.....	78	8 21.6	14 59	10.9
Mon Nov 30/Tue Dec 01	4 13	17 26	18 48	5 43	7 05	23 00	9 56	22 18	.....	69	9 13.0	12 21	10.9

\*\*\*\*\* 2015 DECEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Tue Dec 01/Wed Dec 02	4 17	17 26	18 48	5 43	7 06	23 04	10 01	23 13	.....	59	10 01.9	9 12	10.9
Wed Dec 02/Thu Dec 03	4 21	17 26	18 48	5 44	7 07	23 08	10 06	0 06	.....	49	10 48.6	5 44	10.9
Thu Dec 03/Fri Dec 04	4 25	17 26	18 48	5 45	7 08	23 12	10 10	0 59	.....	40	11 34.1	2 05	10.9
Fri Dec 04/Sat Dec 05	4 29	17 26	18 48	5 45	7 08	23 16	10 15	1 51	.....	31	12 18.8	- 1 37	10.9
Sat Dec 05/Sun Dec 06	4 33	17 26	18 49	5 46	7 09	23 20	10 20	2 43	.....	23	13 03.5	- 5 15	11.0
Sun Dec 06/Mon Dec 07	4 36	17 26	18 49	5 47	7 10	23 24	10 24	3 36	.....	16	13 49.0	- 8 43	11.0
Mon Dec 07/Tue Dec 08	4 40	17 26	18 49	5 47	7 11	23 28	10 29	4 29	.....	9	14 35.6	-11 53	11.0
Tue Dec 08/Wed Dec 09	4 44	17 26	18 49	5 48	7 11	23 33	10 33	5 24	15 52	5	15 23.9	-14 37	11.0
Wed Dec 09/Thu Dec 10	4 48	17 26	18 49	5 49	7 12	23 37	10 38	6 19	16 33	1	16 14.1	-16 44	11.0
Thu Dec 10/Fri Dec 11	4 52	17 26	18 50	5 49	7 13	23 41	10 43	7 13	17 18	0	17 06.1	-18 08	11.0
Fri Dec 11/Sat Dec 12	4 56	17 26	18 50	5 50	7 14	23 45	10 47	8 06	18 07	1	17 59.6	-18 40	11.0
Sat Dec 12/Sun Dec 13	5 00	17 27	18 50	5 51	7 14	23 49	10 52	.....	19 01	4	18 54.1	-18 15	11.0
Sun Dec 13/Mon Dec 14	5 04	17 27	18 50	5 51	7 15	23 54	10 56	.....	19 58	9	19 49.0	-16 52	11.0
Mon Dec 14/Tue Dec 15	5 08	17 27	18 51	5 52	7 16	23 58	11 01	.....	20 58	16	20 43.7	-14 34	11.0
Tue Dec 15/Wed Dec 16	5 12	17 28	18 51	5 53	7 16	0 02	11 06	.....	21 59	24	21 37.9	-11 27	11.0
Wed Dec 16/Thu Dec 17	5 16	17 28	18 52	5 53	7 17	0 07	11 10	.....	23 01	34	22 31.6	- 7 41	11.0
Thu Dec 17/Fri Dec 18	5 20	17 28	18 52	5 54	7 17	0 11	11 15	.....	0 04	45	23 25.0	- 3 29	11.0
Fri Dec 18/Sat Dec 19	5 24	17 29	18 52	5 54	7 18	0 15	11 19	.....	1 07	57	0 18.6	0 58	11.0
Sat Dec 19/Sun Dec 20	5 28	17 29	18 53	5 55	7 18	0 20	11 24	.....	2 11	68	1 13.1	5 24	11.0
Sun Dec 20/Mon Dec 21	5 32	17 30	18 53	5 55	7 19	0 24	11 28	.....	3 16	78	2 08.8	9 32	11.0
Mon Dec 21/Tue Dec 22	5 36	17 30	18 54	5 56	7 19	0 29	11 32	.....	4 21	87	3 06.0	13 07	11.0
Tue Dec 22/Wed Dec 23	5 40	17 31	18 54	5 56	7 20	0 33	11 37	.....	5 25	94	4 04.8	15 53	11.0
Wed Dec 23/Thu Dec 24	5 44	17 31	18 55	5 57	7 20	0 37	11 41	16 16	6 26	98	5 04.4	17 37	11.0
Thu Dec 24/Fri Dec 25	5 47	17 32	18 55	5 57	7 21	0 42	11 46	17 10	7 24	100	6 04.0	18 13	11.0
Fri Dec 25/Sat Dec 26	5 51	17 32	18 56	5 58	7 21	0 46	11 50	18 07	8 16	99	7 02.5	17 41	11.0
Sat Dec 26/Sun Dec 27	5 55	17 33	18 56	5 58	7 22	0 51	11 54	19 05	.....	96	7 58.9	16 07	11.0
Sun Dec 27/Mon Dec 28	5 59	17 33	18 57	5 58	7 22	0 55	11 59	20 03	.....	91	8 52.6	13 44	11.0
Mon Dec 28/Tue Dec 29	6 03	17 34	18 58	5 59	7 22	1 00	12 03	21 00	.....	84	9 43.6	10 43	11.0
Tue Dec 29/Wed Dec 30	6 07	17 35	18 58	5 59	7 23	1 05	12 07	21 55	.....	76	10 32.2	7 18	11.0
Wed Dec 30/Thu Dec 31	6 11	17 35	18 59	5 59	7 23	1 09	12 12	22 49	.....	67	11 18.9	3 38	11.0
Thu Dec 31/Fri Jan 01	6 15	17 36	19 00	6 00	7 23	1 14	12 16	23 42	.....	58	12 04.4	- 0 07	11.0