

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:

***** 2019 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 0.0 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 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 2019, 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 07	0 22	Dec 15	4 50	Dec 22	10 50	Dec 29	2 37
Jan 05	18 30	Jan 13	23 46	Jan 20	22 17	Jan 27	14 12
Feb 04	14 05	Feb 12	15 27	Feb 19	8 54	Feb 26	4 30
Mar 06	9 05	Mar 14	3 27	Mar 20	18 43	Mar 27	21 11
Apr 05	1 52	Apr 12	12 06	Apr 19	4 12	Apr 26	15 19
May 04	15 47	May 11	18 13	May 18	14 12	May 26	9 35
Jun 03	3 03	Jun 09	23 01	Jun 17	1 31	Jun 25	2 48
Jul 02	12 17	Jul 09	3 57	Jul 16	14 40	Jul 24	18 20
Jul 31	20 13	Aug 07	10 33	Aug 15	5 31	Aug 23	7 59
Aug 30	3 38	Sep 05	20 12	Sep 13	21 35	Sep 21	19 44
Sep 28	11 28	Oct 05	9 48	Oct 13	14 11	Oct 21	5 42
Oct 27	20 40	Nov 04	3 24	Nov 12	6 37	Nov 19	14 13
Nov 26	8 08	Dec 03	23 59	Dec 11	22 15	Dec 18	21 59
Dec 25	22 16	Jan 02	21 47	Jan 10	12 23	Jan 17	6 01

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.

***** 2019 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	
Tue Jan 01/Wed Jan 02		6 20	17 37	19 00	6 00	7 23	1 20	12 21	4 18	.....	13	15 53.0	-15 52	11.0
Wed Jan 02/Thu Jan 03		6 24	17 38	19 01	6 00	7 24	1 24	12 25	5 15	.....	7	16 43.6	-18 41	11.0
Thu Jan 03/Fri Jan 04		6 28	17 39	19 02	6 01	7 24	1 29	12 30	6 10	16 01	3	17 34.9	-20 37	11.0
Fri Jan 04/Sat Jan 05		6 32	17 39	19 02	6 01	7 24	1 34	12 34	7 02	16 47	1	18 26.4	-21 36	11.0
Sat Jan 05/Sun Jan 06		6 36	17 40	19 03	6 01	7 24	1 38	12 38	7 51	17 36	0	19 17.8	-21 35	11.0
Sun Jan 06/Mon Jan 07		6 40	17 41	19 04	6 01	7 24	1 43	12 42	.....	18 28	1	20 08.3	-20 37	11.0
Mon Jan 07/Tue Jan 08		6 44	17 42	19 05	6 01	7 24	1 47	12 46	.....	19 21	4	20 57.6	-18 47	10.9
Tue Jan 08/Wed Jan 09		6 48	17 43	19 05	6 01	7 24	1 52	12 50	.....	20 14	9	21 45.4	-16 11	10.9
Wed Jan 09/Thu Jan 10		6 52	17 43	19 06	6 01	7 24	1 57	12 54	.....	21 08	15	22 31.8	-12 56	10.9
Thu Jan 10/Fri Jan 11		6 56	17 44	19 07	6 01	7 24	2 02	12 58	.....	22 01	22	23 17.2	- 9 11	10.9
Fri Jan 11/Sat Jan 12		6 59	17 45	19 08	6 01	7 24	2 06	13 02	.....	22 55	30	0 02.1	- 5 02	10.9
Sat Jan 12/Sun Jan 13		7 03	17 46	19 08	6 01	7 24	2 11	13 06	.....	23 49	39	0 47.2	- 0 38	10.9
Sun Jan 13/Mon Jan 14		7 07	17 47	19 09	6 01	7 24	2 16	13 10	.....	0 45	49	1 33.3	3 52	10.9
Mon Jan 14/Tue Jan 15		7 11	17 48	19 10	6 01	7 24	2 20	13 14	.....	1 42	59	2 21.3	8 21	10.9
Tue Jan 15/Wed Jan 16		7 15	17 49	19 11	6 01	7 23	2 25	13 18	.....	2 42	70	3 12.1	12 35	10.8
Wed Jan 16/Thu Jan 17		7 19	17 49	19 11	6 01	7 23	2 30	13 21	.....	3 45	79	4 06.5	16 19	10.8
Thu Jan 17/Fri Jan 18		7 23	17 50	19 12	6 01	7 23	2 35	13 25	.....	4 50	88	5 05.0	19 14	10.8
Fri Jan 18/Sat Jan 19		7 27	17 51	19 13	6 01	7 23	2 39	13 29	.....	5 56	94	6 07.3	20 59	10.8
Sat Jan 19/Sun Jan 20		7 31	17 52	19 14	6 01	7 22	2 44	13 33	16 23	6 58	99	7 12.3	21 17	10.8
Sun Jan 20/Mon Jan 21		7 35	17 53	19 15	6 00	7 22	2 49	13 36	17 29	7 56	100	8 18.0	19 59	10.8
Mon Jan 21/Tue Jan 22		7 39	17 54	19 15	6 00	7 22	2 53	13 40	18 39	.....	98	9 22.4	17 10	10.7
Tue Jan 22/Wed Jan 23		7 43	17 55	19 16	6 00	7 21	2 58	13 44	19 50	.....	93	10 23.9	13 10	10.7
Wed Jan 23/Thu Jan 24		7 47	17 56	19 17	6 00	7 21	3 03	13 47	21 00	.....	86	11 22.1	8 22	10.7
Thu Jan 24/Fri Jan 25		7 51	17 57	19 18	5 59	7 20	3 08	13 51	22 07	.....	77	12 17.3	3 12	10.7
Fri Jan 25/Sat Jan 26		7 55	17 58	19 19	5 59	7 20	3 12	13 55	23 11	.....	66	13 10.1	- 2 00	10.7
Sat Jan 26/Sun Jan 27		7 59	17 58	19 19	5 59	7 19	3 17	13 58	0 13	.....	56	14 01.4	- 6 55	10.7
Sun Jan 27/Mon Jan 28		8 03	17 59	19 20	5 58	7 19	3 22	14 02	1 14	.....	45	14 51.9	-11 22	10.6
Mon Jan 28/Tue Jan 29		8 07	18 00	19 21	5 58	7 18	3 27	14 05	2 13	.....	35	15 42.2	-15 09	10.6
Tue Jan 29/Wed Jan 30		8 10	18 01	19 22	5 57	7 18	3 31	14 09	3 10	.....	26	16 32.9	-18 10	10.6
Wed Jan 30/Thu Jan 31		8 14	18 02	19 23	5 57	7 17	3 36	14 12	4 06	.....	18	17 23.9	-20 18	10.6
Thu Jan 31/Fri Feb 01		8 18	18 03	19 23	5 56	7 16	3 41	14 16	4 58	.....	11	18 15.1	-21 29	10.6

***** 2019 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	
Fri Feb 01/Sat Feb 02		8 22	18 04	19 24	5 56	7 16	3 46	14 19	5 48	.....	6	19 06.2	-21 41	10.5
Sat Feb 02/Sun Feb 03		8 26	18 05	19 25	5 55	7 15	3 50	14 22	6 33	16 23	2	19 56.7	-20 57	10.5
Sun Feb 03/Mon Feb 04		8 30	18 06	19 26	5 55	7 14	3 55	14 26	7 15	17 15	0	20 46.1	-19 18	10.5
Mon Feb 04/Tue Feb 05		8 34	18 07	19 26	5 54	7 14	4 00	14 29	7 52	18 09	0	21 34.2	-16 52	10.5
Tue Feb 05/Wed Feb 06		8 38	18 08	19 27	5 53	7 13	4 05	14 32	.....	19 02	2	22 20.9	-13 46	10.4
Wed Feb 06/Thu Feb 07		8 42	18 08	19 28	5 53	7 12	4 09	14 36	.....	19 56	5	23 06.4	-10 07	10.4
Thu Feb 07/Fri Feb 08		8 46	18 09	19 29	5 52	7 11	4 14	14 39	.....	20 49	10	23 51.1	- 6 04	10.4
Fri Feb 08/Sat Feb 09		8 50	18 10	19 30	5 51	7 11	4 19	14 42	.....	21 43	16	0 35.6	- 1 46	10.4
Sat Feb 09/Sun Feb 10		8 54	18 11	19 30	5 51	7 10	4 23	14 45	.....	22 37	24	1 20.6	2 40	10.3
Sun Feb 10/Mon Feb 11		8 58	18 12	19 31	5 50	7 09	4 28	14 49	.....	23 33	33	2 06.8	7 04	10.3
Mon Feb 11/Tue Feb 12		9 02	18 13	19 32	5 49	7 08	4 33	14 52	.....	0 31	43	2 55.1	11 16	10.3
Tue Feb 12/Wed Feb 13		9 06	18 14	19 33	5 48	7 07	4 38	14 55	.....	1 30	53	3 46.2	15 04	10.3
Wed Feb 13/Thu Feb 14		9 10	18 15	19 33	5 48	7 06	4 42	14 58	.....	2 32	64	4 40.9	18 12	10.2
Thu Feb 14/Fri Feb 15		9 14	18 15	19 34	5 47	7 05	4 47	15 01	.....	3 35	74	5 39.4	20 23	10.2
Fri Feb 15/Sat Feb 16		9 17	18 16	19 35	5 46	7 04	4 52	15 04	.....	4 37	84	6 41.3	21 20	10.2
Sat Feb 16/Sun Feb 17		9 21	18 17	19 36	5 45	7 03	4 56	15 07	.....	5 37	92	7 45.4	20 48	10.2
Sun Feb 17/Mon Feb 18		9 25	18 18	19 36	5 44	7 02	5 01	15 10	16 11	6 31	97	8 49.9	18 43	10.1
Mon Feb 18/Tue Feb 19		9 29	18 19	19 37	5 43	7 01	5 06	15 13	17 22	7 20	100	9 53.2	15 14	10.1
Tue Feb 19/Wed Feb 20		9 33	18 20	19 38	5 42	7 00	5 10	15 16	18 34	.....	99	10 54.1	10 40	10.1
Wed Feb 20/Thu Feb 21		9 37	18 20	19 39	5 41	6 59	5 15	15 19	19 44	.....	96	11 52.4	5 26	10.0
Thu Feb 21/Fri Feb 22		9 41	18 21	19 39	5 40	6 58	5 20	15 22	20 52	.....	89	12 48.2	- 0 01	10.0
Fri Feb 22/Sat Feb 23		9 45	18 22	19 40	5 39	6 57	5 25	15 25	21 58	.....	81	13 42.2	- 5 19	10.0
Sat Feb 23/Sun Feb 24		9 49	18 23	19 41	5 38	6 56	5 29	15 28	23 02	.....	72	14 35.1	-10 09	10.0
Sun Feb 24/Mon Feb 25		9 53	18 24	19 42	5 37	6 55	5 34	15 31	0 04	.....	61	15 27.3	-14 19	9.9
Mon Feb 25/Tue Feb 26		9 57	18 24	19 42	5 36	6 54	5 39	15 34	1 03	.....	51	16 19.4	-17 39	9.9
Tue Feb 26/Wed Feb 27		10 01	18 25	19 43	5 35	6 53	5 43	15 37	2 00	.....	41	17 11.4	-20 03	9.9
Wed Feb 27/Thu Feb 28		10 05	18 26	19 44	5 34	6 52	5 48	15 40	2 54	.....	32	18 03.3	-21 29	9.8
Thu Feb 28/Fri Mar 01		10 09	18 27	19 45	5 33	6 50	5 53	15 42	3 45	.....	23	18 54.8	-21 54	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.
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***** 2019 MARCH *****

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 Mar 01/Sat Mar 02	10 13	18 28	19 45	5 32	6 49	5 57	15 45	4 32	.....	16	19 45.6	-21 21	9.8
Sat Mar 02/Sun Mar 03	10 17	18 28	19 46	5 30	6 48	6 02	15 48	5 14	.....	10	20 35.2	-19 52	9.7
Sun Mar 03/Mon Mar 04	10 21	18 29	19 47	5 29	6 47	6 07	15 51	5 53	.....	5	21 23.5	-17 35	9.7
Mon Mar 04/Tue Mar 05	10 25	18 30	19 48	5 28	6 46	6 11	15 54	6 28	16 57	2	22 10.4	-14 36	9.7
Tue Mar 05/Wed Mar 06	10 28	18 31	19 48	5 27	6 45	6 16	15 56	7 01	17 51	0	22 56.2	-11 02	9.6
Wed Mar 06/Thu Mar 07	10 32	18 31	19 49	5 26	6 43	6 21	15 59	7 33	18 45	0	23 41.2	- 7 02	9.6
Thu Mar 07/Fri Mar 08	10 36	18 32	19 50	5 25	6 42	6 25	16 02	.....	19 39	2	0 25.7	- 2 44	9.6
Fri Mar 08/Sat Mar 09	10 40	18 33	19 51	5 23	6 41	6 30	16 04	.....	20 33	6	1 10.5	1 43	9.5
Sat Mar 09/Sun Mar 10	10 44	18 34	19 51	5 22	6 40	6 35	16 07	.....	21 28	12	1 56.2	6 09	9.5
Sun Mar 10/Mon Mar 11	10 48	18 34	19 52	5 21	6 38	6 39	16 10	.....	22 25	19	2 43.4	10 23	9.5
Mon Mar 11/Tue Mar 12	10 52	18 35	19 53	5 20	6 37	6 44	16 13	.....	23 23	27	3 32.9	14 15	9.4
Tue Mar 12/Wed Mar 13	10 56	18 36	19 53	5 18	6 36	6 49	16 15	.....	0 23	37	4 25.3	17 31	9.4
Wed Mar 13/Thu Mar 14	11 00	18 36	19 54	5 17	6 35	6 54	16 18	.....	1 24	48	5 20.8	19 55	9.4
Thu Mar 14/Fri Mar 15	11 04	18 37	19 55	5 16	6 33	6 58	16 20	.....	2 25	59	6 19.3	21 14	9.3
Fri Mar 15/Sat Mar 16	11 08	18 38	19 56	5 14	6 32	7 03	16 23	.....	3 23	70	7 20.2	21 14	9.3
Sat Mar 16/Sun Mar 17	11 12	18 39	19 56	5 13	6 31	7 08	16 26	.....	4 18	80	8 22.2	19 49	9.3
Sun Mar 17/Mon Mar 18	11 16	18 39	19 57	5 12	6 30	7 12	16 28	.....	5 07	89	9 24.2	16 58	9.2
Mon Mar 18/Tue Mar 19	11 20	18 40	19 58	5 10	6 28	7 17	16 31	.....	5 53	95	10 24.9	12 54	9.2
Tue Mar 19/Wed Mar 20	11 24	18 41	19 59	5 09	6 27	7 22	16 34	.....	6 35	99	11 23.9	7 56	9.2
Wed Mar 20/Thu Mar 21	11 28	18 41	19 59	5 08	6 26	7 26	16 36	.....	7 14	100	12 21.0	2 27	9.1
Thu Mar 21/Fri Mar 22	11 32	18 42	20 00	5 06	6 24	7 31	16 39	.....	19 36	98	13 16.7	- 3 06	9.1
Fri Mar 22/Sat Mar 23	11 35	18 43	20 01	5 05	6 23	7 36	16 41	.....	20 42	93	14 11.5	- 8 22	9.1
Sat Mar 23/Sun Mar 24	11 39	18 43	20 02	5 04	6 22	7 41	16 44	.....	21 47	86	15 05.8	-13 02	9.0
Sun Mar 24/Mon Mar 25	11 43	18 44	20 03	5 02	6 21	7 45	16 46	.....	22 50	77	16 00.0	-16 52	9.0
Mon Mar 25/Tue Mar 26	11 47	18 45	20 03	5 01	6 19	7 50	16 49	.....	23 50	68	16 53.9	-19 43	9.0
Tue Mar 26/Wed Mar 27	11 51	18 45	20 04	4 59	6 18	7 55	16 51	.....	0 47	58	17 47.6	-21 30	8.9
Wed Mar 27/Thu Mar 28	11 55	18 46	20 05	4 58	6 17	7 59	16 54	.....	1 40	48	18 40.5	-22 13	8.9
Thu Mar 28/Fri Mar 29	11 59	18 47	20 06	4 57	6 16	8 04	16 57	.....	2 29	39	19 32.4	-21 54	8.8
Fri Mar 29/Sat Mar 30	12 03	18 47	20 07	4 55	6 14	8 09	16 59	.....	3 13	30	20 22.9	-20 38	8.8
Sat Mar 30/Sun Mar 31	12 07	18 48	20 07	4 54	6 13	8 14	17 02	.....	3 53	22	21 11.8	-18 30	8.8
Sun Mar 31/Mon Apr 01	12 11	18 49	20 08	4 52	6 12	8 18	17 04	.....	4 29	15	21 59.2	-15 38	8.7

***** 2019 APRIL *****

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 Apr 01/Tue Apr 02	12 15	18 49	20 09	4 51	6 10	8 23	17 07	5 03	.....	9	22 45.2	-12 09	8.7
Tue Apr 02/Wed Apr 03	12 19	18 50	20 10	4 50	6 09	8 28	17 09	5 35	.....	4	23 30.4	- 8 11	8.7
Wed Apr 03/Thu Apr 04	12 23	18 51	20 11	4 48	6 08	8 33	17 12	6 06	17 32	1	0 15.1	- 3 53	8.6
Thu Apr 04/Fri Apr 05	12 27	18 52	20 11	4 47	6 07	8 38	17 14	6 36	18 27	0	1 00.0	0 36	8.6
Fri Apr 05/Sat Apr 06	12 31	18 52	20 12	4 45	6 05	8 42	17 17	.....	19 23	1	1 45.7	5 08	8.6
Sat Apr 06/Sun Apr 07	12 35	18 53	20 13	4 44	6 04	8 47	17 19	.....	20 20	4	2 32.8	9 30	8.5
Sun Apr 07/Mon Apr 08	12 39	18 54	20 14	4 42	6 03	8 52	17 22	.....	21 18	8	3 22.0	13 31	8.5
Mon Apr 08/Tue Apr 09	12 42	18 54	20 15	4 41	6 02	8 57	17 24	.....	22 18	15	4 13.6	16 57	8.4
Tue Apr 09/Wed Apr 10	12 46	18 55	20 16	4 40	6 00	9 02	17 27	.....	23 19	23	5 08.0	19 35	8.4
Wed Apr 10/Thu Apr 11	12 50	18 56	20 17	4 38	5 59	9 06	17 29	.....	0 19	33	6 05.0	21 10	8.4
Thu Apr 11/Fri Apr 12	12 54	18 56	20 17	4 37	5 58	9 11	17 32	.....	1 17	44	7 03.9	21 30	8.3
Fri Apr 12/Sat Apr 13	12 58	18 57	20 18	4 35	5 57	9 16	17 34	.....	2 12	55	8 03.9	20 30	8.3
Sat Apr 13/Sun Apr 14	13 02	18 58	20 19	4 34	5 56	9 21	17 37	.....	3 01	66	9 03.7	18 08	8.2
Sun Apr 14/Mon Apr 15	13 06	18 58	20 20	4 33	5 54	9 26	17 40	.....	3 47	77	10 02.6	14 34	8.2
Mon Apr 15/Tue Apr 16	13 10	18 59	20 21	4 31	5 53	9 31	17 42	.....	4 28	86	11 00.2	10 01	8.2
Tue Apr 16/Wed Apr 17	13 14	19 00	20 22	4 30	5 52	9 35	17 45	.....	5 07	93	11 56.3	4 48	8.1
Wed Apr 17/Thu Apr 18	13 18	19 00	20 23	4 29	5 51	9 40	17 47	.....	5 45	98	12 51.5	- 0 44	8.1
Thu Apr 18/Fri Apr 19	13 22	19 01	20 24	4 27	5 50	9 45	17 50	.....	6 22	100	13 46.3	- 6 13	8.1
Fri Apr 19/Sat Apr 20	13 26	19 02	20 25	4 26	5 49	9 50	17 52	.....	19 26	99	14 41.0	-11 16	8.0
Sat Apr 20/Sun Apr 21	13 30	19 03	20 26	4 24	5 48	9 55	17 55	.....	20 31	95	15 36.1	-15 37	8.0
Sun Apr 21/Mon Apr 22	13 34	19 03	20 27	4 23	5 46	10 00	17 58	.....	21 34	90	16 31.4	-19 01	7.9
Mon Apr 22/Tue Apr 23	13 38	19 04	20 28	4 22	5 45	10 05	18 00	.....	22 34	83	17 26.8	-21 20	7.9
Tue Apr 23/Wed Apr 24	13 42	19 05	20 29	4 20	5 44	10 10	18 03	.....	23 31	74	18 21.7	-22 29	7.9
Wed Apr 24/Thu Apr 25	13 46	19 05	20 30	4 19	5 43	10 15	18 05	.....	0 22	65	19 15.5	-22 32	7.8
Thu Apr 25/Fri Apr 26	13 50	19 06	20 31	4 18	5 42	10 19	18 08	.....	1 09	56	20 07.6	-21 31	7.8
Fri Apr 26/Sat Apr 27	13 53	19 07	20 31	4 17	5 41	10 24	18 11	.....	1 51	46	20 57.7	-19 36	7.8
Sat Apr 27/Sun Apr 28	13 57	19 08	20 32	4 15	5 40	10 29	18 13	.....	2 29	37	21 46.0	-16 53	7.7
Sun Apr 28/Mon Apr 29	14 01	19 08	20 33	4 14	5 39	10 34	18 16	.....	3 03	28	22 32.6	-13 31	7.7
Mon Apr 29/Tue Apr 30	14 05	19 09	20 34	4 13	5 38	10 39	18 19	.....	3 36	20	23 18.0	- 9 39	7.6
Tue Apr 30/Wed May 01	14 09	19 10	20 35	4 11	5 37	10 44	18 21	.....	4 06	13	0 02.8	- 5 23	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.

***** 2019 MAY *****

Date (eve/morn)	LMST midn	----- Sun: -----		LST twilight:		----- Moon: -----				Twi-Twi			
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Wed May 01/Thu May 02	14 13	19 10	20 36	4 10	5 36	10 49	18 24	4 37	.....	7	0 47.6	- 0 53	7.6
Thu May 02/Fri May 03	14 17	19 11	20 37	4 09	5 35	10 54	18 27	5 09	.....	3	1 33.2	3 43	7.5
Fri May 03/Sat May 04	14 21	19 12	20 38	4 08	5 34	10 59	18 30	5 42	18 11	1	2 20.1	8 14	7.5
Sat May 04/Sun May 05	14 25	19 13	20 39	4 07	5 34	11 04	18 32	6 18	19 10	0	3 09.2	12 28	7.5
Sun May 05/Mon May 06	14 29	19 13	20 40	4 06	5 33	11 09	18 35	.....	20 10	2	4 00.8	16 10	7.4
Mon May 06/Tue May 07	14 33	19 14	20 41	4 04	5 32	11 14	18 38	.....	21 12	6	4 55.2	19 05	7.4
Tue May 07/Wed May 08	14 37	19 15	20 42	4 03	5 31	11 19	18 41	.....	22 14	12	5 52.2	20 58	7.3
Wed May 08/Thu May 09	14 41	19 15	20 43	4 02	5 30	11 24	18 44	.....	23 14	20	6 51.0	21 38	7.3
Thu May 09/Fri May 10	14 45	19 16	20 44	4 01	5 29	11 29	18 46	.....	0 10	30	7 50.6	20 56	7.3
Fri May 10/Sat May 11	14 49	19 17	20 45	4 00	5 29	11 34	18 49	.....	1 00	41	8 49.8	18 55	7.2
Sat May 11/Sun May 12	14 53	19 18	20 46	3 59	5 28	11 38	18 52	.....	1 46	52	9 47.8	15 41	7.2
Sun May 12/Mon May 13	14 57	19 18	20 47	3 58	5 27	11 43	18 55	.....	2 27	64	10 44.1	11 28	7.2
Mon May 13/Tue May 14	15 00	19 19	20 48	3 57	5 26	11 48	18 58	.....	3 06	74	11 38.8	6 32	7.1
Tue May 14/Wed May 15	15 04	19 20	20 49	3 56	5 26	11 53	19 01	.....	3 42	84	12 32.4	1 12	7.1
Wed May 15/Thu May 16	15 08	19 20	20 50	3 55	5 25	11 58	19 04	.....	4 19	91	13 25.6	- 4 14	7.1
Thu May 16/Fri May 17	15 12	19 21	20 51	3 54	5 24	12 03	19 07	.....	4 56	97	14 19.1	- 9 25	7.0
Fri May 17/Sat May 18	15 16	19 22	20 52	3 53	5 24	12 08	19 10	.....	5 35	99	15 13.2	-14 05	7.0
Sat May 18/Sun May 19	15 20	19 22	20 53	3 52	5 23	12 13	19 13	.....	6 17	100	16 08.3	-17 56	7.0
Sun May 19/Mon May 20	15 24	19 23	20 54	3 51	5 23	12 18	19 16	.....	.....	98	17 04.0	-20 46	7.0
Mon May 20/Tue May 21	15 28	19 24	20 55	3 51	5 22	12 23	19 19	.....	.....	93	18 00.0	-22 27	6.9
Tue May 21/Wed May 22	15 32	19 24	20 56	3 50	5 21	12 28	19 22	.....	.....	87	18 55.3	-22 58	6.9
Wed May 22/Thu May 23	15 36	19 25	20 57	3 49	5 21	12 33	19 26	.....	.....	80	19 49.2	-22 20	6.9
Thu May 23/Fri May 24	15 40	19 26	20 58	3 48	5 20	12 37	19 29	.....	.....	72	20 41.0	-20 42	6.8
Fri May 24/Sat May 25	15 44	19 26	20 59	3 48	5 20	12 42	19 32	.....	.....	63	21 30.6	-18 11	6.8
Sat May 25/Sun May 26	15 48	19 27	21 00	3 47	5 20	12 47	19 35	.....	.....	53	22 18.2	-14 59	6.8
Sun May 26/Mon May 27	15 52	19 28	21 01	3 46	5 19	12 52	19 39	.....	.....	44	23 04.1	-11 14	6.8
Mon May 27/Tue May 28	15 56	19 28	21 02	3 46	5 19	12 57	19 42	.....	.....	35	23 49.0	- 7 03	6.7
Tue May 28/Wed May 29	16 00	19 29	21 02	3 45	5 18	13 02	19 45	.....	.....	26	0 33.6	- 2 36	6.7
Wed May 29/Thu May 30	16 04	19 30	21 03	3 44	5 18	13 06	19 49	.....	.....	18	1 18.7	2 01	6.7
Thu May 30/Fri May 31	16 08	19 30	21 04	3 44	5 18	13 11	19 52	.....	.....	11	2 05.0	6 36	6.7
Fri May 31/Sat Jun 01	16 11	19 31	21 05	3 43	5 18	13 16	19 56	.....	.....	5	2 53.4	11 00	6.6

***** 2019 JUNE *****

Date (eve/morn)	LMST midn	----- Sun: -----		LST twilight:		----- Moon: -----				Twi-Twi			
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sat Jun 01/Sun Jun 02	16 15	19 31	21 06	3 43	5 17	13 21	19 59	4 53	17 57	2	3 44.4	14 57	6.6
Sun Jun 02/Mon Jun 03	16 19	19 32	21 06	3 43	5 17	13 25	20 03	5 38	18 59	0	4 38.6	18 13	6.6
Mon Jun 03/Tue Jun 04	16 23	19 32	21 07	3 42	5 17	13 30	20 06	6 28	20 03	1	5 35.8	20 31	6.6
Tue Jun 04/Wed Jun 05	16 27	19 33	21 08	3 42	5 17	13 35	20 10	.....	21 05	4	6 35.3	21 35	6.6
Wed Jun 05/Thu Jun 06	16 31	19 33	21 09	3 41	5 17	13 39	20 13	.....	22 04	10	7 35.9	21 16	6.5
Thu Jun 06/Fri Jun 07	16 35	19 34	21 09	3 41	5 16	13 44	20 17	.....	22 58	18	8 36.2	19 33	6.5
Fri Jun 07/Sat Jun 08	16 39	19 34	21 10	3 41	5 16	13 48	20 21	.....	23 46	28	9 35.0	16 35	6.5
Sat Jun 08/Sun Jun 09	16 43	19 35	21 10	3 41	5 16	13 53	20 24	.....	0 29	39	10 31.6	12 34	6.5
Sun Jun 09/Mon Jun 10	16 47	19 35	21 11	3 41	5 16	13 58	20 28	.....	1 08	50	11 26.1	7 49	6.5
Mon Jun 10/Tue Jun 11	16 51	19 36	21 12	3 40	5 16	14 02	20 32	.....	1 44	61	12 19.0	2 38	6.5
Tue Jun 11/Wed Jun 12	16 55	19 36	21 12	3 40	5 16	14 07	20 36	.....	2 20	72	13 11.0	- 2 42	6.5
Wed Jun 12/Thu Jun 13	16 59	19 37	21 13	3 40	5 16	14 11	20 40	.....	2 55	82	14 02.9	- 7 53	6.5
Thu Jun 13/Fri Jun 14	17 03	19 37	21 13	3 40	5 16	14 15	20 43	.....	3 32	89	14 55.4	-12 39	6.4
Fri Jun 14/Sat Jun 15	17 07	19 37	21 14	3 40	5 16	14 20	20 47	.....	4 12	95	15 49.0	-16 45	6.4
Sat Jun 15/Sun Jun 16	17 11	19 38	21 14	3 40	5 16	14 24	20 51	.....	4 55	99	16 43.7	-19 57	6.4
Sun Jun 16/Mon Jun 17	17 15	19 38	21 14	3 40	5 16	14 28	20 55	.....	5 42	100	17 39.3	-22 05	6.4
Mon Jun 17/Tue Jun 18	17 18	19 38	21 15	3 40	5 17	14 33	20 59	.....	.....	99	18 34.9	-23 03	6.4
Tue Jun 18/Wed Jun 19	17 22	19 39	21 15	3 40	5 17	14 37	21 03	.....	.....	96	19 29.7	-22 51	6.4
Wed Jun 19/Thu Jun 20	17 26	19 39	21 15	3 41	5 17	14 41	21 08	.....	.....	91	20 22.9	-21 34	6.4
Thu Jun 20/Fri Jun 21	17 30	19 39	21 16	3 41	5 17	14 45	21 12	.....	.....	85	21 13.9	-19 20	6.4
Fri Jun 21/Sat Jun 22	17 34	19 39	21 16	3 41	5 17	14 50	21 16	.....	.....	78	22 02.7	-16 20	6.4
Sat Jun 22/Sun Jun 23	17 38	19 40	21 16	3 41	5 18	14 54	21 20	.....	.....	69	22 49.4	-12 42	6.4
Sun Jun 23/Mon Jun 24	17 42	19 40	21 16	3 42	5 18	14 58	21 24	.....	.....	60	23 34.7	- 8 38	6.4
Mon Jun 24/Tue Jun 25	17 46	19 40	21 16	3 42	5 18	15 02	21 29	.....	.....	51	0 19.2	- 4 16	6.4
Tue Jun 25/Wed Jun 26	17 50	19 40	21 16	3 42	5 18	15 06	21 33	.....	.....	41	1 03.7	0 17	6.4
Wed Jun 26/Thu Jun 27	17 54	19 40	21 16	3 43	5 19	15 10	21 37	.....	.....	32	1 49.0	4 53	6.4
Thu Jun 27/Fri Jun 28	17 58	19 40	21 16	3 43	5 19	15 14	21 42	.....	.....	23	2 36.1	9 20	6.4
Fri Jun 28/Sat Jun 29	18 02	19 40	21 16	3 43	5 20	15 18	21 46	.....	.....	15	3 25.8	13 28	6.5
Sat Jun 29/Sun Jun 30	18 06	19 40	21 16	3 44	5 20	15 22	21 50	.....	.....	8	4 18.7	17 02	6.5
Sun Jun 30/Mon Jul 01	18 10	19 40	21 16	3 44	5 20	15 25	21 55	.....	.....	3	5 14.9	19 44	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.

***** 2019 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	
Mon Jul 01/Tue Jul 02		18 14	19 40	21 16	3 45	5 21	15 29	21 59	5 11	18 49	0	6 14.3	21 18	6.5
Tue Jul 02/Wed Jul 03		18 18	19 40	21 16	3 46	5 21	15 33	22 04	6 13	19 51	0	7 15.7	21 29	6.5
Wed Jul 03/Thu Jul 04		18 22	19 40	21 16	3 46	5 22	15 37	22 08	.....	20 49	3	8 17.6	20 13	6.5
Thu Jul 04/Fri Jul 05		18 26	19 40	21 15	3 47	5 22	15 40	22 13	.....	21 41	8	9 18.3	17 33	6.5
Fri Jul 05/Sat Jul 06		18 29	19 40	21 15	3 47	5 23	15 44	22 17	.....	22 27	16	10 16.8	13 43	6.5
Sat Jul 06/Sun Jul 07		18 33	19 40	21 15	3 48	5 23	15 48	22 22	.....	23 08	26	11 12.9	9 03	6.6
Sun Jul 07/Mon Jul 08		18 37	19 40	21 14	3 49	5 24	15 51	22 27	.....	23 46	36	12 06.7	3 54	6.6
Mon Jul 08/Tue Jul 09		18 41	19 39	21 14	3 49	5 24	15 55	22 31	.....	0 22	48	12 58.9	- 1 26	6.6
Tue Jul 09/Wed Jul 10		18 45	19 39	21 14	3 50	5 25	15 58	22 36	.....	0 57	59	13 50.5	- 6 39	6.6
Wed Jul 10/Thu Jul 11		18 49	19 39	21 13	3 51	5 25	16 02	22 41	.....	1 33	69	14 42.1	-11 29	6.6
Thu Jul 11/Fri Jul 12		18 53	19 39	21 13	3 52	5 26	16 05	22 45	.....	2 12	79	15 34.5	-15 43	6.6
Fri Jul 12/Sat Jul 13		18 57	19 38	21 12	3 52	5 26	16 09	22 50	.....	2 53	87	16 27.9	-19 08	6.7
Sat Jul 13/Sun Jul 14		19 01	19 38	21 12	3 53	5 27	16 12	22 55	.....	3 38	93	17 22.3	-21 34	6.7
Sun Jul 14/Mon Jul 15		19 05	19 38	21 11	3 54	5 27	16 16	23 00	17 55	4 26	97	18 17.2	-22 53	6.7
Mon Jul 15/Tue Jul 16		19 09	19 37	21 10	3 55	5 28	16 19	23 04	18 48	5 18	100	19 11.9	-23 04	6.7
Tue Jul 16/Wed Jul 17		19 13	19 37	21 10	3 56	5 29	16 22	23 09	19 37	6 12	100	20 05.5	-22 08	6.8
Wed Jul 17/Thu Jul 18		19 17	19 36	21 09	3 57	5 29	16 25	23 14	20 21	.....	98	20 57.4	-20 11	6.8
Thu Jul 18/Fri Jul 19		19 21	19 36	21 08	3 57	5 30	16 29	23 19	21 00	.....	95	21 47.1	-17 24	6.8
Fri Jul 19/Sat Jul 20		19 25	19 35	21 08	3 58	5 30	16 32	23 24	21 35	.....	89	22 34.7	-13 56	6.8
Sat Jul 20/Sun Jul 21		19 29	19 35	21 07	3 59	5 31	16 35	23 28	22 08	.....	83	23 20.6	- 9 59	6.9
Sun Jul 21/Mon Jul 22		19 33	19 34	21 06	4 00	5 32	16 38	23 33	22 38	.....	75	0 05.3	- 5 40	6.9
Mon Jul 22/Tue Jul 23		19 36	19 34	21 05	4 01	5 32	16 41	23 38	23 08	.....	66	0 49.6	- 1 10	6.9
Tue Jul 23/Wed Jul 24		19 40	19 33	21 04	4 02	5 33	16 44	23 43	23 38	.....	57	1 34.2	3 24	7.0
Wed Jul 24/Thu Jul 25		19 44	19 33	21 03	4 03	5 34	16 47	23 48	0 09	.....	47	2 20.0	7 52	7.0
Thu Jul 25/Fri Jul 26		19 48	19 32	21 03	4 04	5 34	16 50	23 53	0 43	.....	37	3 08.0	12 05	7.0
Fri Jul 26/Sat Jul 27		19 52	19 31	21 02	4 05	5 35	16 53	23 58	1 20	.....	27	3 58.7	15 49	7.0
Sat Jul 27/Sun Jul 28		19 56	19 31	21 01	4 06	5 36	16 56	0 02	2 04	.....	18	4 52.9	18 50	7.1
Sun Jul 28/Mon Jul 29		20 00	19 30	21 00	4 07	5 36	16 59	0 07	2 55	.....	11	5 50.6	20 51	7.1
Mon Jul 29/Tue Jul 30		20 04	19 29	20 59	4 07	5 37	17 02	0 12	3 53	17 33	5	6 51.2	21 36	7.1
Tue Jul 30/Wed Jul 31		20 08	19 29	20 58	4 08	5 38	17 05	0 17	4 58	18 33	1	7 53.4	20 53	7.2
Wed Jul 31/Thu Aug 01		20 12	19 28	20 57	4 09	5 38	17 08	0 22	6 08	19 28	0	8 55.5	18 42	7.2

***** 2019 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	
Thu Aug 01/Fri Aug 02		20 16	19 27	20 56	4 10	5 39	17 11	0 27	.....	20 18	2	9 56.2	15 12	7.2
Fri Aug 02/Sat Aug 03		20 20	19 26	20 54	4 11	5 40	17 14	0 32	.....	21 03	7	10 54.5	10 40	7.3
Sat Aug 03/Sun Aug 04		20 24	19 25	20 53	4 12	5 40	17 17	0 37	.....	21 44	14	11 50.4	5 29	7.3
Sun Aug 04/Mon Aug 05		20 28	19 25	20 52	4 13	5 41	17 19	0 42	.....	22 21	23	12 44.4	0 02	7.3
Mon Aug 05/Tue Aug 06		20 32	19 24	20 51	4 14	5 42	17 22	0 46	.....	22 58	34	13 37.0	- 5 21	7.4
Tue Aug 06/Wed Aug 07		20 36	19 23	20 50	4 15	5 42	17 25	0 51	.....	23 34	45	14 29.2	-10 22	7.4
Wed Aug 07/Thu Aug 08		20 40	19 22	20 49	4 16	5 43	17 28	0 56	.....	0 12	56	15 21.6	-14 47	7.5
Thu Aug 08/Fri Aug 09		20 43	19 21	20 47	4 17	5 44	17 30	1 01	.....	0 52	66	16 14.6	-18 24	7.5
Fri Aug 09/Sat Aug 10		20 47	19 20	20 46	4 18	5 44	17 33	1 06	.....	1 36	75	17 08.3	-21 03	7.5
Sat Aug 10/Sun Aug 11		20 51	19 19	20 45	4 19	5 45	17 36	1 11	.....	2 23	84	18 02.6	-22 38	7.6
Sun Aug 11/Mon Aug 12		20 55	19 18	20 44	4 20	5 46	17 39	1 16	.....	3 14	90	18 56.8	-23 06	7.6
Mon Aug 12/Tue Aug 13		20 59	19 17	20 42	4 21	5 46	17 41	1 21	17 34	4 07	95	19 50.2	-22 28	7.6
Tue Aug 13/Wed Aug 14		21 03	19 16	20 41	4 22	5 47	17 44	1 26	18 19	5 01	99	20 42.2	-20 48	7.7
Wed Aug 14/Thu Aug 15		21 07	19 15	20 40	4 23	5 47	17 46	1 30	18 59	5 56	100	21 32.4	-18 14	7.7
Thu Aug 15/Fri Aug 16		21 11	19 14	20 39	4 23	5 48	17 49	1 35	19 36	.....	99	22 20.6	-14 56	7.7
Fri Aug 16/Sat Aug 17		21 15	19 13	20 37	4 24	5 49	17 52	1 40	20 09	.....	97	23 07.1	-11 05	7.8
Sat Aug 17/Sun Aug 18		21 19	19 12	20 36	4 25	5 49	17 54	1 45	20 40	.....	93	23 52.2	- 6 49	7.8
Sun Aug 18/Mon Aug 19		21 23	19 11	20 35	4 26	5 50	17 57	1 50	21 10	.....	87	0 36.7	- 2 19	7.9
Mon Aug 19/Tue Aug 20		21 27	19 10	20 33	4 27	5 51	18 00	1 55	21 39	.....	80	1 21.1	2 15	7.9
Tue Aug 20/Wed Aug 21		21 31	19 08	20 32	4 28	5 51	18 02	2 00	22 09	.....	72	2 06.2	6 46	7.9
Wed Aug 21/Thu Aug 22		21 35	19 07	20 30	4 29	5 52	18 05	2 04	22 41	.....	63	2 52.9	11 02	8.0
Thu Aug 22/Fri Aug 23		21 39	19 06	20 29	4 30	5 53	18 07	2 09	23 16	.....	53	3 41.9	14 53	8.0
Fri Aug 23/Sat Aug 24		21 43	19 05	20 28	4 31	5 53	18 10	2 14	23 56	.....	42	4 33.9	18 07	8.0
Sat Aug 24/Sun Aug 25		21 47	19 04	20 26	4 31	5 54	18 12	2 19	0 42	.....	32	5 29.1	20 27	8.1
Sun Aug 25/Mon Aug 26		21 51	19 03	20 25	4 32	5 55	18 15	2 24	1 35	.....	22	6 27.4	21 39	8.1
Mon Aug 26/Tue Aug 27		21 54	19 01	20 23	4 33	5 55	18 17	2 28	2 36	.....	14	7 28.1	21 31	8.2
Tue Aug 27/Wed Aug 28		21 58	19 00	20 22	4 34	5 56	18 20	2 33	3 43	17 12	7	8 29.7	19 55	8.2
Wed Aug 28/Thu Aug 29		22 02	18 59	20 21	4 35	5 56	18 22	2 38	4 54	18 05	2	9 31.0	16 54	8.2
Thu Aug 29/Fri Aug 30		22 06	18 58	20 19	4 36	5 57	18 25	2 43	6 05	18 52	0	10 30.7	12 41	8.3
Fri Aug 30/Sat Aug 31		22 10	18 57	20 18	4 36	5 58	18 27	2 47	.....	19 35	1	11 28.5	7 37	8.3
Sat Aug 31/Sun Sep 01		22 14	18 55	20 16	4 37	5 58	18 30	2 52	.....	20 15	5	12 24.3	2 04	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.

***** 2019 SEPTEMBER *****

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 Sep 01/Mon Sep 02	22 18	18 54	20 15	4 38	5 59	18 32	2 57	.....	20 53	12	13 18.8	- 3 33	8.4
Mon Sep 02/Tue Sep 03	22 22	18 53	20 13	4 39	6 00	18 35	3 02	.....	21 31	20	14 12.5	- 8 53	8.4
Tue Sep 03/Wed Sep 04	22 26	18 52	20 12	4 40	6 00	18 37	3 06	.....	22 09	30	15 06.1	-13 38	8.5
Wed Sep 04/Thu Sep 05	22 30	18 50	20 11	4 40	6 01	18 40	3 11	.....	22 50	40	15 59.9	-17 34	8.5
Thu Sep 05/Fri Sep 06	22 34	18 49	20 09	4 41	6 01	18 42	3 16	.....	23 33	51	16 54.1	-20 32	8.5
Fri Sep 06/Sat Sep 07	22 38	18 48	20 08	4 42	6 02	18 45	3 21	.....	0 20	61	17 48.6	-22 24	8.6
Sat Sep 07/Sun Sep 08	22 42	18 46	20 06	4 43	6 03	18 47	3 25	.....	1 10	71	18 42.8	-23 08	8.6
Sun Sep 08/Mon Sep 09	22 46	18 45	20 05	4 44	6 03	18 50	3 30	.....	2 02	79	19 36.3	-22 46	8.6
Mon Sep 09/Tue Sep 10	22 50	18 44	20 03	4 44	6 04	18 52	3 35	.....	2 56	86	20 28.4	-21 20	8.7
Tue Sep 10/Wed Sep 11	22 54	18 42	20 02	4 45	6 04	18 55	3 39	17 00	3 51	92	21 18.7	-18 59	8.7
Wed Sep 11/Thu Sep 12	22 58	18 41	20 00	4 46	6 05	18 57	3 44	17 37	4 45	97	22 07.2	-15 51	8.8
Thu Sep 12/Fri Sep 13	23 01	18 40	19 59	4 47	6 06	19 00	3 49	18 11	5 39	99	22 54.0	-12 06	8.8
Fri Sep 13/Sat Sep 14	23 05	18 39	19 57	4 47	6 06	19 02	3 54	18 42	6 32	100	23 39.6	- 7 53	8.8
Sat Sep 14/Sun Sep 15	23 09	18 37	19 56	4 48	6 07	19 05	3 58	19 12	.....	99	0 24.3	- 3 23	8.9
Sun Sep 15/Mon Sep 16	23 13	18 36	19 55	4 49	6 08	19 07	4 03	19 42	.....	96	1 08.8	1 15	8.9
Mon Sep 16/Tue Sep 17	23 17	18 35	19 53	4 49	6 08	19 10	4 08	20 11	.....	91	1 53.9	5 51	8.9
Tue Sep 17/Wed Sep 18	23 21	18 33	19 52	4 50	6 09	19 12	4 12	20 42	.....	85	2 40.2	10 15	9.0
Wed Sep 18/Thu Sep 19	23 25	18 32	19 50	4 51	6 09	19 15	4 17	21 16	.....	77	3 28.3	14 14	9.0
Thu Sep 19/Fri Sep 20	23 29	18 31	19 49	4 52	6 10	19 17	4 21	21 53	.....	68	4 19.0	17 38	9.0
Fri Sep 20/Sat Sep 21	23 33	18 29	19 48	4 52	6 11	19 20	4 26	22 36	.....	58	5 12.5	20 13	9.1
Sat Sep 21/Sun Sep 22	23 37	18 28	19 46	4 53	6 11	19 22	4 31	23 25	.....	47	6 08.7	21 46	9.1
Sun Sep 22/Mon Sep 23	23 41	18 27	19 45	4 54	6 12	19 25	4 35	0 20	.....	37	7 07.2	22 04	9.1
Mon Sep 23/Tue Sep 24	23 45	18 25	19 43	4 54	6 12	19 27	4 40	1 23	.....	26	8 07.1	20 59	9.2
Tue Sep 24/Wed Sep 25	23 49	18 24	19 42	4 55	6 13	19 30	4 45	2 30	.....	17	9 07.1	18 31	9.2
Wed Sep 25/Thu Sep 26	23 53	18 23	19 41	4 56	6 14	19 33	4 49	3 40	16 41	9	10 06.3	14 47	9.3
Thu Sep 26/Fri Sep 27	23 57	18 21	19 39	4 56	6 14	19 35	4 54	4 51	17 25	3	11 04.2	10 02	9.3
Fri Sep 27/Sat Sep 28	0 01	18 20	19 38	4 57	6 15	19 38	4 59	6 01	18 06	0	12 00.6	4 35	9.3
Sat Sep 28/Sun Sep 29	0 05	18 19	19 36	4 58	6 16	19 40	5 03	7 11	18 45	1	12 56.0	- 1 09	9.4
Sun Sep 29/Mon Sep 30	0 09	18 17	19 35	4 58	6 16	19 43	5 08	.....	19 23	4	13 50.8	- 6 47	9.4
Mon Sep 30/Tue Oct 01	0 12	18 16	19 34	4 59	6 17	19 46	5 12	.....	20 02	9	14 45.5	-11 57	9.4

***** 2019 OCTOBER *****

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 Oct 01/Wed Oct 02	0 16	18 15	19 33	5 00	6 18	19 48	5 17	.....	20 43	17	15 40.6	-16 22	9.5
Wed Oct 02/Thu Oct 03	0 20	18 14	19 31	5 00	6 18	19 51	5 22	.....	21 26	25	16 36.1	-19 47	9.5
Thu Oct 03/Fri Oct 04	0 24	18 12	19 30	5 01	6 19	19 53	5 26	.....	22 13	35	17 31.8	-22 04	9.5
Fri Oct 04/Sat Oct 05	0 28	18 11	19 29	5 02	6 19	19 56	5 31	.....	23 03	45	18 27.1	-23 10	9.6
Sat Oct 05/Sun Oct 06	0 32	18 10	19 27	5 02	6 20	19 59	5 35	.....	23 56	55	19 21.4	-23 05	9.6
Sun Oct 06/Mon Oct 07	0 36	18 09	19 26	5 03	6 21	20 01	5 40	.....	0 50	65	20 14.1	-21 55	9.6
Mon Oct 07/Tue Oct 08	0 40	18 07	19 25	5 04	6 22	20 04	5 45	.....	1 45	74	21 04.9	-19 47	9.6
Tue Oct 08/Wed Oct 09	0 44	18 06	19 24	5 04	6 22	20 07	5 49	.....	2 39	81	21 53.7	-16 49	9.7
Wed Oct 09/Thu Oct 10	0 48	18 05	19 22	5 05	6 23	20 10	5 54	.....	3 33	88	22 40.8	-13 12	9.7
Thu Oct 10/Fri Oct 11	0 52	18 04	19 21	5 06	6 24	20 12	5 59	16 45	4 27	94	23 26.5	- 9 04	9.7
Fri Oct 11/Sat Oct 12	0 56	18 02	19 20	5 06	6 24	20 15	6 03	17 15	5 21	97	0 11.3	- 4 35	9.8
Sat Oct 12/Sun Oct 13	1 00	18 01	19 19	5 07	6 25	20 18	6 08	17 44	6 14	99	0 56.0	0 06	9.8
Sun Oct 13/Mon Oct 14	1 04	18 00	19 18	5 08	6 26	20 21	6 12	18 14	7 09	100	1 41.2	4 49	9.8
Mon Oct 14/Tue Oct 15	1 08	17 59	19 17	5 08	6 26	20 23	6 17	18 44	.....	98	2 27.5	9 22	9.9
Tue Oct 15/Wed Oct 16	1 12	17 58	19 15	5 09	6 27	20 26	6 22	19 17	.....	94	3 15.6	13 35	9.9
Wed Oct 16/Thu Oct 17	1 16	17 57	19 14	5 10	6 28	20 29	6 26	19 53	.....	89	4 06.0	17 13	9.9
Thu Oct 17/Fri Oct 18	1 19	17 55	19 13	5 11	6 29	20 32	6 31	20 34	.....	81	4 59.0	20 04	10.0
Fri Oct 18/Sat Oct 19	1 23	17 54	19 12	5 11	6 29	20 35	6 35	21 20	.....	73	5 54.5	21 54	10.0
Sat Oct 19/Sun Oct 20	1 27	17 53	19 11	5 12	6 30	20 38	6 40	22 13	.....	63	6 52.0	22 32	10.0
Sun Oct 20/Mon Oct 21	1 31	17 52	19 10	5 13	6 31	20 41	6 45	23 11	.....	52	7 50.5	21 50	10.0
Mon Oct 21/Tue Oct 22	1 35	17 51	19 09	5 13	6 32	20 44	6 49	0 15	.....	41	8 49.2	19 49	10.1
Tue Oct 22/Wed Oct 23	1 39	17 50	19 08	5 14	6 32	20 47	6 54	1 21	.....	30	9 47.0	16 31	10.1
Wed Oct 23/Thu Oct 24	1 43	17 49	19 07	5 15	6 33	20 50	6 59	2 30	.....	20	10 43.6	12 10	10.1
Thu Oct 24/Fri Oct 25	1 47	17 48	19 06	5 15	6 34	20 52	7 03	3 38	.....	11	11 39.0	7 02	10.2
Fri Oct 25/Sat Oct 26	1 51	17 47	19 05	5 16	6 35	20 56	7 08	4 47	16 38	5	12 33.5	1 25	10.2
Sat Oct 26/Sun Oct 27	1 55	17 46	19 04	5 17	6 35	20 59	7 13	5 56	17 15	1	13 27.8	- 4 18	10.2
Sun Oct 27/Mon Oct 28	1 59	17 45	19 04	5 17	6 36	21 02	7 17	7 04	17 53	0	14 22.4	- 9 46	10.2
Mon Oct 28/Tue Oct 29	2 03	17 44	19 03	5 18	6 37	21 05	7 22	.....	18 33	2	15 17.7	-14 37	10.3
Tue Oct 29/Wed Oct 30	2 07	17 43	19 02	5 19	6 38	21 08	7 26	.....	19 16	6	16 13.9	-18 35	10.3
Wed Oct 30/Thu Oct 31	2 11	17 42	19 01	5 20	6 39	21 11	7 31	.....	20 02	12	17 10.7	-21 25	10.3
Thu Oct 31/Fri Nov 01	2 15	17 41	19 00	5 20	6 39	21 14	7 36	.....	20 52	20	18 07.4	-23 01	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.

***** 2019 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	
Fri Nov 01/Sat Nov 02	2 19	17 40	18 59	5 21	6 40	21 17	7 40	.....	21 45	29	19 03.2	-23 21	10.4
Sat Nov 02/Sun Nov 03	2 23	17 39	18 59	5 22	6 41	21 20	7 45	.....	22 40	38	19 57.4	-22 31	10.4
Sun Nov 03/Mon Nov 04	2 27	17 39	18 58	5 22	6 42	21 24	7 50	.....	23 36	48	20 49.4	-20 39	10.4
Mon Nov 04/Tue Nov 05	2 30	17 38	18 57	5 23	6 43	21 27	7 54	.....	0 31	57	21 39.0	-17 55	10.4
Tue Nov 05/Wed Nov 06	2 34	17 37	18 57	5 24	6 44	21 30	7 59	.....	1 26	67	22 26.5	-14 27	10.5
Wed Nov 06/Thu Nov 07	2 38	17 36	18 56	5 25	6 44	21 33	8 04	.....	2 20	75	23 12.4	-10 27	10.5
Thu Nov 07/Fri Nov 08	2 42	17 35	18 55	5 25	6 45	21 37	8 09	.....	3 13	83	23 57.2	- 6 03	10.5
Fri Nov 08/Sat Nov 09	2 46	17 35	18 55	5 26	6 46	21 40	8 13	.....	4 07	89	0 41.6	- 1 23	10.5
Sat Nov 09/Sun Nov 10	2 50	17 34	18 54	5 27	6 47	21 43	8 18	16 16	5 01	95	1 26.6	3 24	10.5
Sun Nov 10/Mon Nov 11	2 54	17 33	18 54	5 28	6 48	21 47	8 23	16 46	5 57	98	2 12.7	8 06	10.6
Mon Nov 11/Tue Nov 12	2 58	17 33	18 53	5 28	6 49	21 50	8 27	17 18	6 54	100	3 00.7	12 32	10.6
Tue Nov 12/Wed Nov 13	3 02	17 32	18 53	5 29	6 50	21 54	8 32	17 53	7 54	99	3 51.1	16 28	10.6
Wed Nov 13/Thu Nov 14	3 06	17 32	18 52	5 30	6 50	21 57	8 37	18 32	.....	97	4 44.4	19 39	10.6
Thu Nov 14/Fri Nov 15	3 10	17 31	18 52	5 31	6 51	22 01	8 41	19 17	.....	92	5 40.3	21 51	10.6
Fri Nov 15/Sat Nov 16	3 14	17 30	18 51	5 31	6 52	22 04	8 46	20 08	.....	85	6 38.2	22 50	10.7
Sat Nov 16/Sun Nov 17	3 18	17 30	18 51	5 32	6 53	22 08	8 51	21 05	.....	77	7 37.2	22 28	10.7
Sun Nov 17/Mon Nov 18	3 22	17 29	18 50	5 33	6 54	22 11	8 55	22 07	.....	67	8 35.9	20 45	10.7
Mon Nov 18/Tue Nov 19	3 26	17 29	18 50	5 34	6 55	22 15	9 00	23 12	.....	56	9 33.4	17 47	10.7
Tue Nov 19/Wed Nov 20	3 30	17 29	18 50	5 34	6 56	22 19	9 05	0 18	.....	45	10 29.3	13 44	10.7
Wed Nov 20/Thu Nov 21	3 34	17 28	18 50	5 35	6 57	22 22	9 10	1 24	.....	33	11 23.6	8 53	10.8
Thu Nov 21/Fri Nov 22	3 37	17 28	18 49	5 36	6 57	22 26	9 14	2 30	.....	23	12 16.7	3 30	10.8
Fri Nov 22/Sat Nov 23	3 41	17 27	18 49	5 37	6 58	22 30	9 19	3 37	.....	14	13 09.3	- 2 06	10.8
Sat Nov 23/Sun Nov 24	3 45	17 27	18 49	5 37	6 59	22 33	9 24	4 43	15 48	7	14 02.3	- 7 36	10.8
Sun Nov 24/Mon Nov 25	3 49	17 27	18 49	5 38	7 00	22 37	9 28	5 50	16 25	2	14 56.2	-12 41	10.8
Mon Nov 25/Tue Nov 26	3 53	17 27	18 49	5 39	7 01	22 41	9 33	6 57	17 06	0	15 51.4	-17 02	10.8
Tue Nov 26/Wed Nov 27	3 57	17 26	18 48	5 40	7 02	22 45	9 38	8 02	17 50	1	16 47.9	-20 22	10.9
Wed Nov 27/Thu Nov 28	4 01	17 26	18 48	5 40	7 03	22 49	9 42	.....	18 38	3	17 45.1	-22 32	10.9
Thu Nov 28/Fri Nov 29	4 05	17 26	18 48	5 41	7 03	22 52	9 47	.....	19 31	8	18 42.1	-23 24	10.9
Fri Nov 29/Sat Nov 30	4 09	17 26	18 48	5 42	7 04	22 56	9 52	.....	20 26	14	19 37.8	-23 01	10.9
Sat Nov 30/Sun Dec 01	4 13	17 26	18 48	5 43	7 05	23 00	9 56	.....	21 23	22	20 31.3	-21 30	10.9

***** 2019 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	
Sun Dec 01/Mon Dec 02	4 17	17 26	18 48	5 43	7 06	23 04	10 01	.....	22 20	31	21 22.3	-19 01	10.9
Mon Dec 02/Tue Dec 03	4 21	17 26	18 48	5 44	7 07	23 08	10 06	.....	23 15	40	22 10.8	-15 46	10.9
Tue Dec 03/Wed Dec 04	4 25	17 26	18 48	5 45	7 08	23 12	10 10	.....	0 10	49	22 57.1	-11 55	10.9
Wed Dec 04/Thu Dec 05	4 29	17 26	18 48	5 45	7 08	23 16	10 15	.....	1 04	59	23 42.0	- 7 39	10.9
Thu Dec 05/Fri Dec 06	4 33	17 26	18 49	5 46	7 09	23 20	10 20	.....	1 57	68	0 26.1	- 3 04	11.0
Fri Dec 06/Sat Dec 07	4 37	17 26	18 49	5 47	7 10	23 24	10 24	.....	2 51	76	1 10.4	1 40	11.0
Sat Dec 07/Sun Dec 08	4 41	17 26	18 49	5 47	7 11	23 29	10 29	.....	3 46	84	1 55.6	6 24	11.0
Sun Dec 08/Mon Dec 09	4 44	17 26	18 49	5 48	7 11	23 33	10 34	.....	4 42	91	2 42.6	10 58	11.0
Mon Dec 09/Tue Dec 10	4 48	17 26	18 49	5 49	7 12	23 37	10 38	15 50	5 41	96	3 32.3	15 10	11.0
Tue Dec 10/Wed Dec 11	4 52	17 26	18 50	5 49	7 13	23 41	10 43	16 28	6 42	99	4 25.0	18 43	11.0
Wed Dec 11/Thu Dec 12	4 56	17 26	18 50	5 50	7 14	23 45	10 47	17 11	7 43	100	5 21.1	21 22	11.0
Thu Dec 12/Fri Dec 13	5 00	17 27	18 50	5 51	7 14	23 50	10 52	18 01	.....	99	6 19.9	22 49	11.0
Fri Dec 13/Sat Dec 14	5 04	17 27	18 50	5 51	7 15	23 54	10 57	18 57	.....	95	7 20.3	22 54	11.0
Sat Dec 14/Sun Dec 15	5 08	17 27	18 51	5 52	7 16	23 58	11 01	19 59	.....	89	8 20.8	21 32	11.0
Sun Dec 15/Mon Dec 16	5 12	17 28	18 51	5 53	7 16	0 02	11 06	21 04	.....	80	9 20.0	18 48	11.0
Mon Dec 16/Tue Dec 17	5 16	17 28	18 52	5 53	7 17	0 07	11 10	22 11	.....	70	10 17.1	14 56	11.0
Tue Dec 17/Wed Dec 18	5 20	17 28	18 52	5 54	7 17	0 11	11 15	23 17	.....	60	11 12.0	10 13	11.0
Wed Dec 18/Thu Dec 19	5 24	17 29	18 52	5 54	7 18	0 15	11 19	0 22	.....	48	12 05.0	4 57	11.0
Thu Dec 19/Fri Dec 20	5 28	17 29	18 53	5 55	7 18	0 20	11 24	1 27	.....	37	12 56.8	- 0 33	11.0
Fri Dec 20/Sat Dec 21	5 32	17 30	18 53	5 55	7 19	0 24	11 28	2 32	.....	26	13 48.4	- 6 01	11.0
Sat Dec 21/Sun Dec 22	5 36	17 30	18 54	5 56	7 19	0 29	11 33	3 36	.....	17	14 40.6	-11 08	11.0
Sun Dec 22/Mon Dec 23	5 40	17 31	18 54	5 56	7 20	0 33	11 37	4 41	.....	10	15 34.0	-15 38	11.0
Mon Dec 23/Tue Dec 24	5 44	17 31	18 55	5 57	7 20	0 38	11 41	5 46	15 43	4	16 28.9	-19 17	11.0
Tue Dec 24/Wed Dec 25	5 48	17 32	18 55	5 57	7 21	0 42	11 46	6 48	16 28	1	17 25.0	-21 51	11.0
Wed Dec 25/Thu Dec 26	5 52	17 32	18 56	5 58	7 21	0 47	11 50	7 47	17 18	0	18 21.7	-23 11	11.0
Thu Dec 26/Fri Dec 27	5 55	17 33	18 56	5 58	7 22	0 51	11 54	.....	18 12	1	19 17.8	-23 15	11.0
Fri Dec 27/Sat Dec 28	5 59	17 33	18 57	5 58	7 22	0 56	11 59	.....	19 09	4	20 12.4	-22 09	11.0
Sat Dec 28/Sun Dec 29	6 03	17 34	18 58	5 59	7 22	1 00	12 03	.....	20 06	9	21 04.6	-19 59	11.0
Sun Dec 29/Mon Dec 30	6 07	17 35	18 58	5 59	7 23	1 05	12 07	.....	21 03	16	21 54.3	-16 58	11.0
Mon Dec 30/Tue Dec 31	6 11	17 35	18 59	5 59	7 23	1 09	12 12	.....	21 59	23	22 41.5	-13 18	11.0
Tue Dec 31/Wed Jan 01	6 15	17 36	19 00	6 00	7 23	1 14	12 16	.....	22 53	32	23 26.7	- 9 09	11.0