

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 -; 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:

\*\*\*\*\* 2016 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 2016, 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 11 3 30	Dec 18 8 15	Dec 25 4 12	Jan 01 22 32
Jan 09 18 31	Jan 16 16 27	Jan 23 18 46	Jan 31 20 29
Feb 08 7 40	Feb 15 0 48	Feb 22 11 21	Mar 01 16 13
Mar 08 18 56	Mar 15 10 04	Mar 23 5 02	Mar 31 8 19
Apr 07 4 25	Apr 13 21 01	Apr 21 22 25	Apr 29 20 30
May 06 12 31	May 13 10 03	May 21 14 17	May 29 5 14
Jun 04 20 02	Jun 12 1 11	Jun 20 4 05	Jun 27 11 21
Jul 04 4 03	Jul 11 17 53	Jul 19 16 00	Jul 26 16 03
Aug 02 13 47	Aug 10 11 22	Aug 18 2 30	Aug 24 20 44
Sep 01 2 05	Sep 09 4 51	Sep 16 12 08	Sep 23 2 59
Sep 30 17 13	Oct 08 21 35	Oct 15 21 25	Oct 22 12 16
Oct 30 10 40	Nov 07 12 53	Nov 14 6 54	Nov 21 1 35
Nov 29 5 20	Dec 07 2 04	Dec 13 17 07	Dec 20 18 57
Dec 28 23 54	Jan 05 12 48	Jan 12 4 35	Jan 19 15 14

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Jan 01/Sat Jan 02	7389.8	6 19 03	17 38	19 00	6 00	7 22	1 18	12 20	0 33	.....	49	12 49.4	- 3 49
Sat Jan 02/Sun Jan 03	7390.8	6 23 00	17 39	19 01	6 00	7 22	1 23	12 24	1 25	.....	39	13 34.6	- 7 23
Sun Jan 03/Mon Jan 04	7391.8	6 26 57	17 40	19 01	6 00	7 22	1 28	12 28	2 18	.....	30	14 20.7	-10 41
Mon Jan 04/Tue Jan 05	7392.8	6 30 53	17 40	19 02	6 01	7 22	1 32	12 33	3 11	.....	22	15 08.2	-13 35
Tue Jan 05/Wed Jan 06	7393.8	6 34 50	17 41	19 03	6 01	7 23	1 37	12 37	4 06	.....	15	15 57.5	-15 58
Wed Jan 06/Thu Jan 07	7394.8	6 38 46	17 42	19 04	6 01	7 23	1 42	12 41	5 00	.....	8	16 48.9	-17 40
Thu Jan 07/Fri Jan 08	7395.8	6 42 43	17 43	19 04	6 01	7 23	1 46	12 45	5 55	15 59	4	17 42.2	-18 33
Fri Jan 08/Sat Jan 09	7396.8	6 46 39	17 43	19 05	6 01	7 23	1 51	12 49	6 48	16 51	1	18 37.1	-18 30
Sat Jan 09/Sun Jan 10	7397.8	6 50 36	17 44	19 06	6 01	7 23	1 56	12 53	7 39	17 48	0	19 32.9	-17 26
Sun Jan 10/Mon Jan 11	7398.8	6 54 32	17 45	19 07	6 01	7 23	2 00	12 57	.....	18 48	2	20 28.8	-15 24
Mon Jan 11/Tue Jan 12	7399.8	6 58 29	17 46	19 07	6 01	7 23	2 05	13 01	.....	19 51	6	21 24.4	-12 29
Tue Jan 12/Wed Jan 13	7400.8	7 02 26	17 47	19 08	6 01	7 23	2 10	13 05	.....	20 54	12	22 19.2	- 8 50
Wed Jan 13/Thu Jan 14	7401.8	7 06 22	17 48	19 09	6 01	7 22	2 14	13 09	.....	21 58	21	23 13.4	- 4 41
Thu Jan 14/Fri Jan 15	7402.8	7 10 19	17 49	19 10	6 01	7 22	2 19	13 13	.....	23 02	30	0 07.1	- 0 16
Fri Jan 15/Sat Jan 16	7403.8	7 14 15	17 49	19 10	6 01	7 22	2 24	13 17	.....	0 06	41	1 01.0	4 09
Sat Jan 16/Sun Jan 17	7404.8	7 18 12	17 50	19 11	6 01	7 22	2 29	13 20	.....	1 10	53	1 55.4	8 19
Sun Jan 17/Mon Jan 18	7405.8	7 22 08	17 51	19 12	6 01	7 22	2 33	13 24	.....	2 13	64	2 50.8	12 00
Mon Jan 18/Tue Jan 19	7406.8	7 26 05	17 52	19 13	6 01	7 21	2 38	13 28	.....	3 16	74	3 47.4	14 58
Tue Jan 19/Wed Jan 20	7407.8	7 30 01	17 53	19 13	6 01	7 21	2 43	13 32	.....	4 16	84	4 44.9	17 01
Wed Jan 20/Thu Jan 21	7408.8	7 33 58	17 54	19 14	6 01	7 21	2 47	13 35	.....	5 14	91	5 43.0	18 02
Thu Jan 21/Fri Jan 22	7409.8	7 37 55	17 55	19 15	6 00	7 20	2 52	13 39	15 54	6 08	96	6 40.7	17 57
Fri Jan 22/Sat Jan 23	7410.8	7 41 51	17 56	19 16	6 00	7 20	2 57	13 43	16 50	6 57	99	7 37.1	16 50
Sat Jan 23/Sun Jan 24	7411.8	7 45 48	17 57	19 17	6 00	7 20	3 02	13 47	17 48	7 42	100	8 31.7	14 49
Sun Jan 24/Mon Jan 25	7412.8	7 49 44	17 58	19 17	5 59	7 19	3 06	13 50	18 45	.....	98	9 23.9	12 03
Mon Jan 25/Tue Jan 26	7413.8	7 53 41	17 58	19 18	5 59	7 19	3 11	13 54	19 42	.....	95	10 13.9	8 47
Tue Jan 26/Wed Jan 27	7414.8	7 57 37	17 59	19 19	5 59	7 18	3 16	13 57	20 37	.....	89	11 01.9	5 10
Wed Jan 27/Thu Jan 28	7415.8	8 01 34	18 00	19 20	5 58	7 18	3 21	14 01	21 30	.....	83	11 48.5	1 24
Thu Jan 28/Fri Jan 29	7416.8	8 05 30	18 01	19 21	5 58	7 17	3 25	14 04	22 23	.....	75	12 34.1	- 2 22
Fri Jan 29/Sat Jan 30	7417.8	8 09 27	18 02	19 21	5 57	7 17	3 30	14 08	23 15	.....	66	13 19.5	- 6 01
Sat Jan 30/Sun Jan 31	7418.8	8 13 23	18 03	19 22	5 57	7 16	3 35	14 11	0 07	.....	57	14 05.3	- 9 25
Sun Jan 31/Mon Feb 01	7419.8	8 17 20	18 04	19 23	5 56	7 15	3 40	14 15	1 00	.....	48	14 52.0	-12 28

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Feb 01/Tue Feb 02	7420.8	8 21 17	18 05	19 24	5 56	7 15	3 44	14 18	1 53	.....	38	15 40.3	-15 02
Tue Feb 02/Wed Feb 03	7421.8	8 25 13	18 06	19 25	5 55	7 14	3 49	14 22	2 47	.....	29	16 30.3	-17 00
Wed Feb 03/Thu Feb 04	7422.8	8 29 10	18 07	19 25	5 55	7 13	3 54	14 25	3 41	.....	21	17 22.4	-18 13
Thu Feb 04/Fri Feb 05	7423.8	8 33 06	18 08	19 26	5 54	7 13	3 59	14 28	4 34	.....	13	18 16.3	-18 34
Fri Feb 05/Sat Feb 06	7424.8	8 37 03	18 08	19 27	5 54	7 12	4 03	14 32	5 26	.....	7	19 11.7	-17 56
Sat Feb 06/Sun Feb 07	7425.8	8 40 59	18 09	19 28	5 53	7 11	4 08	14 35	6 16	16 31	2	20 08.0	-16 18
Sun Feb 07/Mon Feb 08	7426.8	8 44 56	18 10	19 29	5 52	7 10	4 13	14 38	7 03	17 33	0	21 04.6	-13 42
Mon Feb 08/Tue Feb 09	7427.8	8 48 52	18 11	19 29	5 52	7 10	4 17	14 41	7 48	18 38	1	22 00.9	-10 15
Tue Feb 09/Wed Feb 10	7428.8	8 52 49	18 12	19 30	5 51	7 09	4 22	14 45	.....	19 44	4	22 56.7	- 6 11
Wed Feb 10/Thu Feb 11	7429.8	8 56 46	18 13	19 31	5 50	7 08	4 27	14 48	.....	20 50	9	23 52.1	- 1 44
Thu Feb 11/Fri Feb 12	7430.8	9 00 42	18 14	19 32	5 49	7 07	4 32	14 51	.....	21 56	17	0 47.2	2 47
Fri Feb 12/Sat Feb 13	7431.8	9 04 39	18 15	19 32	5 48	7 06	4 36	14 54	.....	23 01	27	1 42.4	7 07
Sat Feb 13/Sun Feb 14	7432.8	9 08 35	18 16	19 33	5 48	7 05	4 41	14 57	.....	0 06	38	2 38.0	10 58
Sun Feb 14/Mon Feb 15	7433.8	9 12 32	18 16	19 34	5 47	7 04	4 46	15 00	.....	1 09	49	3 34.3	14 07
Mon Feb 15/Tue Feb 16	7434.8	9 16 28	18 17	19 35	5 46	7 03	4 50	15 03	.....	2 11	60	4 31.1	16 23
Tue Feb 16/Wed Feb 17	7435.8	9 20 25	18 18	19 35	5 45	7 02	4 55	15 06	.....	3 09	70	5 28.0	17 40
Wed Feb 17/Thu Feb 18	7436.8	9 24 21	18 19	19 36	5 44	7 01	5 00	15 09	.....	4 03	80	6 24.6	17 54
Thu Feb 18/Fri Feb 19	7437.8	9 28 18	18 20	19 37	5 43	7 00	5 05	15 13	.....	4 53	88	7 20.2	17 08
Fri Feb 19/Sat Feb 20	7438.8	9 32 15	18 21	19 38	5 42	6 59	5 09	15 16	.....	5 38	94	8 14.3	15 26
Sat Feb 20/Sun Feb 21	7439.8	9 36 11	18 21	19 38	5 41	6 58	5 14	15 18	16 36	6 19	98	9 06.6	12 58
Sun Feb 21/Mon Feb 22	7440.8	9 40 08	18 22	19 39	5 40	6 57	5 19	15 21	17 32	6 57	100	9 56.9	9 54
Mon Feb 22/Tue Feb 23	7441.8	9 44 04	18 23	19 40	5 39	6 56	5 23	15 24	18 27	7 32	100	10 45.4	6 25
Tue Feb 23/Wed Feb 24	7442.8	9 48 01	18 24	19 41	5 38	6 55	5 28	15 27	19 21	.....	98	11 32.6	2 42
Wed Feb 24/Thu Feb 25	7443.8	9 51 57	18 25	19 41	5 37	6 54	5 33	15 30	20 14	.....	94	12 18.8	- 1 05
Thu Feb 25/Fri Feb 26	7444.8	9 55 54	18 25	19 42	5 36	6 53	5 37	15 33	21 07	.....	88	13 04.6	- 4 48
Fri Feb 26/Sat Feb 27	7445.8	9 59 50	18 26	19 43	5 35	6 52	5 42	15 36	21 59	.....	82	13 50.4	- 8 19
Sat Feb 27/Sun Feb 28	7446.8	10 03 47	18 27	19 44	5 34	6 51	5 47	15 39	22 51	.....	74	14 36.9	-11 30
Sun Feb 28/Mon Feb 29	7447.8	10 07 44	18 28	19 44	5 33	6 50	5 51	15 42	23 44	.....	65	15 24.4	-14 13
Mon Feb 29/Tue Mar 01	7448.8	10 11 40	18 28	19 45	5 32	6 48	5 56	15 44	0 36	.....	56	16 13.4	-16 23

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Mar 01/Wed Mar 02	7449.8	10 15 37	18 29	19 46	5 31	6 47	6 01	15 47	1 29	.....	46	17 04.0	-17 52
Wed Mar 02/Thu Mar 03	7450.8	10 19 33	18 30	19 47	5 30	6 46	6 05	15 50	2 22	.....	36	17 56.3	-18 32
Thu Mar 03/Fri Mar 04	7451.8	10 23 30	18 31	19 47	5 28	6 45	6 10	15 53	3 13	.....	27	18 50.2	-18 18
Fri Mar 04/Sat Mar 05	7452.8	10 27 26	18 31	19 48	5 27	6 44	6 15	15 56	4 03	.....	18	19 45.3	-17 07
Sat Mar 05/Sun Mar 06	7453.8	10 31 23	18 32	19 49	5 26	6 42	6 19	15 58	4 51	.....	10	20 41.2	-14 56
Sun Mar 06/Mon Mar 07	7454.8	10 35 19	18 33	19 50	5 25	6 41	6 24	16 01	5 37	.....	4	21 37.5	-11 52
Mon Mar 07/Tue Mar 08	7455.8	10 39 16	18 34	19 50	5 24	6 40	6 29	16 04	6 21	17 22	1	22 33.9	- 8 01
Tue Mar 08/Wed Mar 09	7456.8	10 43 13	18 34	19 51	5 22	6 39	6 34	16 06	7 04	18 29	0	23 30.3	- 3 38
Wed Mar 09/Thu Mar 10	7457.8	10 47 09	18 35	19 52	5 21	6 38	6 38	16 09	.....	19 37	2	0 26.8	0 59
Thu Mar 10/Fri Mar 11	7458.8	10 51 06	18 36	19 52	5 20	6 36	6 43	16 12	.....	20 45	7	1 23.6	5 31
Fri Mar 11/Sat Mar 12	7459.8	10 55 02	18 37	19 53	5 19	6 35	6 48	16 14	.....	21 53	14	2 20.8	9 40
Sat Mar 12/Sun Mar 13	7460.8	10 58 59	18 37	19 54	5 17	6 34	6 52	16 17	.....	22 59	23	3 18.4	13 08
Sun Mar 13/Mon Mar 14	7461.8	11 02 55	18 38	19 55	5 16	6 33	6 57	16 20	.....	0 03	34	4 16.3	15 43
Mon Mar 14/Tue Mar 15	7462.8	11 06 52	18 39	19 55	5 15	6 31	7 02	16 22	.....	1 03	45	5 13.9	17 17
Tue Mar 15/Wed Mar 16	7463.8	11 10 48	18 39	19 56	5 13	6 30	7 06	16 25	.....	1 59	56	6 10.9	17 47
Wed Mar 16/Thu Mar 17	7464.8	11 14 45	18 40	19 57	5 12	6 29	7 11	16 28	.....	2 50	66	7 06.6	17 16
Thu Mar 17/Fri Mar 18	7465.8	11 18 42	18 41	19 58	5 11	6 27	7 16	16 30	.....	3 37	76	8 00.6	15 49
Fri Mar 18/Sat Mar 19	7466.8	11 22 38	18 42	19 58	5 09	6 26	7 20	16 33	.....	4 19	84	8 52.6	13 34
Sat Mar 19/Sun Mar 20	7467.8	11 26 35	18 42	19 59	5 08	6 25	7 25	16 35	.....	4 57	91	9 42.7	10 42
Sun Mar 20/Mon Mar 21	7468.8	11 30 31	18 43	20 00	5 07	6 24	7 30	16 38	.....	5 33	96	10 31.2	7 22
Mon Mar 21/Tue Mar 22	7469.8	11 34 28	18 44	20 01	5 05	6 22	7 35	16 41	17 15	6 07	99	11 18.3	3 44
Tue Mar 22/Wed Mar 23	7470.8	11 38 24	18 44	20 02	5 04	6 21	7 39	16 43	18 08	6 40	100	12 04.6	- 0 02
Wed Mar 23/Thu Mar 24	7471.8	11 42 21	18 45	20 02	5 02	6 20	7 44	16 46	19 01	7 13	99	12 50.5	- 3 48
Thu Mar 24/Fri Mar 25	7472.8	11 46 17	18 46	20 03	5 01	6 18	7 49	16 48	19 53	.....	97	13 36.4	- 7 24
Fri Mar 25/Sat Mar 26	7473.8	11 50 14	18 46	20 04	5 00	6 17	7 53	16 51	20 45	.....	93	14 22.9	-10 42
Sat Mar 26/Sun Mar 27	7474.8	11 54 11	18 47	20 05	4 58	6 16	7 58	16 53	21 38	.....	87	15 10.3	-13 36
Sun Mar 27/Mon Mar 28	7475.8	11 58 07	18 48	20 05	4 57	6 15	8 03	16 56	22 30	.....	80	15 58.8	-15 57
Mon Mar 28/Tue Mar 29	7476.8	12 02 04	18 48	20 06	4 56	6 13	8 08	16 58	23 22	.....	72	16 48.7	-17 38
Tue Mar 29/Wed Mar 30	7477.8	12 06 00	18 49	20 07	4 54	6 12	8 12	17 01	0 14	.....	63	17 40.0	-18 33
Wed Mar 30/Thu Mar 31	7478.8	12 09 57	18 50	20 08	4 53	6 11	8 17	17 03	1 04	.....	53	18 32.5	-18 37
Thu Mar 31/Fri Apr 01	7479.8	12 13 53	18 50	20 09	4 51	6 10	8 22	17 06	1 53	.....	43	19 26.0	-17 47

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Apr 01/Sat Apr 02	7480.8	12 17 50	18 51	20 10	4 50	6 08	8 27	17 08	2 41	.....	32	20 20.3	-16 00
Sat Apr 02/Sun Apr 03	7481.8	12 21 46	18 52	20 10	4 48	6 07	8 32	17 11	3 26	.....	23	21 15.2	-13 20
Sun Apr 03/Mon Apr 04	7482.8	12 25 43	18 52	20 11	4 47	6 06	8 36	17 14	4 10	.....	14	22 10.4	- 9 51
Mon Apr 04/Tue Apr 05	7483.8	12 29 40	18 53	20 12	4 46	6 04	8 41	17 16	4 53	.....	7	23 06.0	- 5 43
Tue Apr 05/Wed Apr 06	7484.8	12 33 36	18 54	20 13	4 44	6 03	8 46	17 19	5 36	17 12	2	0 02.3	- 1 10
Wed Apr 06/Thu Apr 07	7485.8	12 37 33	18 55	20 14	4 43	6 02	8 51	17 21	6 19	18 20	0	0 59.2	3 29
Thu Apr 07/Fri Apr 08	7486.8	12 41 29	18 55	20 15	4 41	6 01	8 55	17 24	.....	19 30	1	1 57.2	7 55
Fri Apr 08/Sat Apr 09	7487.8	12 45 26	18 56	20 15	4 40	6 00	9 00	17 26	.....	20 39	5	2 56.0	11 48
Sat Apr 09/Sun Apr 10	7488.8	12 49 22	18 57	20 16	4 39	5 58	9 05	17 29	.....	21 47	11	3 55.5	14 50
Sun Apr 10/Mon Apr 11	7489.8	12 53 19	18 57	20 17	4 37	5 57	9 10	17 31	.....	22 51	20	4 55.1	16 50
Mon Apr 11/Tue Apr 12	7490.8	12 57 15	18 58	20 18	4 36	5 56	9 15	17 34	.....	23 51	30	5 54.0	17 42
Tue Apr 12/Wed Apr 13	7491.8	13 01 12	18 59	20 19	4 34	5 55	9 20	17 36	.....	0 46	40	6 51.3	17 28
Wed Apr 13/Thu Apr 14	7492.8	13 05 09	18 59	20 20	4 33	5 53	9 24	17 39	.....	1 35	51	7 46.5	16 15
Thu Apr 14/Fri Apr 15	7493.8	13 09 05	19 00	20 21	4 32	5 52	9 29	17 41	.....	2 19	61	8 39.4	14 11
Fri Apr 15/Sat Apr 16	7494.8	13 13 02	19 01	20 22	4 30	5 51	9 34	17 44	.....	2 58	71	9 29.9	11 27
Sat Apr 16/Sun Apr 17	7495.8	13 16 58	19 01	20 23	4 29	5 50	9 39	17 47	.....	3 35	79	10 18.5	8 14
Sun Apr 17/Mon Apr 18	7496.8	13 20 55	19 02	20 24	4 27	5 49	9 44	17 49	.....	4 09	87	11 05.6	4 40
Mon Apr 18/Tue Apr 19	7497.8	13 24 51	19 03	20 24	4 26	5 48	9 49	17 52	.....	4 42	92	11 51.7	0 56
Tue Apr 19/Wed Apr 20	7498.8	13 28 48	19 04	20 25	4 25	5 47	9 54	17 54	.....	5 15	97	12 37.4	- 2 51
Wed Apr 20/Thu Apr 21	7499.8	13 32 44	19 04	20 26	4 23	5 45	9 59	17 57	17 48	5 48	99	13 23.2	- 6 31
Thu Apr 21/Fri Apr 22	7500.8	13 36 41	19 05	20 27	4 22	5 44	10 03	17 59	18 41	6 22	100	14 09.6	- 9 57
Fri Apr 22/Sat Apr 23	7501.8	13 40 38	19 06	20 28	4 21	5 43	10 08	18 02	19 33	.....	99	14 56.9	-13 01
Sat Apr 23/Sun Apr 24	7502.8	13 44 34	19 06	20 29	4 19	5 42	10 13	18 05	20 26	.....	96	15 45.4	-15 34
Sun Apr 24/Mon Apr 25	7503.8	13 48 31	19 07	20 30	4 18	5 41	10 18	18 07	21 18	.....	91	16 35.2	-17 29
Mon Apr 25/Tue Apr 26	7504.8	13 52 27	19 08	20 31	4 17	5 40	10 23	18 10	22 10	.....	85	17 26.3	-18 38
Tue Apr 26/Wed Apr 27	7505.8	13 56 24	19 09	20 32	4 16	5 39	10 28	18 13	23 00	.....	77	18 18.4	-18 57
Wed Apr 27/Thu Apr 28	7506.8	14 00 20	19 09	20 33	4 14	5 38	10 33	18 15	23 49	.....	68	19 11.3	-18 22
Thu Apr 28/Fri Apr 29	7507.8	14 04 17	19 10	20 34	4 13	5 37	10 38	18 18	0 36	.....	58	20 04.6	-16 53
Fri Apr 29/Sat Apr 30	7508.8	14 08 13	19 11	20 35	4 12	5 36	10 43	18 21	1 21	.....	48	20 58.1	-14 31
Sat Apr 30/Sun May 01	7509.8	14 12 10	19 11	20 36	4 11	5 35	10 48	18 23	2 04	.....	37	21 51.8	-11 21

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sun May 01/Mon May 02	7510.8	14 16 07	19 12	20 37	4 09	5 34	10 53	18 26	2 45	.....	27	22 45.7	- 7 31
Mon May 02/Tue May 03	7511.8	14 20 03	19 13	20 38	4 08	5 33	10 58	18 29	3 27	.....	17	23 40.2	- 3 12
Tue May 03/Wed May 04	7512.8	14 24 00	19 14	20 39	4 07	5 32	11 03	18 32	4 09	.....	9	0 35.6	1 23
Wed May 04/Thu May 05	7513.8	14 27 56	19 14	20 40	4 06	5 32	11 07	18 34	4 52	.....	4	1 32.3	5 56
Thu May 05/Fri May 06	7514.8	14 31 53	19 15	20 41	4 05	5 31	11 12	18 37	5 38	18 14	1	2 30.5	10 07
Fri May 06/Sat May 07	7515.8	14 35 49	19 16	20 42	4 03	5 30	11 17	18 40	6 28	19 23	1	3 30.2	13 37
Sat May 07/Sun May 08	7516.8	14 39 46	19 16	20 43	4 02	5 29	11 22	18 43	.....	20 31	3	4 30.8	16 09
Sun May 08/Mon May 09	7517.8	14 43 42	19 17	20 44	4 01	5 28	11 27	18 46	.....	21 36	9	5 31.4	17 32
Mon May 09/Tue May 10	7518.8	14 47 39	19 18	20 45	4 00	5 27	11 32	18 48	.....	22 35	16	6 30.9	17 44
Tue May 10/Wed May 11	7519.8	14 51 36	19 19	20 46	3 59	5 27	11 37	18 51	.....	23 28	25	7 28.4	16 50
Wed May 11/Thu May 12	7520.8	14 55 32	19 19	20 47	3 58	5 26	11 42	18 54	.....	0 16	35	8 23.3	14 59
Thu May 12/Fri May 13	7521.8	14 59 29	19 20	20 48	3 57	5 25	11 47	18 57	.....	0 58	45	9 15.5	12 24
Fri May 13/Sat May 14	7522.8	15 03 25	19 21	20 49	3 56	5 25	11 52	19 00	.....	1 36	55	10 05.1	9 15
Sat May 14/Sun May 15	7523.8	15 07 22	19 21	20 50	3 55	5 24	11 57	19 03	.....	2 11	65	10 52.8	5 45
Sun May 15/Mon May 16	7524.8	15 11 18	19 22	20 51	3 54	5 23	12 02	19 06	.....	2 44	74	11 39.1	2 02
Mon May 16/Tue May 17	7525.8	15 15 15	19 23	20 52	3 53	5 23	12 07	19 09	.....	3 17	82	12 24.7	- 1 46
Tue May 17/Wed May 18	7526.8	15 19 11	19 23	20 53	3 52	5 22	12 12	19 12	.....	3 50	89	13 10.2	- 5 30
Wed May 18/Thu May 19	7527.8	15 23 08	19 24	20 54	3 52	5 21	12 17	19 15	.....	4 23	94	13 56.1	- 9 02
Thu May 19/Fri May 20	7528.8	15 27 05	19 25	20 55	3 51	5 21	12 21	19 18	.....	4 59	98	14 43.1	-12 16
Fri May 20/Sat May 21	7529.8	15 31 01	19 26	20 56	3 50	5 20	12 26	19 22	18 21	5 37	100	15 31.5	-15 02
Sat May 21/Sun May 22	7530.8	15 34 58	19 26	20 57	3 49	5 20	12 31	19 25	19 14	6 18	100	16 21.3	-17 11
Sun May 22/Mon May 23	7531.8	15 38 54	19 27	20 58	3 48	5 19	12 36	19 28	20 06	.....	98	17 12.6	-18 37
Mon May 23/Tue May 24	7532.8	15 42 51	19 28	20 59	3 48	5 19	12 41	19 31	20 58	.....	94	18 05.1	-19 12
Tue May 24/Wed May 25	7533.8	15 46 47	19 28	21 00	3 47	5 18	12 46	19 34	21 48	.....	89	18 58.3	-18 52
Wed May 25/Thu May 26	7534.8	15 50 44	19 29	21 00	3 46	5 18	12 51	19 38	22 35	.....	81	19 51.8	-17 37
Thu May 26/Fri May 27	7535.8	15 54 40	19 29	21 01	3 46	5 18	12 55	19 41	23 20	.....	73	20 45.2	-15 29
Fri May 27/Sat May 28	7536.8	15 58 37	19 30	21 02	3 45	5 17	13 00	19 44	0 03	.....	63	21 38.4	-12 33
Sat May 28/Sun May 29	7537.8	16 02 34	19 31	21 03	3 45	5 17	13 05	19 48	0 44	.....	52	22 31.3	- 8 56
Sun May 29/Mon May 30	7538.8	16 06 30	19 31	21 04	3 44	5 17	13 10	19 51	1 24	.....	41	23 24.2	- 4 49
Mon May 30/Tue May 31	7539.8	16 10 27	19 32	21 05	3 43	5 16	13 15	19 55	2 04	.....	30	0 17.7	- 0 22
Tue May 31/Wed Jun 01	7540.8	16 14 23	19 32	21 05	3 43	5 16	13 19	19 58	2 45	.....	20	1 12.3	4 08

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Jun 01/Thu Jun 02	7541.8	16 18 20	19 33	21 06	3 43	5 16	13 24	20 01	3 28	.....	11	2 08.4	8 25
Thu Jun 02/Fri Jun 03	7542.8	16 22 16	19 34	21 07	3 42	5 16	13 29	20 05	4 15	.....	5	3 06.3	12 12
Fri Jun 03/Sat Jun 04	7543.8	16 26 13	19 34	21 08	3 42	5 15	13 33	20 09	5 05	18 09	1	4 05.9	15 10
Sat Jun 04/Sun Jun 05	7544.8	16 30 09	19 35	21 08	3 41	5 15	13 38	20 12	6 00	19 15	0	5 06.5	17 06
Sun Jun 05/Mon Jun 06	7545.8	16 34 06	19 35	21 09	3 41	5 15	13 43	20 16	.....	20 18	2	6 07.0	17 50
Mon Jun 06/Tue Jun 07	7546.8	16 38 03	19 36	21 10	3 41	5 15	13 47	20 20	.....	21 16	6	7 06.3	17 24
Tue Jun 07/Wed Jun 08	7547.8	16 41 59	19 36	21 10	3 41	5 15	13 52	20 23	.....	22 07	13	8 03.3	15 54
Wed Jun 08/Thu Jun 09	7548.8	16 45 56	19 37	21 11	3 40	5 15	13 56	20 27	.....	22 53	21	8 57.6	13 32
Thu Jun 09/Fri Jun 10	7549.8	16 49 52	19 37	21 11	3 40	5 15	14 01	20 31	.....	23 34	30	9 49.1	10 31
Fri Jun 10/Sat Jun 11	7550.8	16 53 49	19 37	21 12	3 40	5 15	14 05	20 35	.....	0 11	39	10 38.1	7 04
Sat Jun 11/Sun Jun 12	7551.8	16 57 45	19 38	21 12	3 40	5 15	14 10	20 38	.....	0 45	49	11 25.2	3 22
Sun Jun 12/Mon Jun 13	7552.8	17 01 42	19 38	21 13	3 40	5 15	14 14	20 42	.....	1 18	59	12 11.1	- 0 27
Mon Jun 13/Tue Jun 14	7553.8	17 05 38	19 39	21 13	3 40	5 15	14 19	20 46	.....	1 51	68	12 56.5	- 4 14
Tue Jun 14/Wed Jun 15	7554.8	17 09 35	19 39	21 14	3 40	5 15	14 23	20 50	.....	2 24	76	13 42.1	- 7 52
Wed Jun 15/Thu Jun 16	7555.8	17 13 32	19 39	21 14	3 40	5 15	14 27	20 54	.....	2 59	84	14 28.5	-11 14
Thu Jun 16/Fri Jun 17	7556.8	17 17 28	19 40	21 15	3 40	5 15	14 32	20 58	.....	3 36	90	15 16.3	-14 11
Fri Jun 17/Sat Jun 18	7557.8	17 21 25	19 40	21 15	3 40	5 15	14 36	21 02	.....	4 16	95	16 05.7	-16 35
Sat Jun 18/Sun Jun 19	7558.8	17 25 21	19 40	21 15	3 40	5 15	14 40	21 06	18 00	5 00	98	16 56.8	-18 19
Sun Jun 19/Mon Jun 20	7559.8	17 29 18	19 40	21 15	3 41	5 16	14 44	21 10	18 53	5 48	100	17 49.5	-19 13
Mon Jun 20/Tue Jun 21	7560.8	17 33 14	19 41	21 16	3 41	5 16	14 49	21 15	19 44	.....	99	18 43.3	-19 12
Tue Jun 21/Wed Jun 22	7561.8	17 37 11	19 41	21 16	3 41	5 16	14 53	21 19	20 33	.....	96	19 37.8	-18 14
Wed Jun 22/Thu Jun 23	7562.8	17 41 07	19 41	21 16	3 41	5 16	14 57	21 23	21 20	.....	91	20 32.1	-16 20
Thu Jun 23/Fri Jun 24	7563.8	17 45 04	19 41	21 16	3 42	5 17	15 01	21 27	22 04	.....	84	21 26.1	-13 34
Fri Jun 24/Sat Jun 25	7564.8	17 49 01	19 41	21 16	3 42	5 17	15 05	21 32	22 45	.....	76	22 19.4	-10 05
Sat Jun 25/Sun Jun 26	7565.8	17 52 57	19 41	21 16	3 42	5 17	15 09	21 36	23 25	.....	66	23 12.3	- 6 04
Sun Jun 26/Mon Jun 27	7566.8	17 56 54	19 41	21 16	3 43	5 18	15 13	21 40	0 04	.....	55	0 05.1	- 1 44
Mon Jun 27/Tue Jun 28	7567.8	18 00 50	19 42	21 16	3 43	5 18	15 17	21 45	0 44	.....	44	0 58.4	2 43
Tue Jun 28/Wed Jun 29	7568.8	18 04 47	19 42	21 16	3 44	5 18	15 21	21 49	1 24	.....	32	1 52.7	7 02
Wed Jun 29/Thu Jun 30	7569.8	18 08 43	19 42	21 16	3 44	5 19	15 24	21 54	2 08	.....	22	2 48.5	10 55
Thu Jun 30/Fri Jul 01	7570.8	18 12 40	19 42	21 16	3 45	5 19	15 28	21 58	2 55	.....	13	3 46.0	14 09



\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Jul 01/Sat Jul 02	7571.8	18 16 36	19 42	21 16	3 45	5 20	15 32	22 02	3 47	.....	6	4 44.9	16 27
Sat Jul 02/Sun Jul 03	7572.8	18 20 33	19 41	21 16	3 46	5 20	15 36	22 07	4 42	18 01	2	5 44.6	17 41
Sun Jul 03/Mon Jul 04	7573.8	18 24 30	19 41	21 15	3 46	5 21	15 39	22 12	5 41	19 01	0	6 44.0	17 44
Mon Jul 04/Tue Jul 05	7574.8	18 28 26	19 41	21 15	3 47	5 21	15 43	22 16	.....	19 55	1	7 41.9	16 40
Tue Jul 05/Wed Jul 06	7575.8	18 32 23	19 41	21 15	3 48	5 21	15 47	22 21	.....	20 44	4	8 37.7	14 38
Wed Jul 06/Thu Jul 07	7576.8	18 36 19	19 41	21 15	3 48	5 22	15 50	22 25	.....	21 28	9	9 30.7	11 51
Thu Jul 07/Fri Jul 08	7577.8	18 40 16	19 41	21 14	3 49	5 22	15 54	22 30	.....	22 08	16	10 21.3	8 31
Fri Jul 08/Sat Jul 09	7578.8	18 44 12	19 41	21 14	3 50	5 23	15 57	22 35	.....	22 44	24	11 09.6	4 52
Sat Jul 09/Sun Jul 10	7579.8	18 48 09	19 40	21 13	3 51	5 24	16 01	22 39	.....	23 18	33	11 56.2	1 03
Sun Jul 10/Mon Jul 11	7580.8	18 52 05	19 40	21 13	3 51	5 24	16 04	22 44	.....	23 51	42	12 42.0	- 2 47
Mon Jul 11/Tue Jul 12	7581.8	18 56 02	19 40	21 12	3 52	5 25	16 08	22 49	.....	0 24	52	13 27.4	- 6 29
Tue Jul 12/Wed Jul 13	7582.8	18 59 59	19 39	21 12	3 53	5 25	16 11	22 53	.....	0 58	61	14 13.3	- 9 57
Wed Jul 13/Thu Jul 14	7583.8	19 03 55	19 39	21 11	3 54	5 26	16 15	22 58	.....	1 34	70	15 00.2	-13 03
Thu Jul 14/Fri Jul 15	7584.8	19 07 52	19 39	21 11	3 54	5 26	16 18	23 03	.....	2 12	79	15 48.6	-15 41
Fri Jul 15/Sat Jul 16	7585.8	19 11 48	19 38	21 10	3 55	5 27	16 21	23 08	.....	2 55	86	16 38.9	-17 41
Sat Jul 16/Sun Jul 17	7586.8	19 15 45	19 38	21 09	3 56	5 28	16 25	23 13	.....	3 41	92	17 31.0	-18 55
Sun Jul 17/Mon Jul 18	7587.8	19 19 41	19 37	21 09	3 57	5 28	16 28	23 17	17 37	4 31	97	18 24.7	-19 17
Mon Jul 18/Tue Jul 19	7588.8	19 23 38	19 37	21 08	3 58	5 29	16 31	23 22	18 27	5 26	99	19 19.6	-18 41
Tue Jul 19/Wed Jul 20	7589.8	19 27 34	19 36	21 07	3 59	5 29	16 34	23 27	19 16	6 24	100	20 15.0	-17 05
Wed Jul 20/Thu Jul 21	7590.8	19 31 31	19 36	21 06	4 00	5 30	16 37	23 32	20 02	.....	98	21 10.3	-14 33
Thu Jul 21/Fri Jul 22	7591.8	19 35 28	19 35	21 05	4 01	5 31	16 40	23 37	20 45	.....	94	22 05.1	-11 13
Fri Jul 22/Sat Jul 23	7592.8	19 39 24	19 35	21 05	4 01	5 31	16 44	23 42	21 26	.....	87	22 59.3	- 7 16
Sat Jul 23/Sun Jul 24	7593.8	19 43 21	19 34	21 04	4 02	5 32	16 47	23 46	22 06	.....	78	23 53.0	- 2 56
Sun Jul 24/Mon Jul 25	7594.8	19 47 17	19 33	21 03	4 03	5 33	16 50	23 51	22 45	.....	68	0 46.7	1 34
Mon Jul 25/Tue Jul 26	7595.8	19 51 14	19 33	21 02	4 04	5 33	16 53	23 56	23 25	.....	57	1 40.8	5 56
Tue Jul 26/Wed Jul 27	7596.8	19 55 10	19 32	21 01	4 05	5 34	16 56	0 01	0 07	.....	46	2 35.7	9 55
Wed Jul 27/Thu Jul 28	7597.8	19 59 07	19 31	21 00	4 06	5 35	16 59	0 06	0 52	.....	34	3 31.9	13 18
Thu Jul 28/Fri Jul 29	7598.8	20 03 03	19 31	20 59	4 07	5 35	17 02	0 11	1 40	.....	24	4 29.3	15 50
Fri Jul 29/Sat Jul 30	7599.8	20 07 00	19 30	20 58	4 08	5 36	17 04	0 16	2 33	.....	15	5 27.5	17 22
Sat Jul 30/Sun Jul 31	7600.8	20 10 57	19 29	20 57	4 09	5 37	17 07	0 21	3 29	.....	8	6 25.7	17 49
Sun Jul 31/Mon Aug 01	7601.8	20 14 53	19 28	20 56	4 10	5 37	17 10	0 26	4 28	17 45	3	7 23.2	17 09

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----					
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Aug 01/Tue Aug 02	7602.8	20 18 50	19 28	20 55	4 11	5 38	17 13	0 30	5 27	18 36	0	8 19.1	15 29	
Tue Aug 02/Wed Aug 03	7603.8	20 22 46	19 27	20 54	4 12	5 39	17 16	0 35	6 27	19 22	0	9 12.8	12 59	
Wed Aug 03/Thu Aug 04	7604.8	20 26 43	19 26	20 52	4 13	5 39	17 19	0 40	.....	20 03	2	10 04.2	9 51	
Thu Aug 04/Fri Aug 05	7605.8	20 30 39	19 25	20 51	4 14	5 40	17 21	0 45	.....	20 41	6	10 53.4	6 18	
Fri Aug 05/Sat Aug 06	7606.8	20 34 36	19 24	20 50	4 15	5 41	17 24	0 50	.....	21 16	12	11 40.8	2 31	
Sat Aug 06/Sun Aug 07	7607.8	20 38 32	19 23	20 49	4 16	5 41	17 27	0 55	.....	21 50	19	12 27.0	- 1 19	
Sun Aug 07/Mon Aug 08	7608.8	20 42 29	19 22	20 48	4 17	5 42	17 30	1 00	.....	22 23	27	13 12.6	- 5 05	
Mon Aug 08/Tue Aug 09	7609.8	20 46 26	19 21	20 47	4 18	5 43	17 32	1 05	.....	22 57	36	13 58.2	- 8 37	
Tue Aug 09/Wed Aug 10	7610.8	20 50 22	19 20	20 45	4 18	5 43	17 35	1 10	.....	23 32	45	14 44.4	-11 51	
Wed Aug 10/Thu Aug 11	7611.8	20 54 19	19 19	20 44	4 19	5 44	17 38	1 14	.....	0 09	54	15 31.7	-14 37	
Thu Aug 11/Fri Aug 12	7612.8	20 58 15	19 18	20 43	4 20	5 45	17 40	1 19	.....	0 49	64	16 20.6	-16 51	
Fri Aug 12/Sat Aug 13	7613.8	21 02 12	19 17	20 42	4 21	5 45	17 43	1 24	.....	1 33	73	17 11.3	-18 23	
Sat Aug 13/Sun Aug 14	7614.8	21 06 08	19 16	20 40	4 22	5 46	17 46	1 29	.....	2 21	81	18 03.8	-19 06	
Sun Aug 14/Mon Aug 15	7615.8	21 10 05	19 15	20 39	4 23	5 47	17 48	1 34	.....	3 14	89	18 57.9	-18 54	
Mon Aug 15/Tue Aug 16	7616.8	21 14 01	19 14	20 38	4 24	5 47	17 51	1 39	.....	4 10	95	19 53.2	-17 44	
Tue Aug 16/Wed Aug 17	7617.8	21 17 58	19 13	20 36	4 25	5 48	17 54	1 44	.....	5 10	98	20 49.1	-15 34	
Wed Aug 17/Thu Aug 18	7618.8	21 21 55	19 12	20 35	4 26	5 49	17 56	1 48	.....	6 12	100	21 45.1	-12 29	
Thu Aug 18/Fri Aug 19	7619.8	21 25 51	19 11	20 34	4 27	5 49	17 59	1 53	.....	19 22	99	22 40.8	- 8 40	
Fri Aug 19/Sat Aug 20	7620.8	21 29 48	19 10	20 32	4 28	5 50	18 01	1 58	.....	20 04	95	23 36.2	- 4 20	
Sat Aug 20/Sun Aug 21	7621.8	21 33 44	19 09	20 31	4 29	5 51	18 04	2 03	.....	20 44	89	0 31.5	0 16	
Sun Aug 21/Mon Aug 22	7622.8	21 37 41	19 08	20 29	4 29	5 51	18 07	2 08	.....	21 25	81	1 27.0	4 48	
Mon Aug 22/Tue Aug 23	7623.8	21 41 37	19 06	20 28	4 30	5 52	18 09	2 13	.....	22 07	70	2 22.9	9 00	
Tue Aug 23/Wed Aug 24	7624.8	21 45 34	19 05	20 27	4 31	5 52	18 12	2 17	.....	22 51	59	3 19.5	12 35	
Wed Aug 24/Thu Aug 25	7625.8	21 49 30	19 04	20 25	4 32	5 53	18 14	2 22	.....	23 38	48	4 16.9	15 21	
Thu Aug 25/Fri Aug 26	7626.8	21 53 27	19 03	20 24	4 33	5 54	18 17	2 27	.....	0 29	37	5 14.6	17 07	
Fri Aug 26/Sat Aug 27	7627.8	21 57 24	19 02	20 22	4 34	5 54	18 19	2 32	.....	1 23	26	6 12.3	17 49	
Sat Aug 27/Sun Aug 28	7628.8	22 01 20	19 00	20 21	4 35	5 55	18 22	2 37	.....	2 20	17	7 09.1	17 26	
Sun Aug 28/Mon Aug 29	7629.8	22 05 17	18 59	20 20	4 35	5 56	18 24	2 41	.....	3 18	10	8 04.5	16 03	
Mon Aug 29/Tue Aug 30	7630.8	22 09 13	18 58	20 18	4 36	5 56	18 27	2 46	.....	4 17	5	8 58.0	13 49	
Tue Aug 30/Wed Aug 31	7631.8	22 13 10	18 57	20 17	4 37	5 57	18 29	2 51	.....	5 15	18 00	1	9 49.4	10 54
Wed Aug 31/Thu Sep 01	7632.8	22 17 06	18 56	20 15	4 38	5 58	18 32	2 56	.....	6 11	18 38	0	10 38.8	7 30

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Sep 01/Fri Sep 02	7633.8	22 21 03	18 54	20 14	4 39	5 58	18 34	3 00	.....	19 14	1	11 26.5	3 48
Fri Sep 02/Sat Sep 03	7634.8	22 24 59	18 53	20 12	4 39	5 59	18 37	3 05	.....	19 49	4	12 12.9	- 0 01
Sat Sep 03/Sun Sep 04	7635.8	22 28 56	18 52	20 11	4 40	5 59	18 39	3 10	.....	20 22	8	12 58.6	- 3 48
Sun Sep 04/Mon Sep 05	7636.8	22 32 53	18 50	20 09	4 41	6 00	18 42	3 15	.....	20 56	14	13 44.1	- 7 25
Mon Sep 05/Tue Sep 06	7637.8	22 36 49	18 49	20 08	4 42	6 01	18 44	3 19	.....	21 30	21	14 29.8	-10 44
Tue Sep 06/Wed Sep 07	7638.8	22 40 46	18 48	20 07	4 43	6 01	18 47	3 24	.....	22 06	29	15 16.4	-13 39
Wed Sep 07/Thu Sep 08	7639.8	22 44 42	18 47	20 05	4 43	6 02	18 49	3 29	.....	22 45	38	16 04.1	-16 02
Thu Sep 08/Fri Sep 09	7640.8	22 48 39	18 45	20 04	4 44	6 02	18 52	3 33	.....	23 26	47	16 53.3	-17 47
Fri Sep 09/Sat Sep 10	7641.8	22 52 35	18 44	20 02	4 45	6 03	18 54	3 38	.....	0 12	57	17 44.1	-18 48
Sat Sep 10/Sun Sep 11	7642.8	22 56 32	18 43	20 01	4 46	6 04	18 57	3 43	.....	1 02	67	18 36.4	-18 58
Sun Sep 11/Mon Sep 12	7643.8	23 00 28	18 41	19 59	4 46	6 04	18 59	3 48	.....	1 55	76	19 30.2	-18 12
Mon Sep 12/Tue Sep 13	7644.8	23 04 25	18 40	19 58	4 47	6 05	19 02	3 52	.....	2 53	84	20 25.0	-16 29
Tue Sep 13/Wed Sep 14	7645.8	23 08 22	18 39	19 56	4 48	6 06	19 04	3 57	.....	3 54	92	21 20.6	-13 49
Wed Sep 14/Thu Sep 15	7646.8	23 12 18	18 37	19 55	4 48	6 06	19 07	4 02	17 14	4 57	97	22 16.5	-10 18
Thu Sep 15/Fri Sep 16	7647.8	23 16 15	18 36	19 54	4 49	6 07	19 09	4 06	17 56	6 02	100	23 12.8	- 6 06
Fri Sep 16/Sat Sep 17	7648.8	23 20 11	18 35	19 52	4 50	6 07	19 12	4 11	18 38	7 09	100	0 09.4	- 1 29
Sat Sep 17/Sun Sep 18	7649.8	23 24 08	18 33	19 51	4 51	6 08	19 14	4 16	19 20	.....	97	1 06.4	3 16
Sun Sep 18/Mon Sep 19	7650.8	23 28 04	18 32	19 49	4 51	6 09	19 17	4 20	20 03	.....	91	2 04.2	7 46
Mon Sep 19/Tue Sep 20	7651.8	23 32 01	18 31	19 48	4 52	6 09	19 19	4 25	20 47	.....	83	3 02.7	11 43
Tue Sep 20/Wed Sep 21	7652.8	23 35 57	18 29	19 46	4 53	6 10	19 22	4 29	21 35	.....	73	4 01.8	14 50
Wed Sep 21/Thu Sep 22	7653.8	23 39 54	18 28	19 45	4 53	6 10	19 24	4 34	22 25	.....	62	5 01.0	16 55
Thu Sep 22/Fri Sep 23	7654.8	23 43 51	18 27	19 44	4 54	6 11	19 27	4 39	23 19	.....	51	5 59.7	17 53
Fri Sep 23/Sat Sep 24	7655.8	23 47 47	18 25	19 42	4 55	6 12	19 29	4 43	0 15	.....	40	6 57.3	17 44
Sat Sep 24/Sun Sep 25	7656.8	23 51 44	18 24	19 41	4 55	6 12	19 32	4 48	1 12	.....	29	7 53.0	16 33
Sun Sep 25/Mon Sep 26	7657.8	23 55 40	18 23	19 40	4 56	6 13	19 34	4 53	2 10	.....	20	8 46.5	14 30
Mon Sep 26/Tue Sep 27	7658.8	23 59 37	18 21	19 38	4 57	6 14	19 37	4 57	3 08	.....	13	9 37.8	11 45
Tue Sep 27/Wed Sep 28	7659.8	0 03 33	18 20	19 37	4 58	6 14	19 40	5 02	4 04	16 38	7	10 27.1	8 28
Wed Sep 28/Thu Sep 29	7660.8	0 07 30	18 19	19 35	4 58	6 15	19 42	5 06	5 00	17 14	3	11 14.6	4 52
Thu Sep 29/Fri Sep 30	7661.8	0 11 26	18 18	19 34	4 59	6 15	19 45	5 11	5 54	17 49	0	12 00.9	1 05
Fri Sep 30/Sat Oct 01	7662.8	0 15 23	18 16	19 33	5 00	6 16	19 47	5 16	6 48	18 22	0	12 46.5	- 2 43

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Oct 01/Sun Oct 02	7663.8	0 19 20	18 15	19 31	5 00	6 17	19 50	5 20	.....	18 56	2	13 31.8	- 6 23
Sun Oct 02/Mon Oct 03	7664.8	0 23 16	18 14	19 30	5 01	6 17	19 53	5 25	.....	19 30	5	14 17.3	- 9 48
Mon Oct 03/Tue Oct 04	7665.8	0 27 13	18 12	19 29	5 02	6 18	19 55	5 30	.....	20 05	9	15 03.4	-12 50
Tue Oct 04/Wed Oct 05	7666.8	0 31 09	18 11	19 28	5 02	6 19	19 58	5 34	.....	20 42	16	15 50.5	-15 22
Wed Oct 05/Thu Oct 06	7667.8	0 35 06	18 10	19 26	5 03	6 19	20 01	5 39	.....	21 22	23	16 38.6	-17 18
Thu Oct 06/Fri Oct 07	7668.8	0 39 02	18 09	19 25	5 04	6 20	20 03	5 43	.....	22 06	31	17 28.1	-18 32
Fri Oct 07/Sat Oct 08	7669.8	0 42 59	18 07	19 24	5 04	6 21	20 06	5 48	.....	22 53	41	18 18.8	-18 59
Sat Oct 08/Sun Oct 09	7670.8	0 46 55	18 06	19 23	5 05	6 21	20 09	5 53	.....	23 44	50	19 10.6	-18 34
Sun Oct 09/Mon Oct 10	7671.8	0 50 52	18 05	19 21	5 06	6 22	20 12	5 57	.....	0 38	60	20 03.5	-17 15
Mon Oct 10/Tue Oct 11	7672.8	0 54 49	18 04	19 20	5 06	6 23	20 14	6 02	.....	1 36	70	20 57.1	-15 01
Tue Oct 11/Wed Oct 12	7673.8	0 58 45	18 03	19 19	5 07	6 24	20 17	6 06	.....	2 37	80	21 51.4	-11 55
Wed Oct 12/Thu Oct 13	7674.8	1 02 42	18 01	19 18	5 08	6 24	20 20	6 11	.....	3 40	88	22 46.5	- 8 03
Thu Oct 13/Fri Oct 14	7675.8	1 06 38	18 00	19 17	5 08	6 25	20 23	6 16	.....	4 46	95	23 42.4	- 3 36
Fri Oct 14/Sat Oct 15	7676.8	1 10 35	17 59	19 16	5 09	6 26	20 26	6 20	.....	5 53	99	0 39.4	1 10
Sat Oct 15/Sun Oct 16	7677.8	1 14 31	17 58	19 15	5 10	6 26	20 28	6 25	.....	7 02	100	1 37.8	5 56
Sun Oct 16/Mon Oct 17	7678.8	1 18 28	17 57	19 14	5 10	6 27	20 31	6 30	.....	18 37	98	2 37.6	10 18
Mon Oct 17/Tue Oct 18	7679.8	1 22 24	17 56	19 12	5 11	6 28	20 34	6 34	.....	19 25	93	3 38.7	13 57
Tue Oct 18/Wed Oct 19	7680.8	1 26 21	17 55	19 11	5 12	6 29	20 37	6 39	.....	20 16	85	4 40.4	16 33
Wed Oct 19/Thu Oct 20	7681.8	1 30 18	17 53	19 10	5 12	6 29	20 40	6 43	.....	21 10	76	5 41.9	17 57
Thu Oct 20/Fri Oct 21	7682.8	1 34 14	17 52	19 09	5 13	6 30	20 43	6 48	.....	22 07	66	6 42.0	18 08
Fri Oct 21/Sat Oct 22	7683.8	1 38 11	17 51	19 08	5 14	6 31	20 46	6 53	.....	23 06	55	7 39.9	17 11
Sat Oct 22/Sun Oct 23	7684.8	1 42 07	17 50	19 07	5 14	6 32	20 49	6 57	.....	0 05	44	8 35.0	15 16
Sun Oct 23/Mon Oct 24	7685.8	1 46 04	17 49	19 06	5 15	6 32	20 52	7 02	.....	1 03	34	9 27.3	12 37
Mon Oct 24/Tue Oct 25	7686.8	1 50 00	17 48	19 05	5 16	6 33	20 55	7 07	.....	2 00	25	10 17.1	9 25
Tue Oct 25/Wed Oct 26	7687.8	1 53 57	17 47	19 05	5 16	6 34	20 58	7 11	.....	2 55	17	11 04.8	5 51
Wed Oct 26/Thu Oct 27	7688.8	1 57 53	17 46	19 04	5 17	6 35	21 01	7 16	.....	3 49	10	11 51.1	2 05
Thu Oct 27/Fri Oct 28	7689.8	2 01 50	17 45	19 03	5 18	6 36	21 04	7 21	.....	4 43	5	12 36.4	- 1 44
Fri Oct 28/Sat Oct 29	7690.8	2 05 47	17 44	19 02	5 19	6 36	21 07	7 25	.....	5 35	2	13 21.4	- 5 27
Sat Oct 29/Sun Oct 30	7691.8	2 09 43	17 43	19 01	5 19	6 37	21 10	7 30	.....	6 28	0	14 06.6	- 8 57
Sun Oct 30/Mon Oct 31	7692.8	2 13 40	17 43	19 00	5 20	6 38	21 13	7 35	.....	7 20	0	14 52.4	-12 07
Mon Oct 31/Tue Nov 01	7693.8	2 17 36	17 42	19 00	5 21	6 39	21 16	7 39	.....	18 42	2	15 39.1	-14 49

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Nov 01/Wed Nov 02	7694.8	2 21 33	17 41	18 59	5 21	6 40	21 20	7 44	.....	19 21	6	16 26.9	-16 55
Wed Nov 02/Thu Nov 03	7695.8	2 25 29	17 40	18 58	5 22	6 40	21 23	7 49	.....	20 03	11	17 15.8	-18 21
Thu Nov 03/Fri Nov 04	7696.8	2 29 26	17 39	18 57	5 23	6 41	21 26	7 53	.....	20 48	17	18 05.6	-19 01
Fri Nov 04/Sat Nov 05	7697.8	2 33 22	17 38	18 57	5 24	6 42	21 29	7 58	.....	21 37	25	18 56.4	-18 51
Sat Nov 05/Sun Nov 06	7698.8	2 37 19	17 38	18 56	5 24	6 43	21 33	8 03	.....	22 30	34	19 47.7	-17 50
Sun Nov 06/Mon Nov 07	7699.8	2 41 16	17 37	18 55	5 25	6 44	21 36	8 07	.....	23 25	44	20 39.5	-15 56
Mon Nov 07/Tue Nov 08	7700.8	2 45 12	17 36	18 55	5 26	6 45	21 39	8 12	.....	0 22	54	21 31.6	-13 13
Tue Nov 08/Wed Nov 09	7701.8	2 49 09	17 35	18 54	5 27	6 46	21 43	8 17	.....	1 22	65	22 24.3	- 9 45
Wed Nov 09/Thu Nov 10	7702.8	2 53 05	17 35	18 54	5 27	6 46	21 46	8 21	.....	2 25	75	23 17.8	- 5 39
Thu Nov 10/Fri Nov 11	7703.8	2 57 02	17 34	18 53	5 28	6 47	21 49	8 26	.....	3 29	84	0 12.5	- 1 06
Fri Nov 11/Sat Nov 12	7704.8	3 00 58	17 33	18 53	5 29	6 48	21 53	8 31	.....	4 36	92	1 09.0	3 40
Sat Nov 12/Sun Nov 13	7705.8	3 04 55	17 33	18 52	5 30	6 49	21 56	8 35	16 24	5 45	97	2 07.5	8 18
Sun Nov 13/Mon Nov 14	7706.8	3 08 51	17 32	18 52	5 30	6 50	22 00	8 40	17 10	6 55	100	3 08.4	12 25
Mon Nov 14/Tue Nov 15	7707.8	3 12 48	17 32	18 51	5 31	6 51	22 03	8 45	18 00	8 04	99	4 11.1	15 40
Tue Nov 15/Wed Nov 16	7708.8	3 16 45	17 31	18 51	5 32	6 52	22 07	8 49	18 54	.....	95	5 14.9	17 45
Wed Nov 16/Thu Nov 17	7709.8	3 20 41	17 31	18 50	5 33	6 52	22 10	8 54	19 52	.....	89	6 18.2	18 30
Thu Nov 17/Fri Nov 18	7710.8	3 24 38	17 30	18 50	5 33	6 53	22 14	8 59	20 53	.....	80	7 19.6	17 58
Fri Nov 18/Sat Nov 19	7711.8	3 28 34	17 30	18 50	5 34	6 54	22 18	9 04	21 54	.....	71	8 18.1	16 18
Sat Nov 19/Sun Nov 20	7712.8	3 32 31	17 29	18 50	5 35	6 55	22 21	9 08	22 54	.....	60	9 13.2	13 45
Sun Nov 20/Mon Nov 21	7713.8	3 36 27	17 29	18 49	5 36	6 56	22 25	9 13	23 53	.....	50	10 05.1	10 35
Mon Nov 21/Tue Nov 22	7714.8	3 40 24	17 29	18 49	5 36	6 57	22 29	9 18	0 50	.....	40	10 54.1	7 00
Tue Nov 22/Wed Nov 23	7715.8	3 44 20	17 28	18 49	5 37	6 58	22 32	9 22	1 44	.....	30	11 41.2	3 13
Wed Nov 23/Thu Nov 24	7716.8	3 48 17	17 28	18 49	5 38	6 59	22 36	9 27	2 38	.....	22	12 26.8	- 0 39
Thu Nov 24/Fri Nov 25	7717.8	3 52 14	17 28	18 49	5 39	6 59	22 40	9 32	3 31	.....	15	13 11.8	- 4 26
Fri Nov 25/Sat Nov 26	7718.8	3 56 10	17 28	18 48	5 39	7 00	22 44	9 36	4 23	.....	9	13 56.8	- 8 02
Sat Nov 26/Sun Nov 27	7719.8	4 00 07	17 27	18 48	5 40	7 01	22 48	9 41	5 16	16 06	4	14 42.3	-11 19
Sun Nov 27/Mon Nov 28	7720.8	4 04 03	17 27	18 48	5 41	7 02	22 51	9 46	6 08	16 42	1	15 28.7	-14 11
Mon Nov 28/Tue Nov 29	7721.8	4 08 00	17 27	18 48	5 42	7 03	22 55	9 51	7 00	17 20	0	16 16.2	-16 29
Tue Nov 29/Wed Nov 30	7722.8	4 11 56	17 27	18 48	5 42	7 04	22 59	9 55	7 52	18 01	1	17 04.9	-18 07
Wed Nov 30/Thu Dec 01	7723.8	4 15 53	17 27	18 48	5 43	7 04	23 03	10 00	.....	18 46	3	17 54.7	-19 00

\*\*\*\*\* 2016 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) (2016 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Dec 01/Fri Dec 02	7724.8	4 19 49	17 27	18 48	5 44	7 05	23 07	10 05	.....	19 34	7	18 45.2	-19 04
Fri Dec 02/Sat Dec 03	7725.8	4 23 46	17 27	18 48	5 44	7 06	23 11	10 09	.....	20 25	12	19 36.2	-18 16
Sat Dec 03/Sun Dec 04	7726.8	4 27 43	17 27	18 48	5 45	7 07	23 15	10 14	.....	21 19	20	20 27.4	-16 37
Sun Dec 04/Mon Dec 05	7727.8	4 31 39	17 27	18 48	5 46	7 08	23 19	10 18	.....	22 15	28	21 18.4	-14 10
Mon Dec 05/Tue Dec 06	7728.8	4 35 36	17 27	18 49	5 47	7 08	23 23	10 23	.....	23 13	38	22 09.5	-11 00
Tue Dec 06/Wed Dec 07	7729.8	4 39 32	17 27	18 49	5 47	7 09	23 27	10 28	.....	0 12	48	23 00.8	- 7 12
Wed Dec 07/Thu Dec 08	7730.8	4 43 29	17 27	18 49	5 48	7 10	23 32	10 32	.....	1 13	59	23 52.8	- 2 56
Thu Dec 08/Fri Dec 09	7731.8	4 47 25	17 27	18 49	5 49	7 11	23 36	10 37	.....	2 17	70	0 46.2	1 37
Fri Dec 09/Sat Dec 10	7732.8	4 51 22	17 27	18 49	5 49	7 11	23 40	10 42	.....	3 22	80	1 41.5	6 12
Sat Dec 10/Sun Dec 11	7733.8	4 55 18	17 28	18 50	5 50	7 12	23 44	10 46	.....	4 30	89	2 39.3	10 31
Sun Dec 11/Mon Dec 12	7734.8	4 59 15	17 28	18 50	5 51	7 13	23 48	10 51	15 44	5 38	95	3 39.9	14 13
Mon Dec 12/Tue Dec 13	7735.8	5 03 12	17 28	18 50	5 51	7 13	23 53	10 55	16 35	6 47	99	4 42.9	16 58
Tue Dec 13/Wed Dec 14	7736.8	5 07 08	17 28	18 51	5 52	7 14	23 57	11 00	17 31	7 52	100	5 47.1	18 27
Wed Dec 14/Thu Dec 15	7737.8	5 11 05	17 29	18 51	5 52	7 15	0 01	11 04	18 32	.....	97	6 51.0	18 35
Thu Dec 15/Fri Dec 16	7738.8	5 15 01	17 29	18 51	5 53	7 15	0 06	11 09	19 34	.....	92	7 52.9	17 25
Fri Dec 16/Sat Dec 17	7739.8	5 18 58	17 29	18 52	5 54	7 16	0 10	11 13	20 38	.....	85	8 51.7	15 10
Sat Dec 17/Sun Dec 18	7740.8	5 22 54	17 30	18 52	5 54	7 16	0 14	11 18	21 39	.....	76	9 46.9	12 06
Sun Dec 18/Mon Dec 19	7741.8	5 26 51	17 30	18 53	5 55	7 17	0 19	11 22	22 39	.....	67	10 38.7	8 31
Mon Dec 19/Tue Dec 20	7742.8	5 30 47	17 31	18 53	5 55	7 17	0 23	11 27	23 36	.....	57	11 27.8	4 39
Tue Dec 20/Wed Dec 21	7743.8	5 34 44	17 31	18 54	5 56	7 18	0 27	11 31	0 31	.....	47	12 14.8	0 42
Wed Dec 21/Thu Dec 22	7744.8	5 38 41	17 32	18 54	5 56	7 18	0 32	11 36	1 25	.....	38	13 00.6	- 3 12
Thu Dec 22/Fri Dec 23	7745.8	5 42 37	17 32	18 55	5 57	7 19	0 36	11 40	2 17	.....	29	13 45.8	- 6 55
Fri Dec 23/Sat Dec 24	7746.8	5 46 34	17 33	18 55	5 57	7 19	0 41	11 45	3 10	.....	21	14 31.2	-10 20
Sat Dec 24/Sun Dec 25	7747.8	5 50 30	17 33	18 56	5 57	7 20	0 45	11 49	4 02	.....	14	15 17.4	-13 21
Sun Dec 25/Mon Dec 26	7748.8	5 54 27	17 34	18 56	5 58	7 20	0 50	11 53	4 55	.....	8	16 04.6	-15 51
Mon Dec 26/Tue Dec 27	7749.8	5 58 23	17 35	18 57	5 58	7 21	0 54	11 58	5 47	15 59	4	16 53.1	-17 43
Tue Dec 27/Wed Dec 28	7750.8	6 02 20	17 35	18 57	5 59	7 21	0 59	12 02	6 38	16 43	1	17 42.8	-18 51
Wed Dec 28/Thu Dec 29	7751.8	6 06 16	17 36	18 58	5 59	7 21	1 03	12 06	7 27	17 30	0	18 33.6	-19 09
Thu Dec 29/Fri Dec 30	7752.8	6 10 13	17 36	18 59	5 59	7 21	1 08	12 11	8 15	18 20	1	19 24.9	-18 36
Fri Dec 30/Sat Dec 31	7753.8	6 14 10	17 37	18 59	6 00	7 22	1 13	12 15	.....	19 14	4	20 16.5	-17 10
Sat Dec 31/Sun Jan 01	7754.8	6 18 06	17 38	19 00	6 00	7 22	1 17	12 19	.....	20 10	9	21 07.8	-14 54