

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:

***** 2018 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 2018, 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 17 23 31	Dec 26 2 20	Jan 01 19 25	Jan 08 15 27
Jan 16 19 18	Jan 24 15 21	Jan 31 6 28	Feb 07 8 56
Feb 15 14 07	Feb 23 1 09	Mar 01 17 52	Mar 09 4 23
Mar 17 6 14	Mar 24 8 36	Mar 31 5 38	Apr 08 0 21
Apr 15 19 00	Apr 22 14 47	Apr 29 17 59	May 07 19 12
May 15 4 50	May 21 20 51	May 29 7 21	Jun 06 11 34
Jun 13 12 45	Jun 20 3 53	Jun 27 21 55	Jul 06 0 53
Jul 12 19 50	Jul 19 12 54	Jul 27 13 22	Aug 04 11 20
Aug 11 2 59	Aug 18 0 50	Aug 26 4 58	Sep 02 19 39
Sep 09 11 03	Sep 16 16 16	Sep 24 19 55	Oct 02 2 47
Oct 08 20 48	Oct 16 11 02	Oct 24 9 48	Oct 31 9 42
Nov 07 9 03	Nov 15 7 54	Nov 22 22 41	Nov 29 17 21
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

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Jan 01/Tue Jan 02	8120.8	6 21 05	17 38	19 00	6 00	7 22	1 21	12 22	17 28	7 57	100	7 02.7	19 47
Tue Jan 02/Wed Jan 03	8121.8	6 25 02	17 39	19 01	6 00	7 22	1 25	12 26	18 34	.....	98	8 08.1	18 34
Wed Jan 03/Thu Jan 04	8122.8	6 28 58	17 40	19 02	6 01	7 22	1 30	12 31	19 42	.....	93	9 11.0	16 03
Thu Jan 04/Fri Jan 05	8123.8	6 32 55	17 41	19 03	6 01	7 23	1 35	12 35	20 49	.....	85	10 10.3	12 31
Fri Jan 05/Sat Jan 06	8124.8	6 36 52	17 41	19 03	6 01	7 23	1 39	12 39	21 54	.....	76	11 05.8	8 21
Sat Jan 06/Sun Jan 07	8125.8	6 40 48	17 42	19 04	6 01	7 23	1 44	12 43	22 57	.....	66	11 58.1	3 53
Sun Jan 07/Mon Jan 08	8126.8	6 44 45	17 43	19 05	6 01	7 23	1 49	12 47	23 56	.....	56	12 47.8	- 0 37
Mon Jan 08/Tue Jan 09	8127.8	6 48 41	17 44	19 05	6 01	7 23	1 53	12 51	0 53	.....	46	13 36.0	- 4 57
Tue Jan 09/Wed Jan 10	8128.8	6 52 38	17 45	19 06	6 01	7 23	1 58	12 55	1 49	.....	36	14 23.3	- 8 58
Wed Jan 10/Thu Jan 11	8129.8	6 56 34	17 46	19 07	6 01	7 23	2 03	12 59	2 44	.....	27	15 10.4	-12 31
Thu Jan 11/Fri Jan 12	8130.8	7 00 31	17 46	19 08	6 01	7 23	2 07	13 03	3 37	.....	19	15 57.9	-15 30
Fri Jan 12/Sat Jan 13	8131.8	7 04 27	17 47	19 08	6 01	7 22	2 12	13 07	4 30	.....	12	16 46.0	-17 50
Sat Jan 13/Sun Jan 14	8132.8	7 08 24	17 48	19 09	6 01	7 22	2 17	13 11	5 22	.....	7	17 34.9	-19 24
Sun Jan 14/Mon Jan 15	8133.8	7 12 21	17 49	19 10	6 01	7 22	2 22	13 15	6 11	16 09	3	18 24.3	-20 10
Mon Jan 15/Tue Jan 16	8134.8	7 16 17	17 50	19 11	6 01	7 22	2 26	13 19	6 58	16 56	1	19 14.1	-20 04
Tue Jan 16/Wed Jan 17	8135.8	7 20 14	17 51	19 12	6 01	7 22	2 31	13 22	7 42	17 46	0	20 03.7	-19 07
Wed Jan 17/Thu Jan 18	8136.8	7 24 10	17 52	19 12	6 01	7 21	2 36	13 26	.....	18 39	1	20 52.9	-17 20
Thu Jan 18/Fri Jan 19	8137.8	7 28 07	17 53	19 13	6 01	7 21	2 40	13 30	.....	19 33	4	21 41.5	-14 48
Fri Jan 19/Sat Jan 20	8138.8	7 32 03	17 53	19 14	6 01	7 21	2 45	13 34	.....	20 27	9	22 29.3	-11 37
Sat Jan 20/Sun Jan 21	8139.8	7 36 00	17 54	19 15	6 00	7 21	2 50	13 37	.....	21 23	15	23 16.8	- 7 55
Sun Jan 21/Mon Jan 22	8140.8	7 39 56	17 55	19 15	6 00	7 20	2 55	13 41	.....	22 19	23	0 04.2	- 3 48
Mon Jan 22/Tue Jan 23	8141.8	7 43 53	17 56	19 16	6 00	7 20	2 59	13 45	.....	23 16	32	0 52.2	0 32
Tue Jan 23/Wed Jan 24	8142.8	7 47 50	17 57	19 17	6 00	7 19	3 04	13 48	.....	0 15	42	1 41.6	4 58
Wed Jan 24/Thu Jan 25	8143.8	7 51 46	17 58	19 18	5 59	7 19	3 09	13 52	.....	1 16	53	2 33.1	9 16
Thu Jan 25/Fri Jan 26	8144.8	7 55 43	17 59	19 19	5 59	7 18	3 14	13 56	.....	2 20	64	3 27.5	13 12
Fri Jan 26/Sat Jan 27	8145.8	7 59 39	18 00	19 19	5 58	7 18	3 18	13 59	.....	3 25	75	4 25.3	16 28
Sat Jan 27/Sun Jan 28	8146.8	8 03 36	18 01	19 20	5 58	7 17	3 23	14 03	.....	4 31	84	5 26.5	18 45
Sun Jan 28/Mon Jan 29	8147.8	8 07 32	18 02	19 21	5 58	7 17	3 28	14 06	.....	5 35	92	6 30.4	19 46
Mon Jan 29/Tue Jan 30	8148.8	8 11 29	18 03	19 22	5 57	7 16	3 33	14 10	16 09	6 35	98	7 35.4	19 20
Tue Jan 30/Wed Jan 31	8149.8	8 15 25	18 04	19 23	5 57	7 16	3 37	14 13	17 16	7 30	100	8 39.7	17 28
Wed Jan 31/Thu Feb 01	8150.8	8 19 22	18 04	19 23	5 56	7 15	3 42	14 17	18 24	.....	99	9 41.7	14 21

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Feb 01/Fri Feb 02	8151.8	8 23 19	18 05	19 24	5 56	7 14	3 47	14 20	19 32	.....	96	10 40.4	10 21
Fri Feb 02/Sat Feb 03	8152.8	8 27 15	18 06	19 25	5 55	7 14	3 51	14 23	20 38	.....	89	11 36.0	5 51
Sat Feb 03/Sun Feb 04	8153.8	8 31 12	18 07	19 26	5 54	7 13	3 56	14 27	21 41	.....	82	12 28.6	1 09
Sun Feb 04/Mon Feb 05	8154.8	8 35 08	18 08	19 27	5 54	7 12	4 01	14 30	22 41	.....	73	13 19.2	- 3 26
Mon Feb 05/Tue Feb 06	8155.8	8 39 05	18 09	19 27	5 53	7 11	4 06	14 33	23 39	.....	63	14 08.3	- 7 42
Tue Feb 06/Wed Feb 07	8156.8	8 43 01	18 10	19 28	5 53	7 11	4 10	14 37	0 36	.....	53	14 56.7	-11 31
Wed Feb 07/Thu Feb 08	8157.8	8 46 58	18 11	19 29	5 52	7 10	4 15	14 40	1 31	.....	43	15 44.9	-14 44
Thu Feb 08/Fri Feb 09	8158.8	8 50 54	18 12	19 30	5 51	7 09	4 20	14 43	2 24	.....	34	16 33.5	-17 18
Fri Feb 09/Sat Feb 10	8159.8	8 54 51	18 12	19 30	5 50	7 08	4 25	14 46	3 16	.....	25	17 22.4	-19 05
Sat Feb 10/Sun Feb 11	8160.8	8 58 48	18 13	19 31	5 50	7 07	4 29	14 49	4 06	.....	18	18 11.9	-20 04
Sun Feb 11/Mon Feb 12	8161.8	9 02 44	18 14	19 32	5 49	7 07	4 34	14 53	4 54	.....	11	19 01.6	-20 12
Mon Feb 12/Tue Feb 13	8162.8	9 06 41	18 15	19 33	5 48	7 06	4 39	14 56	5 40	.....	6	19 51.4	-19 28
Tue Feb 13/Wed Feb 14	8163.8	9 10 37	18 16	19 34	5 47	7 05	4 43	14 59	6 22	16 33	2	20 40.9	-17 53
Wed Feb 14/Thu Feb 15	8164.8	9 14 34	18 17	19 34	5 46	7 04	4 48	15 02	7 01	17 26	0	21 29.9	-15 31
Thu Feb 15/Fri Feb 16	8165.8	9 18 30	18 18	19 35	5 46	7 03	4 53	15 05	7 38	18 21	0	22 18.3	-12 27
Fri Feb 16/Sat Feb 17	8166.8	9 22 27	18 18	19 36	5 45	7 02	4 58	15 08	.....	19 17	2	23 06.2	- 8 50
Sat Feb 17/Sun Feb 18	8167.8	9 26 23	18 19	19 37	5 44	7 01	5 02	15 11	.....	20 14	6	23 53.9	- 4 46
Sun Feb 18/Mon Feb 19	8168.8	9 30 20	18 20	19 37	5 43	7 00	5 07	15 14	.....	21 11	11	0 41.8	- 0 27
Mon Feb 19/Tue Feb 20	8169.8	9 34 17	18 21	19 38	5 42	6 59	5 12	15 17	.....	22 10	19	1 30.6	3 57
Tue Feb 20/Wed Feb 21	8170.8	9 38 13	18 22	19 39	5 41	6 58	5 16	15 20	.....	23 10	27	2 20.9	8 15
Wed Feb 21/Thu Feb 22	8171.8	9 42 10	18 23	19 40	5 40	6 57	5 21	15 23	.....	0 11	38	3 13.3	12 13
Thu Feb 22/Fri Feb 23	8172.8	9 46 06	18 23	19 40	5 39	6 56	5 26	15 26	.....	1 14	49	4 08.4	15 35
Fri Feb 23/Sat Feb 24	8173.8	9 50 03	18 24	19 41	5 38	6 55	5 30	15 29	.....	2 18	60	5 06.4	18 06
Sat Feb 24/Sun Feb 25	8174.8	9 53 59	18 25	19 42	5 37	6 53	5 35	15 32	.....	3 20	71	6 06.9	19 31
Sun Feb 25/Mon Feb 26	8175.8	9 57 56	18 26	19 43	5 36	6 52	5 40	15 35	.....	4 20	81	7 09.2	19 38
Mon Feb 26/Tue Feb 27	8176.8	10 01 52	18 27	19 43	5 35	6 51	5 44	15 37	.....	5 15	90	8 11.8	18 23
Tue Feb 27/Wed Feb 28	8177.8	10 05 49	18 27	19 44	5 34	6 50	5 49	15 40	.....	6 06	96	9 13.4	15 51
Wed Feb 28/Thu Mar 01	8178.8	10 09 46	18 28	19 45	5 32	6 49	5 54	15 43	17 09	6 51	99	10 12.9	12 15

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Mar 01/Fri Mar 02	8179.8	10 13 42	18 29	19 45	5 31	6 48	5 58	15 46	18 16	7 32	100	11 09.9	7 55
Fri Mar 02/Sat Mar 03	8180.8	10 17 39	18 30	19 46	5 30	6 47	6 03	15 49	19 21	.....	98	12 04.5	3 12
Sat Mar 03/Sun Mar 04	8181.8	10 21 35	18 30	19 47	5 29	6 45	6 08	15 51	20 23	.....	93	12 57.0	- 1 35
Sun Mar 04/Mon Mar 05	8182.8	10 25 32	18 31	19 48	5 28	6 44	6 13	15 54	21 24	.....	87	13 48.0	- 6 09
Mon Mar 05/Tue Mar 06	8183.8	10 29 28	18 32	19 48	5 27	6 43	6 17	15 57	22 23	.....	79	14 38.1	-10 17
Tue Mar 06/Wed Mar 07	8184.8	10 33 25	18 33	19 49	5 25	6 42	6 22	16 00	23 20	.....	70	15 27.8	-13 51
Wed Mar 07/Thu Mar 08	8185.8	10 37 21	18 33	19 50	5 24	6 41	6 27	16 02	0 15	.....	61	16 17.4	-16 43
Thu Mar 08/Fri Mar 09	8186.8	10 41 18	18 34	19 51	5 23	6 39	6 31	16 05	1 08	.....	51	17 07.2	-18 48
Fri Mar 09/Sat Mar 10	8187.8	10 45 15	18 35	19 51	5 22	6 38	6 36	16 08	2 00	.....	42	17 57.1	-20 03
Sat Mar 10/Sun Mar 11	8188.8	10 49 11	18 36	19 52	5 20	6 37	6 41	16 10	2 49	.....	33	18 47.2	-20 26
Sun Mar 11/Mon Mar 12	8189.8	10 53 08	18 36	19 53	5 19	6 36	6 45	16 13	3 35	.....	24	19 37.1	-19 56
Mon Mar 12/Tue Mar 13	8190.8	10 57 04	18 37	19 54	5 18	6 34	6 50	16 16	4 18	.....	17	20 26.8	-18 34
Tue Mar 13/Wed Mar 14	8191.8	11 01 01	18 38	19 54	5 17	6 33	6 55	16 18	4 59	.....	10	21 16.0	-16 24
Wed Mar 14/Thu Mar 15	8192.8	11 04 57	18 38	19 55	5 15	6 32	6 59	16 21	5 37	.....	5	22 04.7	-13 30
Thu Mar 15/Fri Mar 16	8193.8	11 08 54	18 39	19 56	5 14	6 31	7 04	16 24	6 13	17 08	2	22 53.0	- 9 59
Fri Mar 16/Sat Mar 17	8194.8	11 12 50	18 40	19 57	5 13	6 29	7 09	16 26	6 48	18 05	0	23 41.2	- 5 58
Sat Mar 17/Sun Mar 18	8195.8	11 16 47	18 40	19 57	5 11	6 28	7 13	16 29	7 23	19 03	1	0 29.6	- 1 37
Sun Mar 18/Mon Mar 19	8196.8	11 20 44	18 41	19 58	5 10	6 27	7 18	16 32	.....	20 03	3	1 18.7	2 53
Mon Mar 19/Tue Mar 20	8197.8	11 24 40	18 42	19 59	5 09	6 26	7 23	16 34	.....	21 03	8	2 09.2	7 18
Tue Mar 20/Wed Mar 21	8198.8	11 28 37	18 43	20 00	5 07	6 24	7 28	16 37	.....	22 05	15	3 01.5	11 24
Wed Mar 21/Thu Mar 22	8199.8	11 32 33	18 43	20 00	5 06	6 23	7 32	16 39	.....	23 08	24	3 56.0	14 56
Thu Mar 22/Fri Mar 23	8200.8	11 36 30	18 44	20 01	5 05	6 22	7 37	16 42	.....	0 12	34	4 52.8	17 40
Fri Mar 23/Sat Mar 24	8201.8	11 40 26	18 45	20 02	5 03	6 20	7 42	16 44	.....	1 14	45	5 51.8	19 20
Sat Mar 24/Sun Mar 25	8202.8	11 44 23	18 45	20 03	5 02	6 19	7 46	16 47	.....	2 13	57	6 52.1	19 47
Sun Mar 25/Mon Mar 26	8203.8	11 48 19	18 46	20 03	5 00	6 18	7 51	16 50	.....	3 09	68	7 52.8	18 56
Mon Mar 26/Tue Mar 27	8204.8	11 52 16	18 47	20 04	4 59	6 17	7 56	16 52	.....	3 59	78	8 52.7	16 50
Tue Mar 27/Wed Mar 28	8205.8	11 56 13	18 47	20 05	4 58	6 15	8 01	16 55	.....	4 45	87	9 51.0	13 39
Wed Mar 28/Thu Mar 29	8206.8	12 00 09	18 48	20 06	4 56	6 14	8 05	16 57	.....	5 26	94	10 47.4	9 38
Thu Mar 29/Fri Mar 30	8207.8	12 04 06	18 49	20 07	4 55	6 13	8 10	17 00	17 03	6 05	98	11 41.8	5 05
Fri Mar 30/Sat Mar 31	8208.8	12 08 02	18 49	20 07	4 53	6 11	8 15	17 02	18 06	6 42	100	12 34.6	0 17
Sat Mar 31/Sun Apr 01	8209.8	12 11 59	18 50	20 08	4 52	6 10	8 20	17 05	19 07	.....	99	13 26.2	- 4 26

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Apr 01/Mon Apr 02	8210.8	12 15 55	18 51	20 09	4 51	6 09	8 24	17 07	20 07	.....	96	14 17.1	- 8 52
Mon Apr 02/Tue Apr 03	8211.8	12 19 52	18 51	20 10	4 49	6 08	8 29	17 10	21 06	.....	91	15 07.7	-12 47
Tue Apr 03/Wed Apr 04	8212.8	12 23 48	18 52	20 11	4 48	6 06	8 34	17 12	22 03	.....	84	15 58.4	-16 01
Wed Apr 04/Thu Apr 05	8213.8	12 27 45	18 53	20 12	4 46	6 05	8 39	17 15	22 58	.....	77	16 49.1	-18 28
Thu Apr 05/Fri Apr 06	8214.8	12 31 42	18 53	20 12	4 45	6 04	8 44	17 17	23 51	.....	68	17 39.9	-20 03
Fri Apr 06/Sat Apr 07	8215.8	12 35 38	18 54	20 13	4 43	6 03	8 48	17 20	0 42	.....	59	18 30.7	-20 44
Sat Apr 07/Sun Apr 08	8216.8	12 39 35	18 55	20 14	4 42	6 01	8 53	17 22	1 29	.....	50	19 21.2	-20 31
Sun Apr 08/Mon Apr 09	8217.8	12 43 31	18 56	20 15	4 41	6 00	8 58	17 25	2 14	.....	40	20 11.1	-19 25
Mon Apr 09/Tue Apr 10	8218.8	12 47 28	18 56	20 16	4 39	5 59	9 03	17 27	2 55	.....	31	21 00.4	-17 29
Tue Apr 10/Wed Apr 11	8219.8	12 51 24	18 57	20 17	4 38	5 58	9 08	17 30	3 34	.....	23	21 49.2	-14 47
Wed Apr 11/Thu Apr 12	8220.8	12 55 21	18 58	20 18	4 36	5 56	9 12	17 33	4 10	.....	15	22 37.4	-11 26
Thu Apr 12/Fri Apr 13	8221.8	12 59 17	18 58	20 19	4 35	5 55	9 17	17 35	4 46	.....	9	23 25.6	- 7 31
Fri Apr 13/Sat Apr 14	8222.8	13 03 14	18 59	20 19	4 34	5 54	9 22	17 38	5 21	.....	4	0 14.0	- 3 12
Sat Apr 14/Sun Apr 15	8223.8	13 07 11	19 00	20 20	4 32	5 53	9 27	17 40	5 56	17 50	1	1 03.3	1 21
Sun Apr 15/Mon Apr 16	8224.8	13 11 07	19 00	20 21	4 31	5 52	9 32	17 43	6 33	18 51	0	1 54.0	5 55
Mon Apr 16/Tue Apr 17	8225.8	13 15 04	19 01	20 22	4 29	5 51	9 37	17 45	.....	19 54	2	2 46.6	10 16
Tue Apr 17/Wed Apr 18	8226.8	13 19 00	19 02	20 23	4 28	5 49	9 42	17 48	.....	20 58	6	3 41.5	14 06
Wed Apr 18/Thu Apr 19	8227.8	13 22 57	19 02	20 24	4 27	5 48	9 46	17 50	.....	22 04	13	4 38.8	17 09
Thu Apr 19/Fri Apr 20	8228.8	13 26 53	19 03	20 25	4 25	5 47	9 51	17 53	.....	23 08	21	5 38.1	19 08
Fri Apr 20/Sat Apr 21	8229.8	13 30 50	19 04	20 26	4 24	5 46	9 56	17 56	.....	0 10	31	6 38.5	19 54
Sat Apr 21/Sun Apr 22	8230.8	13 34 46	19 05	20 27	4 23	5 45	10 01	17 58	.....	1 06	42	7 39.0	19 21
Sun Apr 22/Mon Apr 23	8231.8	13 38 43	19 05	20 28	4 21	5 44	10 06	18 01	.....	1 58	54	8 38.5	17 32
Mon Apr 23/Tue Apr 24	8232.8	13 42 40	19 06	20 29	4 20	5 43	10 11	18 03	.....	2 44	65	9 36.1	14 39
Tue Apr 24/Wed Apr 25	8233.8	13 46 36	19 07	20 30	4 19	5 42	10 16	18 06	.....	3 26	75	10 31.6	10 53
Wed Apr 25/Thu Apr 26	8234.8	13 50 33	19 07	20 31	4 17	5 41	10 21	18 09	.....	4 04	84	11 25.1	6 32
Thu Apr 26/Fri Apr 27	8235.8	13 54 29	19 08	20 32	4 16	5 40	10 26	18 11	.....	4 40	91	12 16.9	1 52
Fri Apr 27/Sat Apr 28	8236.8	13 58 26	19 09	20 33	4 15	5 39	10 31	18 14	.....	5 16	96	13 07.8	- 2 52
Sat Apr 28/Sun Apr 29	8237.8	14 02 22	19 10	20 34	4 14	5 38	10 35	18 17	17 55	5 51	99	13 58.2	- 7 26
Sun Apr 29/Mon Apr 30	8238.8	14 06 19	19 10	20 35	4 12	5 37	10 40	18 19	18 53	6 28	100	14 48.5	-11 35
Mon Apr 30/Tue May 01	8239.8	14 10 15	19 11	20 36	4 11	5 36	10 45	18 22	19 51	.....	98	15 39.2	-15 08

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue May 01/Wed May 02	8240.8	14 14 12	19 12	20 37	4 10	5 35	10 50	18 25	20 48	.....	95	16 30.3	-17 57
Wed May 02/Thu May 03	8241.8	14 18 09	19 12	20 38	4 09	5 34	10 55	18 27	21 42	.....	89	17 21.7	-19 55
Thu May 03/Fri May 04	8242.8	14 22 05	19 13	20 39	4 07	5 33	11 00	18 30	22 34	.....	83	18 13.2	-20 57
Fri May 04/Sat May 05	8243.8	14 26 02	19 14	20 40	4 06	5 32	11 05	18 33	23 24	.....	75	19 04.4	-21 03
Sat May 05/Sun May 06	8244.8	14 29 58	19 15	20 41	4 05	5 31	11 10	18 36	0 09	.....	66	19 55.0	-20 15
Sun May 06/Mon May 07	8245.8	14 33 55	19 15	20 42	4 04	5 30	11 15	18 39	0 52	.....	57	20 44.6	-18 34
Mon May 07/Tue May 08	8246.8	14 37 51	19 16	20 43	4 03	5 29	11 20	18 41	1 31	.....	48	21 33.4	-16 07
Tue May 08/Wed May 09	8247.8	14 41 48	19 17	20 44	4 02	5 29	11 25	18 44	2 08	.....	38	22 21.5	-12 59
Wed May 09/Thu May 10	8248.8	14 45 44	19 18	20 45	4 01	5 28	11 30	18 47	2 43	.....	29	23 09.1	- 9 15
Thu May 10/Fri May 11	8249.8	14 49 41	19 18	20 46	4 00	5 27	11 35	18 50	3 17	.....	20	23 56.9	- 5 04
Fri May 11/Sat May 12	8250.8	14 53 38	19 19	20 47	3 59	5 26	11 40	18 53	3 52	.....	13	0 45.5	- 0 34
Sat May 12/Sun May 13	8251.8	14 57 34	19 20	20 48	3 58	5 26	11 45	18 56	4 28	.....	6	1 35.4	4 04
Sun May 13/Mon May 14	8252.8	15 01 31	19 20	20 49	3 57	5 25	11 50	18 59	5 07	17 36	2	2 27.5	8 36
Mon May 14/Tue May 15	8253.8	15 05 27	19 21	20 50	3 56	5 24	11 55	19 02	5 49	18 41	0	3 22.2	12 45
Tue May 15/Wed May 16	8254.8	15 09 24	19 22	20 51	3 55	5 23	11 59	19 05	.....	19 48	1	4 19.7	16 13
Wed May 16/Thu May 17	8255.8	15 13 20	19 22	20 52	3 54	5 23	12 04	19 08	.....	20 55	4	5 19.7	18 40
Thu May 17/Fri May 18	8256.8	15 17 17	19 23	20 53	3 53	5 22	12 09	19 11	.....	22 00	11	6 21.5	19 53
Fri May 18/Sat May 19	8257.8	15 21 13	19 24	20 54	3 52	5 22	12 14	19 14	.....	23 01	19	7 23.5	19 43
Sat May 19/Sun May 20	8258.8	15 25 10	19 25	20 54	3 51	5 21	12 19	19 17	.....	23 56	29	8 24.3	18 12
Sun May 20/Mon May 21	8259.8	15 29 07	19 25	20 55	3 50	5 21	12 24	19 20	.....	0 44	40	9 23.0	15 32
Mon May 21/Tue May 22	8260.8	15 33 03	19 26	20 56	3 50	5 20	12 29	19 23	.....	1 27	51	10 19.0	11 57
Tue May 22/Wed May 23	8261.8	15 37 00	19 27	20 57	3 49	5 19	12 34	19 26	.....	2 06	62	11 12.5	7 44
Wed May 23/Thu May 24	8262.8	15 40 56	19 27	20 58	3 48	5 19	12 39	19 30	.....	2 43	72	12 04.0	3 09
Thu May 24/Fri May 25	8263.8	15 44 53	19 28	20 59	3 47	5 19	12 43	19 33	.....	3 17	81	12 54.1	- 1 33
Fri May 25/Sat May 26	8264.8	15 48 49	19 29	21 00	3 47	5 18	12 48	19 36	.....	3 52	89	13 43.5	- 6 08
Sat May 26/Sun May 27	8265.8	15 52 46	19 29	21 01	3 46	5 18	12 53	19 39	.....	4 27	95	14 33.0	-10 24
Sun May 27/Mon May 28	8266.8	15 56 42	19 30	21 02	3 45	5 17	12 58	19 43	17 42	5 04	98	15 22.8	-14 10
Mon May 28/Tue May 29	8267.8	16 00 39	19 30	21 03	3 45	5 17	13 03	19 46	18 39	5 44	100	16 13.4	-17 16
Tue May 29/Wed May 30	8268.8	16 04 36	19 31	21 03	3 44	5 17	13 08	19 49	19 34	6 26	99	17 04.6	-19 33
Wed May 30/Thu May 31	8269.8	16 08 32	19 32	21 04	3 44	5 16	13 12	19 53	20 28	.....	97	17 56.3	-20 57
Thu May 31/Fri Jun 01	8270.8	16 12 29	19 32	21 05	3 43	5 16	13 17	19 56	21 18	.....	93	18 48.0	-21 23

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Jun 01/Sat Jun 02	8271.8	16 16 25	19 33	21 06	3 43	5 16	13 22	20 00	22 05	.....	88	19 39.2	-20 53
Sat Jun 02/Sun Jun 03	8272.8	16 20 22	19 33	21 07	3 42	5 16	13 26	20 03	22 49	.....	81	20 29.4	-19 30
Sun Jun 03/Mon Jun 04	8273.8	16 24 18	19 34	21 07	3 42	5 15	13 31	20 07	23 29	.....	73	21 18.6	-17 17
Mon Jun 04/Tue Jun 05	8274.8	16 28 15	19 34	21 08	3 42	5 15	13 36	20 10	0 07	.....	64	22 06.7	-14 21
Tue Jun 05/Wed Jun 06	8275.8	16 32 11	19 35	21 09	3 41	5 15	13 40	20 14	0 42	.....	54	22 54.1	-10 50
Wed Jun 06/Thu Jun 07	8276.8	16 36 08	19 35	21 09	3 41	5 15	13 45	20 18	1 15	.....	44	23 41.1	- 6 49
Thu Jun 07/Fri Jun 08	8277.8	16 40 05	19 36	21 10	3 41	5 15	13 50	20 21	1 49	.....	35	0 28.5	- 2 28
Fri Jun 08/Sat Jun 09	8278.8	16 44 01	19 36	21 11	3 41	5 15	13 54	20 25	2 23	.....	25	1 17.0	2 06
Sat Jun 09/Sun Jun 10	8279.8	16 47 58	19 37	21 11	3 40	5 15	13 59	20 29	3 00	.....	16	2 07.4	6 40
Sun Jun 10/Mon Jun 11	8280.8	16 51 54	19 37	21 12	3 40	5 15	14 03	20 33	3 40	.....	9	3 00.4	11 01
Mon Jun 11/Tue Jun 12	8281.8	16 55 51	19 38	21 12	3 40	5 15	14 08	20 37	4 24	.....	4	3 56.6	14 49
Tue Jun 12/Wed Jun 13	8282.8	16 59 47	19 38	21 13	3 40	5 15	14 12	20 40	5 15	18 34	1	4 56.1	17 47
Wed Jun 13/Thu Jun 14	8283.8	17 03 44	19 38	21 13	3 40	5 15	14 16	20 44	6 13	19 42	0	5 58.3	19 34
Thu Jun 14/Fri Jun 15	8284.8	17 07 40	19 39	21 14	3 40	5 15	14 21	20 48	.....	20 46	3	7 01.7	19 57
Fri Jun 15/Sat Jun 16	8285.8	17 11 37	19 39	21 14	3 40	5 15	14 25	20 52	.....	21 46	9	8 04.8	18 54
Sat Jun 16/Sun Jun 17	8286.8	17 15 34	19 39	21 14	3 40	5 15	14 30	20 56	.....	22 39	17	9 05.9	16 32
Sun Jun 17/Mon Jun 18	8287.8	17 19 30	19 40	21 15	3 40	5 15	14 34	21 00	.....	23 26	26	10 04.1	13 07
Mon Jun 18/Tue Jun 19	8288.8	17 23 27	19 40	21 15	3 40	5 15	14 38	21 04	.....	0 07	37	10 59.3	8 58
Tue Jun 19/Wed Jun 20	8289.8	17 27 23	19 40	21 15	3 40	5 16	14 42	21 08	.....	0 45	48	11 51.7	4 24
Wed Jun 20/Thu Jun 21	8290.8	17 31 20	19 41	21 16	3 41	5 16	14 46	21 13	.....	1 20	59	12 42.2	- 0 18
Thu Jun 21/Fri Jun 22	8291.8	17 35 16	19 41	21 16	3 41	5 16	14 51	21 17	.....	1 55	69	13 31.5	- 4 56
Fri Jun 22/Sat Jun 23	8292.8	17 39 13	19 41	21 16	3 41	5 16	14 55	21 21	.....	2 29	78	14 20.4	- 9 17
Sat Jun 23/Sun Jun 24	8293.8	17 43 09	19 41	21 16	3 41	5 17	14 59	21 25	.....	3 05	86	15 09.5	-13 10
Sun Jun 24/Mon Jun 25	8294.8	17 47 06	19 41	21 16	3 42	5 17	15 03	21 30	.....	3 43	92	15 59.2	-16 28
Mon Jun 25/Tue Jun 26	8295.8	17 51 03	19 41	21 16	3 42	5 17	15 07	21 34	.....	4 24	97	16 49.7	-19 00
Tue Jun 26/Wed Jun 27	8296.8	17 54 59	19 41	21 16	3 43	5 17	15 11	21 38	18 22	5 08	99	17 41.0	-20 41
Wed Jun 27/Thu Jun 28	8297.8	17 58 56	19 42	21 16	3 43	5 18	15 15	21 43	19 14	5 55	100	18 32.6	-21 27
Thu Jun 28/Fri Jun 29	8298.8	18 02 52	19 42	21 16	3 43	5 18	15 19	21 47	20 02	.....	99	19 24.1	-21 15
Fri Jun 29/Sat Jun 30	8299.8	18 06 49	19 42	21 16	3 44	5 19	15 23	21 51	20 47	.....	96	20 14.9	-20 08
Sat Jun 30/Sun Jul 01	8300.8	18 10 45	19 42	21 16	3 44	5 19	15 26	21 56	21 29	.....	92	21 04.7	-18 10

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sun Jul 01/Mon Jul 02	8301.8	18 14 42	19 42	21 16	3 45	5 19	15 30	22 00	22 07	.....	85	21 53.3	-15 26
Mon Jul 02/Tue Jul 03	8302.8	18 18 38	19 41	21 16	3 46	5 20	15 34	22 05	22 42	.....	78	22 40.8	-12 05
Tue Jul 03/Wed Jul 04	8303.8	18 22 35	19 41	21 16	3 46	5 20	15 38	22 09	23 16	.....	69	23 27.5	- 8 13
Wed Jul 04/Thu Jul 05	8304.8	18 26 32	19 41	21 15	3 47	5 21	15 41	22 14	23 49	.....	60	0 14.2	- 4 00
Thu Jul 05/Fri Jul 06	8305.8	18 30 28	19 41	21 15	3 47	5 21	15 45	22 18	0 22	.....	50	1 01.4	0 27
Fri Jul 06/Sat Jul 07	8306.8	18 34 25	19 41	21 15	3 48	5 22	15 49	22 23	0 56	.....	40	1 50.0	4 57
Sat Jul 07/Sun Jul 08	8307.8	18 38 21	19 41	21 14	3 49	5 22	15 52	22 28	1 33	.....	29	2 40.8	9 19
Sun Jul 08/Mon Jul 09	8308.8	18 42 18	19 41	21 14	3 49	5 23	15 56	22 32	2 14	.....	20	3 34.5	13 18
Mon Jul 09/Tue Jul 10	8309.8	18 46 14	19 40	21 14	3 50	5 23	15 59	22 37	3 01	.....	11	4 31.7	16 37
Tue Jul 10/Wed Jul 11	8310.8	18 50 11	19 40	21 13	3 51	5 24	16 03	22 42	3 54	.....	5	5 32.2	18 55
Wed Jul 11/Thu Jul 12	8311.8	18 54 07	19 40	21 13	3 52	5 24	16 06	22 46	4 55	18 25	1	6 35.3	19 56
Thu Jul 12/Fri Jul 13	8312.8	18 58 04	19 40	21 12	3 52	5 25	16 10	22 51	6 01	19 28	0	7 39.3	19 30
Fri Jul 13/Sat Jul 14	8313.8	19 02 01	19 39	21 11	3 53	5 26	16 13	22 56	.....	20 26	2	8 42.5	17 37
Sat Jul 14/Sun Jul 15	8314.8	19 05 57	19 39	21 11	3 54	5 26	16 16	23 01	.....	21 17	7	9 43.3	14 31
Sun Jul 15/Mon Jul 16	8315.8	19 09 54	19 38	21 10	3 55	5 27	16 20	23 05	.....	22 03	14	10 41.1	10 30
Mon Jul 16/Tue Jul 17	8316.8	19 13 50	19 38	21 10	3 56	5 27	16 23	23 10	.....	22 43	23	11 35.8	5 56
Tue Jul 17/Wed Jul 18	8317.8	19 17 47	19 38	21 09	3 57	5 28	16 26	23 15	.....	23 20	33	12 28.0	1 08
Wed Jul 18/Thu Jul 19	8318.8	19 21 43	19 37	21 08	3 57	5 29	16 29	23 20	.....	23 56	44	13 18.4	- 3 37
Thu Jul 19/Fri Jul 20	8319.8	19 25 40	19 37	21 07	3 58	5 29	16 33	23 25	.....	0 31	54	14 07.7	- 8 06
Fri Jul 20/Sat Jul 21	8320.8	19 29 36	19 36	21 07	3 59	5 30	16 36	23 30	.....	1 07	64	14 56.9	-12 08
Sat Jul 21/Sun Jul 22	8321.8	19 33 33	19 36	21 06	4 00	5 30	16 39	23 34	.....	1 44	74	15 46.2	-15 36
Sun Jul 22/Mon Jul 23	8322.8	19 37 30	19 35	21 05	4 01	5 31	16 42	23 39	.....	2 23	82	16 36.2	-18 21
Mon Jul 23/Tue Jul 24	8323.8	19 41 26	19 34	21 04	4 02	5 32	16 45	23 44	.....	3 06	89	17 27.0	-20 16
Tue Jul 24/Wed Jul 25	8324.8	19 45 23	19 34	21 03	4 03	5 32	16 48	23 49	.....	3 52	94	18 18.2	-21 18
Wed Jul 25/Thu Jul 26	8325.8	19 49 19	19 33	21 02	4 04	5 33	16 51	23 54	17 59	4 40	98	19 09.6	-21 23
Thu Jul 26/Fri Jul 27	8326.8	19 53 16	19 32	21 01	4 05	5 34	16 54	23 59	18 45	5 31	100	20 00.7	-20 32
Fri Jul 27/Sat Jul 28	8327.8	19 57 12	19 32	21 00	4 06	5 34	16 57	0 04	19 28	6 24	100	20 50.9	-18 48
Sat Jul 28/Sun Jul 29	8328.8	20 01 09	19 31	20 59	4 07	5 35	17 00	0 08	20 07	.....	98	21 40.1	-16 15
Sun Jul 29/Mon Jul 30	8329.8	20 05 05	19 30	20 58	4 08	5 36	17 03	0 13	20 44	.....	95	22 28.2	-13 03
Mon Jul 30/Tue Jul 31	8330.8	20 09 02	19 30	20 57	4 09	5 36	17 06	0 18	21 18	.....	89	23 15.3	- 9 18
Tue Jul 31/Wed Aug 01	8331.8	20 12 59	19 29	20 56	4 09	5 37	17 09	0 23	21 51	.....	82	0 02.0	- 5 09

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Aug 01/Thu Aug 02	8332.8	20 16 55	19 28	20 55	4 10	5 38	17 12	0 28	22 23	.....	74	0 48.7	- 0 46
Thu Aug 02/Fri Aug 03	8333.8	20 20 52	19 27	20 54	4 11	5 38	17 15	0 33	22 56	.....	65	1 36.3	3 42
Fri Aug 03/Sat Aug 04	8334.8	20 24 48	19 26	20 53	4 12	5 39	17 17	0 38	23 31	.....	54	2 25.4	8 03
Sat Aug 04/Sun Aug 05	8335.8	20 28 45	19 26	20 52	4 13	5 40	17 20	0 43	0 09	.....	44	3 16.9	12 06
Sun Aug 05/Mon Aug 06	8336.8	20 32 41	19 25	20 51	4 14	5 40	17 23	0 48	0 51	.....	33	4 11.5	15 35
Mon Aug 06/Tue Aug 07	8337.8	20 36 38	19 24	20 50	4 15	5 41	17 26	0 53	1 40	.....	23	5 09.3	18 13
Tue Aug 07/Wed Aug 08	8338.8	20 40 34	19 23	20 48	4 16	5 42	17 28	0 57	2 35	.....	14	6 10.0	19 44
Wed Aug 08/Thu Aug 09	8339.8	20 44 31	19 22	20 47	4 17	5 42	17 31	1 02	3 38	.....	7	7 12.8	19 53
Thu Aug 09/Fri Aug 10	8340.8	20 48 28	19 21	20 46	4 18	5 43	17 34	1 07	4 45	18 08	2	8 16.0	18 37
Fri Aug 10/Sat Aug 11	8341.8	20 52 24	19 20	20 45	4 19	5 44	17 37	1 12	5 55	19 03	0	9 18.0	16 00
Sat Aug 11/Sun Aug 12	8342.8	20 56 21	19 19	20 43	4 20	5 44	17 39	1 17	.....	19 52	1	10 17.7	12 16
Sun Aug 12/Mon Aug 13	8343.8	21 00 17	19 18	20 42	4 21	5 45	17 42	1 22	.....	20 36	5	11 14.7	7 48
Mon Aug 13/Tue Aug 14	8344.8	21 04 14	19 17	20 41	4 22	5 46	17 45	1 27	.....	21 15	11	12 09.0	2 57
Tue Aug 14/Wed Aug 15	8345.8	21 08 10	19 16	20 40	4 23	5 46	17 47	1 32	.....	21 53	20	13 01.2	- 1 58
Wed Aug 15/Thu Aug 16	8346.8	21 12 07	19 15	20 38	4 24	5 47	17 50	1 36	.....	22 29	29	13 52.0	- 6 40
Thu Aug 16/Fri Aug 17	8347.8	21 16 03	19 14	20 37	4 25	5 48	17 52	1 41	.....	23 05	39	14 42.0	-10 57
Fri Aug 17/Sat Aug 18	8348.8	21 20 00	19 13	20 36	4 25	5 48	17 55	1 46	.....	23 43	49	15 31.9	-14 39
Sat Aug 18/Sun Aug 19	8349.8	21 23 57	19 12	20 34	4 26	5 49	17 58	1 51	.....	0 22	59	16 22.1	-17 37
Sun Aug 19/Mon Aug 20	8350.8	21 27 53	19 10	20 33	4 27	5 50	18 00	1 56	.....	1 04	68	17 12.7	-19 47
Mon Aug 20/Tue Aug 21	8351.8	21 31 50	19 09	20 31	4 28	5 50	18 03	2 01	.....	1 49	77	18 03.8	-21 04
Tue Aug 21/Wed Aug 22	8352.8	21 35 46	19 08	20 30	4 29	5 51	18 05	2 05	.....	2 36	84	18 55.0	-21 25
Wed Aug 22/Thu Aug 23	8353.8	21 39 43	19 07	20 29	4 30	5 52	18 08	2 10	.....	3 27	91	19 46.0	-20 49
Thu Aug 23/Fri Aug 24	8354.8	21 43 39	19 06	20 27	4 31	5 52	18 10	2 15	17 27	4 19	95	20 36.5	-19 19
Fri Aug 24/Sat Aug 25	8355.8	21 47 36	19 05	20 26	4 32	5 53	18 13	2 20	18 07	5 12	99	21 26.1	-16 59
Sat Aug 25/Sun Aug 26	8356.8	21 51 32	19 03	20 24	4 32	5 53	18 15	2 25	18 45	6 07	100	22 14.7	-13 55
Sun Aug 26/Mon Aug 27	8357.8	21 55 29	19 02	20 23	4 33	5 54	18 18	2 30	19 20	.....	99	23 02.5	-10 16
Mon Aug 27/Tue Aug 28	8358.8	21 59 26	19 01	20 22	4 34	5 55	18 20	2 34	19 53	.....	97	23 49.6	- 6 09
Tue Aug 28/Wed Aug 29	8359.8	22 03 22	19 00	20 20	4 35	5 55	18 23	2 39	20 26	.....	92	0 36.7	- 1 46
Wed Aug 29/Thu Aug 30	8360.8	22 07 19	18 59	20 19	4 36	5 56	18 26	2 44	20 58	.....	86	1 24.3	2 45
Thu Aug 30/Fri Aug 31	8361.8	22 11 15	18 57	20 17	4 37	5 57	18 28	2 49	21 32	.....	78	2 13.0	7 10
Fri Aug 31/Sat Sep 01	8362.8	22 15 12	18 56	20 16	4 37	5 57	18 31	2 53	22 08	.....	69	3 03.6	11 18

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Sep 01/Sun Sep 02	8363.8	22 19 08	18 55	20 14	4 38	5 58	18 33	2 58	22 48	.....	58	3 56.5	14 55
Sun Sep 02/Mon Sep 03	8364.8	22 23 05	18 54	20 13	4 39	5 58	18 35	3 03	23 33	.....	47	4 52.2	17 45
Mon Sep 03/Tue Sep 04	8365.8	22 27 01	18 52	20 12	4 40	5 59	18 38	3 08	0 24	.....	36	5 50.7	19 35
Tue Sep 04/Wed Sep 05	8366.8	22 30 58	18 51	20 10	4 41	6 00	18 40	3 12	1 21	.....	26	6 51.2	20 11
Wed Sep 05/Thu Sep 06	8367.8	22 34 55	18 50	20 09	4 41	6 00	18 43	3 17	2 25	.....	16	7 52.8	19 25
Thu Sep 06/Fri Sep 07	8368.8	22 38 51	18 48	20 07	4 42	6 01	18 45	3 22	3 32	.....	8	8 54.0	17 19
Fri Sep 07/Sat Sep 08	8369.8	22 42 48	18 47	20 06	4 43	6 02	18 48	3 26	4 41	17 40	3	9 53.8	14 01
Sat Sep 08/Sun Sep 09	8370.8	22 46 44	18 46	20 04	4 44	6 02	18 50	3 31	5 50	18 25	0	10 51.4	9 48
Sun Sep 09/Mon Sep 10	8371.8	22 50 41	18 45	20 03	4 44	6 03	18 53	3 36	6 58	19 07	1	11 46.9	5 02
Mon Sep 10/Tue Sep 11	8372.8	22 54 37	18 43	20 01	4 45	6 03	18 55	3 41	.....	19 46	3	12 40.4	0 01
Tue Sep 11/Wed Sep 12	8373.8	22 58 34	18 42	20 00	4 46	6 04	18 58	3 45	.....	20 23	9	13 32.5	- 4 54
Wed Sep 12/Thu Sep 13	8374.8	23 02 30	18 41	19 59	4 47	6 05	19 00	3 50	.....	21 00	16	14 23.8	- 9 28
Thu Sep 13/Fri Sep 14	8375.8	23 06 27	18 39	19 57	4 47	6 05	19 03	3 55	.....	21 38	24	15 14.6	-13 29
Fri Sep 14/Sat Sep 15	8376.8	23 10 24	18 38	19 56	4 48	6 06	19 05	3 59	.....	22 18	33	16 05.5	-16 47
Sat Sep 15/Sun Sep 16	8377.8	23 14 20	18 37	19 54	4 49	6 06	19 08	4 04	.....	22 59	43	16 56.6	-19 15
Sun Sep 16/Mon Sep 17	8378.8	23 18 17	18 35	19 53	4 50	6 07	19 10	4 09	.....	23 44	52	17 47.9	-20 49
Mon Sep 17/Tue Sep 18	8379.8	23 22 13	18 34	19 51	4 50	6 08	19 13	4 13	.....	0 31	62	18 39.3	-21 27
Tue Sep 18/Wed Sep 19	8380.8	23 26 10	18 33	19 50	4 51	6 08	19 15	4 18	.....	1 20	71	19 30.3	-21 07
Wed Sep 19/Thu Sep 20	8381.8	23 30 06	18 31	19 49	4 52	6 09	19 18	4 23	.....	2 12	79	20 20.8	-19 53
Thu Sep 20/Fri Sep 21	8382.8	23 34 03	18 30	19 47	4 52	6 10	19 20	4 27	.....	3 05	86	21 10.5	-17 47
Fri Sep 21/Sat Sep 22	8383.8	23 37 59	18 29	19 46	4 53	6 10	19 23	4 32	16 44	3 59	92	21 59.4	-14 54
Sat Sep 22/Sun Sep 23	8384.8	23 41 56	18 27	19 44	4 54	6 11	19 26	4 37	17 20	4 54	97	22 47.5	-11 22
Sun Sep 23/Mon Sep 24	8385.8	23 45 53	18 26	19 43	4 54	6 11	19 28	4 41	17 54	5 50	99	23 35.1	- 7 19
Mon Sep 24/Tue Sep 25	8386.8	23 49 49	18 25	19 42	4 55	6 12	19 31	4 46	18 27	6 46	100	0 22.7	- 2 54
Tue Sep 25/Wed Sep 26	8387.8	23 53 46	18 23	19 40	4 56	6 13	19 33	4 50	19 00	.....	98	1 10.8	1 42
Wed Sep 26/Thu Sep 27	8388.8	23 57 42	18 22	19 39	4 57	6 13	19 36	4 55	19 33	.....	95	1 59.9	6 16
Thu Sep 27/Fri Sep 28	8389.8	0 01 39	18 21	19 37	4 57	6 14	19 38	5 00	20 09	.....	89	2 50.7	10 35
Fri Sep 28/Sat Sep 29	8390.8	0 05 35	18 20	19 36	4 58	6 15	19 41	5 04	20 48	.....	81	3 43.6	14 25
Sat Sep 29/Sun Sep 30	8391.8	0 09 32	18 18	19 35	4 59	6 15	19 44	5 09	21 31	.....	72	4 38.9	17 30
Sun Sep 30/Mon Oct 01	8392.8	0 13 28	18 17	19 33	4 59	6 16	19 46	5 13	22 19	.....	62	5 36.5	19 35

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Oct 01/Tue Oct 02	8393.8	0 17 25	18 16	19 32	5 00	6 16	19 49	5 18	23 13	.....	51	6 35.9	20 29
Tue Oct 02/Wed Oct 03	8394.8	0 21 22	18 14	19 31	5 01	6 17	19 51	5 23	0 13	.....	39	7 36.1	20 05
Wed Oct 03/Thu Oct 04	8395.8	0 25 18	18 13	19 30	5 01	6 18	19 54	5 27	1 17	.....	28	8 36.0	18 22
Thu Oct 04/Fri Oct 05	8396.8	0 29 15	18 12	19 28	5 02	6 18	19 57	5 32	2 24	.....	19	9 34.7	15 28
Fri Oct 05/Sat Oct 06	8397.8	0 33 11	18 11	19 27	5 03	6 19	19 59	5 37	3 31	.....	10	10 31.6	11 35
Sat Oct 06/Sun Oct 07	8398.8	0 37 08	18 09	19 26	5 03	6 20	20 02	5 41	4 38	17 00	5	11 26.7	7 01
Sun Oct 07/Mon Oct 08	8399.8	0 41 04	18 08	19 25	5 04	6 20	20 05	5 46	5 43	17 39	1	12 20.1	2 05
Mon Oct 08/Tue Oct 09	8400.8	0 45 01	18 07	19 23	5 05	6 21	20 08	5 50	6 47	18 17	0	13 12.3	- 2 56
Tue Oct 09/Wed Oct 10	8401.8	0 48 57	18 06	19 22	5 05	6 22	20 10	5 55	.....	18 54	2	14 03.9	- 7 43
Wed Oct 10/Thu Oct 11	8402.8	0 52 54	18 04	19 21	5 06	6 22	20 13	6 00	.....	19 31	6	14 55.2	-12 03
Thu Oct 11/Fri Oct 12	8403.8	0 56 51	18 03	19 20	5 07	6 23	20 16	6 04	.....	20 11	11	15 46.7	-15 43
Fri Oct 12/Sat Oct 13	8404.8	1 00 47	18 02	19 19	5 07	6 24	20 19	6 09	.....	20 52	18	16 38.4	-18 33
Sat Oct 13/Sun Oct 14	8405.8	1 04 44	18 01	19 17	5 08	6 25	20 21	6 13	.....	21 36	27	17 30.3	-20 29
Sun Oct 14/Mon Oct 15	8406.8	1 08 40	18 00	19 16	5 09	6 25	20 24	6 18	.....	22 23	36	18 22.1	-21 27
Mon Oct 15/Tue Oct 16	8407.8	1 12 37	17 58	19 15	5 09	6 26	20 27	6 23	.....	23 12	45	19 13.5	-21 27
Tue Oct 16/Wed Oct 17	8408.8	1 16 33	17 57	19 14	5 10	6 27	20 30	6 27	.....	0 03	54	20 04.1	-20 30
Wed Oct 17/Thu Oct 18	8409.8	1 20 30	17 56	19 13	5 11	6 27	20 33	6 32	.....	0 56	64	20 53.9	-18 40
Thu Oct 18/Fri Oct 19	8410.8	1 24 26	17 55	19 12	5 11	6 28	20 36	6 37	.....	1 49	72	21 42.6	-16 02
Fri Oct 19/Sat Oct 20	8411.8	1 28 23	17 54	19 11	5 12	6 29	20 38	6 41	.....	2 44	81	22 30.6	-12 43
Sat Oct 20/Sun Oct 21	8412.8	1 32 20	17 53	19 10	5 13	6 30	20 41	6 46	.....	3 39	88	23 18.1	- 8 48
Sun Oct 21/Mon Oct 22	8413.8	1 36 16	17 52	19 09	5 13	6 30	20 44	6 50	16 26	4 35	93	0 05.7	- 4 27
Mon Oct 22/Tue Oct 23	8414.8	1 40 13	17 51	19 08	5 14	6 31	20 47	6 55	16 59	5 33	98	0 53.8	0 11
Tue Oct 23/Wed Oct 24	8415.8	1 44 09	17 50	19 07	5 15	6 32	20 50	7 00	17 33	6 32	100	1 43.1	4 55
Wed Oct 24/Thu Oct 25	8416.8	1 48 06	17 49	19 06	5 15	6 33	20 53	7 04	18 08	7 33	99	2 34.2	9 29
Thu Oct 25/Fri Oct 26	8417.8	1 52 02	17 48	19 05	5 16	6 34	20 56	7 09	18 46	.....	97	3 27.6	13 38
Fri Oct 26/Sat Oct 27	8418.8	1 55 59	17 47	19 04	5 17	6 34	20 59	7 14	19 28	.....	92	4 23.7	17 05
Sat Oct 27/Sun Oct 28	8419.8	1 59 55	17 46	19 03	5 18	6 35	21 02	7 18	20 16	.....	85	5 22.1	19 32
Sun Oct 28/Mon Oct 29	8420.8	2 03 52	17 45	19 02	5 18	6 36	21 05	7 23	21 09	.....	75	6 22.2	20 47
Mon Oct 29/Tue Oct 30	8421.8	2 07 49	17 44	19 02	5 19	6 37	21 09	7 28	22 07	.....	65	7 22.9	20 41
Tue Oct 30/Wed Oct 31	8422.8	2 11 45	17 43	19 01	5 20	6 38	21 12	7 32	23 10	.....	54	8 22.9	19 15
Wed Oct 31/Thu Nov 01	8423.8	2 15 42	17 42	19 00	5 20	6 38	21 15	7 37	0 14	.....	42	9 21.4	16 37

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Nov 01/Fri Nov 02	8424.8	2 19 38	17 41	18 59	5 21	6 39	21 18	7 42	1 20	.....	31	10 17.8	12 59
Fri Nov 02/Sat Nov 03	8425.8	2 23 35	17 40	18 58	5 22	6 40	21 21	7 46	2 25	.....	22	11 12.0	8 38
Sat Nov 03/Sun Nov 04	8426.8	2 27 31	17 40	18 58	5 23	6 41	21 24	7 51	3 29	.....	13	12 04.5	3 50
Sun Nov 04/Mon Nov 05	8427.8	2 31 28	17 39	18 57	5 23	6 42	21 28	7 56	4 32	16 14	7	12 55.8	- 1 08
Mon Nov 05/Tue Nov 06	8428.8	2 35 24	17 38	18 56	5 24	6 43	21 31	8 00	5 34	16 50	2	13 46.5	- 6 00
Tue Nov 06/Wed Nov 07	8429.8	2 39 21	17 37	18 56	5 25	6 43	21 34	8 05	6 36	17 26	0	14 37.3	-10 31
Wed Nov 07/Thu Nov 08	8430.8	2 43 18	17 36	18 55	5 25	6 44	21 38	8 10	7 36	18 04	1	15 28.4	-14 28
Thu Nov 08/Fri Nov 09	8431.8	2 47 14	17 36	18 54	5 26	6 45	21 41	8 14	.....	18 44	3	16 20.0	-17 40
Fri Nov 09/Sat Nov 10	8432.8	2 51 11	17 35	18 54	5 27	6 46	21 44	8 19	.....	19 27	7	17 12.1	-19 59
Sat Nov 10/Sun Nov 11	8433.8	2 55 07	17 34	18 53	5 28	6 47	21 48	8 24	.....	20 13	13	18 04.3	-21 20
Sun Nov 11/Mon Nov 12	8434.8	2 59 04	17 34	18 53	5 28	6 48	21 51	8 28	.....	21 02	20	18 56.2	-21 41
Mon Nov 12/Tue Nov 13	8435.8	3 03 00	17 33	18 52	5 29	6 49	21 55	8 33	.....	21 53	28	19 47.3	-21 03
Tue Nov 13/Wed Nov 14	8436.8	3 06 57	17 33	18 52	5 30	6 49	21 58	8 38	.....	22 45	37	20 37.2	-19 31
Wed Nov 14/Thu Nov 15	8437.8	3 10 53	17 32	18 51	5 31	6 50	22 02	8 42	.....	23 39	46	21 26.0	-17 10
Thu Nov 15/Fri Nov 16	8438.8	3 14 50	17 31	18 51	5 31	6 51	22 05	8 47	.....	0 33	56	22 13.6	-14 06
Fri Nov 16/Sat Nov 17	8439.8	3 18 47	17 31	18 51	5 32	6 52	22 09	8 52	.....	1 27	65	23 00.5	-10 25
Sat Nov 17/Sun Nov 18	8440.8	3 22 43	17 30	18 50	5 33	6 53	22 12	8 57	.....	2 22	74	23 47.2	- 6 15
Sun Nov 18/Mon Nov 19	8441.8	3 26 40	17 30	18 50	5 34	6 54	22 16	9 01	.....	3 18	82	0 34.4	- 1 44
Mon Nov 19/Tue Nov 20	8442.8	3 30 36	17 30	18 50	5 34	6 55	22 19	9 06	.....	4 17	89	1 22.7	3 00
Tue Nov 20/Wed Nov 21	8443.8	3 34 33	17 29	18 49	5 35	6 56	22 23	9 11	16 04	5 17	95	2 13.0	7 43
Wed Nov 21/Thu Nov 22	8444.8	3 38 29	17 29	18 49	5 36	6 56	22 27	9 15	16 41	6 20	99	3 06.0	12 10
Thu Nov 22/Fri Nov 23	8445.8	3 42 26	17 29	18 49	5 37	6 57	22 31	9 20	17 21	7 25	100	4 02.1	16 04
Fri Nov 23/Sat Nov 24	8446.8	3 46 22	17 28	18 49	5 37	6 58	22 34	9 25	18 08	.....	98	5 01.3	19 02
Sat Nov 24/Sun Nov 25	8447.8	3 50 19	17 28	18 49	5 38	6 59	22 38	9 29	19 00	.....	94	6 03.0	20 48
Sun Nov 25/Mon Nov 26	8448.8	3 54 16	17 28	18 48	5 39	7 00	22 42	9 34	19 58	.....	88	7 05.8	21 10
Mon Nov 26/Tue Nov 27	8449.8	3 58 12	17 27	18 48	5 40	7 01	22 46	9 39	21 01	.....	79	8 08.1	20 05
Tue Nov 27/Wed Nov 28	8450.8	4 02 09	17 27	18 48	5 40	7 02	22 50	9 44	22 07	.....	68	9 08.5	17 40
Wed Nov 28/Thu Nov 29	8451.8	4 06 05	17 27	18 48	5 41	7 02	22 53	9 48	23 13	.....	57	10 06.1	14 12
Thu Nov 29/Fri Nov 30	8452.8	4 10 02	17 27	18 48	5 42	7 03	22 57	9 53	0 18	.....	46	11 01.0	9 56
Fri Nov 30/Sat Dec 01	8453.8	4 13 58	17 27	18 48	5 43	7 04	23 01	9 58	1 22	.....	35	11 53.5	5 13

***** 2018 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) (2018 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sat Dec 01/Sun Dec 02	8454.8	4 17 55	17 27	18 48	5 43	7 05	23 05	10 02	2 24	.....	25	12 44.3	0 18
Sun Dec 02/Mon Dec 03	8455.8	4 21 51	17 27	18 48	5 44	7 06	23 09	10 07	3 25	.....	16	13 34.1	- 4 34
Mon Dec 03/Tue Dec 04	8456.8	4 25 48	17 27	18 48	5 45	7 06	23 13	10 12	4 25	.....	9	14 23.8	- 9 09
Tue Dec 04/Wed Dec 05	8457.8	4 29 45	17 27	18 48	5 46	7 07	23 17	10 16	5 25	16 02	4	15 13.8	-13 16
Wed Dec 05/Thu Dec 06	8458.8	4 33 41	17 27	18 49	5 46	7 08	23 21	10 21	6 24	16 40	1	16 04.6	-16 42
Thu Dec 06/Fri Dec 07	8459.8	4 37 38	17 27	18 49	5 47	7 09	23 25	10 26	7 21	17 22	0	16 56.1	-19 20
Fri Dec 07/Sat Dec 08	8460.8	4 41 34	17 27	18 49	5 48	7 10	23 30	10 30	8 16	18 06	1	17 48.0	-21 01
Sat Dec 08/Sun Dec 09	8461.8	4 45 31	17 27	18 49	5 48	7 10	23 34	10 35	.....	18 54	4	18 40.0	-21 43
Sun Dec 09/Mon Dec 10	8462.8	4 49 27	17 27	18 49	5 49	7 11	23 38	10 39	.....	19 44	8	19 31.4	-21 26
Mon Dec 10/Tue Dec 11	8463.8	4 53 24	17 28	18 50	5 50	7 12	23 42	10 44	.....	20 36	14	20 21.8	-20 12
Tue Dec 11/Wed Dec 12	8464.8	4 57 20	17 28	18 50	5 50	7 12	23 46	10 49	.....	21 29	21	21 10.8	-18 07
Wed Dec 12/Thu Dec 13	8465.8	5 01 17	17 28	18 50	5 51	7 13	23 51	10 53	.....	22 23	29	21 58.4	-15 18
Thu Dec 13/Fri Dec 14	8466.8	5 05 14	17 28	18 50	5 51	7 14	23 55	10 58	.....	23 17	38	22 44.8	-11 51
Fri Dec 14/Sat Dec 15	8467.8	5 09 10	17 29	18 51	5 52	7 14	23 59	11 02	.....	0 10	47	23 30.6	- 7 55
Sat Dec 15/Sun Dec 16	8468.8	5 13 07	17 29	18 51	5 53	7 15	0 03	11 07	.....	1 05	57	0 16.4	- 3 36
Sun Dec 16/Mon Dec 17	8469.8	5 17 03	17 29	18 52	5 53	7 16	0 08	11 11	.....	2 01	67	1 02.9	0 58
Mon Dec 17/Tue Dec 18	8470.8	5 21 00	17 30	18 52	5 54	7 16	0 12	11 16	.....	2 59	76	1 51.1	5 38
Tue Dec 18/Wed Dec 19	8471.8	5 24 56	17 30	18 52	5 54	7 17	0 16	11 20	.....	4 00	85	2 41.8	10 11
Wed Dec 19/Thu Dec 20	8472.8	5 28 53	17 30	18 53	5 55	7 17	0 21	11 25	.....	5 03	92	3 35.9	14 22
Thu Dec 20/Fri Dec 21	8473.8	5 32 49	17 31	18 53	5 55	7 18	0 25	11 29	15 55	6 09	97	4 33.8	17 51
Fri Dec 21/Sat Dec 22	8474.8	5 36 46	17 31	18 54	5 56	7 18	0 30	11 34	16 45	7 16	100	5 35.3	20 17
Sat Dec 22/Sun Dec 23	8475.8	5 40 43	17 32	18 54	5 56	7 19	0 34	11 38	17 41	8 20	100	6 39.4	21 20
Sun Dec 23/Mon Dec 24	8476.8	5 44 39	17 32	18 55	5 57	7 19	0 39	11 42	18 44	.....	96	7 44.4	20 50
Mon Dec 24/Tue Dec 25	8477.8	5 48 36	17 33	18 55	5 57	7 20	0 43	11 47	19 52	.....	90	8 48.2	18 49
Tue Dec 25/Wed Dec 26	8478.8	5 52 32	17 34	18 56	5 58	7 20	0 48	11 51	21 01	.....	82	9 49.3	15 33
Wed Dec 26/Thu Dec 27	8479.8	5 56 29	17 34	18 57	5 58	7 20	0 52	11 56	22 08	.....	72	10 47.0	11 20
Thu Dec 27/Fri Dec 28	8480.8	6 00 25	17 35	18 57	5 58	7 21	0 57	12 00	23 14	.....	61	11 41.6	6 34
Fri Dec 28/Sat Dec 29	8481.8	6 04 22	17 35	18 58	5 59	7 21	1 01	12 04	0 18	.....	50	12 33.6	1 35
Sat Dec 29/Sun Dec 30	8482.8	6 08 18	17 36	18 58	5 59	7 21	1 06	12 08	1 19	.....	40	13 24.0	- 3 23
Sun Dec 30/Mon Dec 31	8483.8	6 12 15	17 37	18 59	5 59	7 22	1 10	12 13	2 19	.....	29	14 13.6	- 8 03
Mon Dec 31/Tue Jan 01	8484.8	6 16 12	17 38	19 00	6 00	7 22	1 15	12 17	3 18	.....	21	15 03.0	-12 16