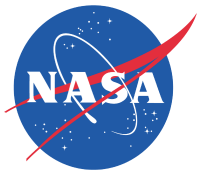

Kepler Data Release 14 Notes

Q0–Q4

KSCI-19054-001
Data Analysis Working Group (DAWG)
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Contents

A Word of Caution to Users

The Simple Aperture Photometry (SAP) product generated by the PA (Photometric Analysis) pipeline module and the PDC (Pre-search Data Conditioning) processed data are designed for automated photometry on over 160,000 stars. Although significant effort has been expended to make these products robust and reliable, they do not produce the best photometry for every target. To mitigate the impact of non-optimal apertures, Kepler is now providing target pixel files so that users can perform their own photometry. Kepler has also completely reworked the PDC software module, which is now producing significantly improved results for most long-cadence targets (see Appendix A.1). To take advantage of these improvements, Q0–Q4 have been reprocessed (these Notes) and Q5–Q8 will be reprocessed by July 2012. First-time processing has used this new PDC module since Q9 (Data Release 12). Also, cotrending basis vectors (see Section 7.0) are being provided for all quarters so that users can better remove systematics from the simple-aperture-photometry (SAP) light curves generated by the pipeline or custom light curves self-extracted from the target pixel files.

Investigators are strongly encouraged to study the Data Characteristics Handbook and Data Release Notes for all data sets that they intend to use. We advise against publication of results based on Kepler light curves without careful consideration and due diligence by the end user, and dialogue with the Science Office or Guest Observer Office where appropriate.

Users are encouraged to notice and document artifacts or issues with the processing and report them to the Science Office at kepler-scienceoffice@lists.nasa.gov.

Like Waldseemüller's 1507 map, the Maximum A Priori (MAP) method for PDC and other improvements to light curve correction implemented in Kepler Pipeline 8.0 will show us more of the light-curve world than we knew before, while leaving some hazards to navigation around the edges. Far-ranging light curve mariners will be given the tools to help navigate in such perilous circumstances by the Guest Observer Office.

1 Introduction

This set of Data Release Notes includes, for the first time, multiple quarters of data. This is a result of the large and ongoing re-processing effort on the part of the Kepler Scientific Operations Center (SOC) and the Kepler Science Office. Quarters 0–4 are re-released here, processed with the latest version of the software, SOC Pipeline 8.0. This software includes many significant improvements over the previous versions, which will be described in detail in the Kepler Data Processing Handbook when it is updated for SOC Pipeline 8.0. The major improvements are summarized in Appendix A.

These Notes contain the summary figures and tables for these quarters—the companion text can be found in the Kepler Data Characteristics Handbook (KSCI-19040). The sections are numbered in the same order in these Notes and the Handbook to assist the reader, with the exception of the addition of Section 5.14 to describe a new anomaly category.

1.1 Dates, Cadence Numbers, and Units

No changes from the Data Characteristics Handbook.

Contents of Data Release 14–Cadence Data.

Q.m	Class	First Cadence MJD midTime	Last Cadence MJD midTime	First Cadence UT midTime	Last Cadence UT midTime	Num CINs	Start CIN	End CIN
0	LC	54953.0382	54962.7441	02-May-2009 00:54:56	11-May-2009 17:51:31	476	568	1043
0	SC	54953.0283	54962.7540	02-May-2009 00:40:43	11-May-2009 18:05:44	14280	5500	19779
1	LC	54964.0110	54997.4812	13-May-2009 00:15:49	15-Jun-2009 11:32:57	1639	1105	2743
1	SC	54964.0011	54997.4911	13-May-2009 00:01:36	15-Jun-2009 11:47:11	49170	21610	70779
2	LC	55002.0175	55090.9649	20-Jun-2009 00:25:09	16-Sep-2009 23:09:29	4354	2965	7318
2.1	SCM1	55002.0076	55032.8003	20-Jun-2009 00:10:56	20-Jul-2009 19:12:30	45210	77410	122619
2.2	SCM2	55032.8215	55062.7969	20-Jul-2009 19:42:54	19-Aug-2009 19:07:29	44010	122650	166659
2.3	SCM3	55063.8601	55090.9748	20-Aug-2009 20:38:32	16-Sep-2009 23:23:42	39810	168220	208029
3	LC	55092.7222	55181.9966	18-Sep-2009 17:19:58	16-Dec-2009 23:55:06	4370	7404	11773
3.1	SCM1	55092.7123	55123.0555	18-Sep-2009 17:05:45	19-Oct-2009 01:19:58	44550	210580	255129
3.2	SCM2	55123.9144	55153.9511	19-Oct-2009 21:56:47	18-Nov-2009 22:49:38	44100	256390	300489
3.3	SCM3	55156.0156	55182.0065	21-Nov-2009 00:22:29	17-Dec-2009 00:09:19	38160	303520	341679
4	LC	55184.8777	55274.7038	19-Dec-2009 21:03:56	19-Mar-2010 16:53:31	4397	11914	16310
4.1	SCM1	55184.8679	55205.7421	19-Dec-2009 20:49:43	09-Jan-2010 17:48:41	30648	345880	376527
4.2	SCM2	55216.8056	55245.7389	20-Jan-2010 19:20:01	18-Feb-2010 17:43:58	42480	392770	435249
4.3	SCM3	55245.8009	55274.7137	18-Feb-2010 19:13:13	19-Mar-2010 17:07:44	42450	435340	477789

Contents of Data Release 14–Full Frame Images.

Q	Class	Filename	UT Start	UT End
-	-	-	-	-
-	-	-	-	-
2	FFI	KPLR2009170043915	19-Jun-2009 04:09:49	19-Jun-2009 04:39:15
2	FFI	KPLR2009231194831	19-Aug-2009 19:19:05	19-Aug-2009 19:48:31
2	FFI	KPLR2009260000800	16-Sep-2009 23:38:34	17-Sep-2009 00:08:00
3	FFI	KPLR2009292020429	19-Oct-2009 01:35:04	19-Oct-2009 02:04:29
3	FFI	KPLR2009322233047	18-Nov-2009 23:01:21	18-Nov-2009 23:30:47
3	FFI	KPLR2009351005245	17-Dec-2009 00:23:19	17-Dec-2009 00:52:45
4	FFI	KPLR2010019225502	19-Jan-2010 22:25:37	19-Jan-2010 22:55:02
4	FFI	KPLR2010020005046	20-Jan-2010 00:21:21	20-Jan-2010 00:50:46
4	FFI	KPLR2010049182302	18-Feb-2010 17:53:37	18-Feb-2010 18:23:02
4	FFI	KPLR2010078174524	19-Mar-2010 17:15:58	19-Mar-2010 17:45:24

The Q2–Q4 Full Frame Images (FFIs) have an improved world coordinate system (WCS) solution when compared to previous releases. The new FFIs use a non-linear WCS based on the simple imaging polynomial (SIP) conventions of Shupe et al. (2005). The transformations from sky coordinates to pixel coordinates is calculated by the Kepler pipeline for each long cadence but not for the FFIs. We use the nearest good long cadence to calculate the coordinate transformations for each FFI (usually the last long cadence of the month). The WCS solution is typically accurate to 0.1 pixels (0.4 arcseconds) when compared to the 2MASS point source catalogue (Skrutskie et al. 2006). For additional details, see the Archive Manual.

We note that the WCS for first Q2 FFI has a lower accuracy than typical FFIs. This is because this FFI was taken at the very start of the quarter and we entered a safe mode shortly thereafter. When we subsequently returned to normal operation the pointing was offset from the pointing when the FFI was taken. We have used a linear solution for the WCS for this FFI and only expect the WCS to be accurate to $\sim$1 pixel for CCDs near the edges of the focal plane.

2 Release Description

No change from the Data Characteristics Handbook.

3 Evaluation of Performance

3.1 Overall

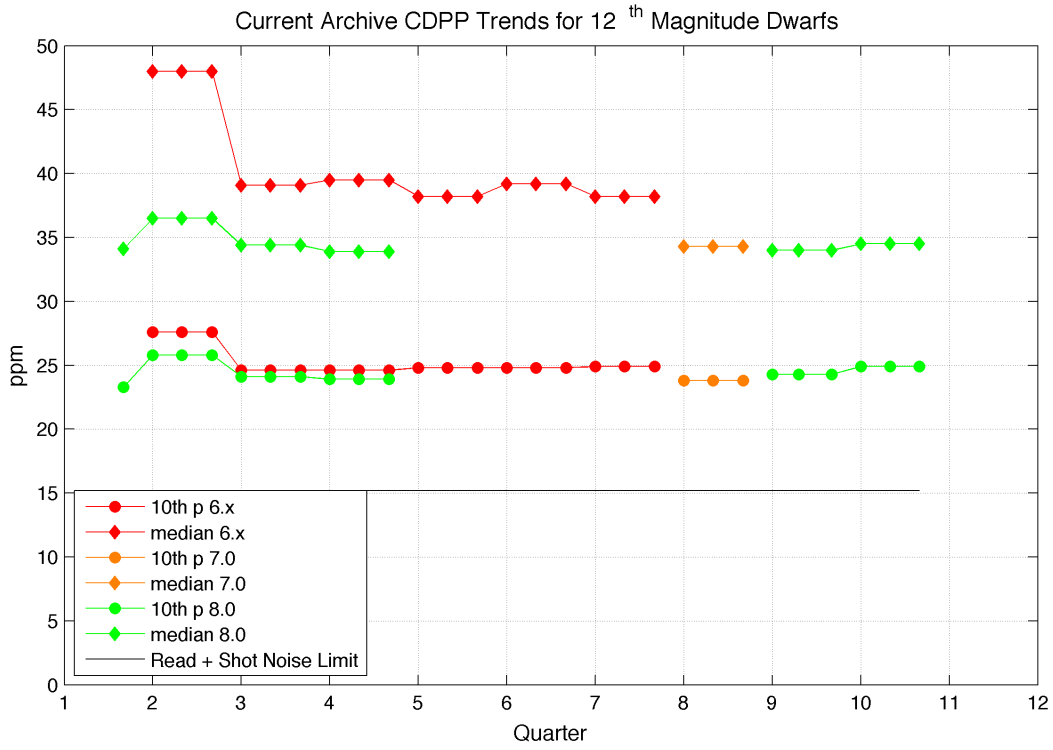


Figure 1: 6.5-h Temporal Median (TM) of the CDPP time series calculated by the TPS pipeline module for dwarf stars between Kp=11.75–12.25. The 6-h TMCDPPs have been divided by sqrt(13/12) = 1.041 to approximate 6.5-h TMCDPPs. A detailed discussion of the median and 10th percentile of CDPP values is given in the Kepler Data Characteristics Handbook. The 6.x, 7.0 and 8.0 labels given in the legend refer to the version of the SOC pipeline used; these Notes pertain to the SOC 8.0 reprocessing up to Q4. Note that Q0 and Q1 are shorter than nominal quarters, and were originally over-fitted. Re-processed Q1 is shown here; all values are given in Table 1.

Table 1: Aggregate statistics for the TMCDPPs by magnitude. Column Definitions: (1) Kepler Magnitude at the center of the bin. Bins are ± 0.25 mag, for a bin of width 0.5 mag centered on this value. (2) Number of dwarfs (log g > 4) in the bin. (3) 10th percentile TMCDPP for dwarfs in the bin. (4) Median TMCDPP for dwarfs in the bin. (5) Number of all stars in the bin. (6) 10th percentile TMCDPP of all observed stars in the bin. (7) Median TMCDPP for all stars in the bin. (8) Simplified noise model CDPP.

Q0							
Kp mag	No. dwarfs	10th prctile	Median	No. stars	10th prctile	Median	Noise model
9.0	53	7.7	24.3	401	8.9	33.8	3.8
10.0	164	10.1	27.7	1126	11.1	47.1	6.0
11.0	626	16.0	26.7	2881	17.5	54.4	9.5
12.0	2118	22.5	33.4	6293	24.0	57.6	15.2
13.0	6098	33.9	46.6	13121	35.7	62.0	24.4
Q1							
Kp mag	No. dwarfs	10th prctile	Median	No. stars	10th prctile	Median	Noise model
9.0	55	10.6	23.8	228	9.9	45.9	3.8
10.0	170	11.5	30.7	708	12.9	55.0	6.0
11.0	655	16.6	29.2	2003	19.1	66.2	9.5
12.0	2311	23.3	34.0	4808	25.1	58.8	15.2
13.0	7261	35.1	46.7	11503	36.7	57.5	24.4
14.0	14673	56.4	72.4	17787	57.3	75.6	40.1
15.0	27836	101.6	130.8	27841	101.6	130.8	68.8
16.0	6692	186.3	232.7	6692	186.3	232.7	127.8
Q2							
Kp mag	No. dwarfs	10th prctile	Median	No. stars	10th prctile	Median	Noise model
9.0	56	11.5	21.8	227	13.0	39.1	3.8
10.0	170	13.3	31.7	710	15.0	56.6	6.0
11.0	651	18.6	30.1	2003	20.9	69.0	9.5
12.0	2308	25.8	36.5	4805	27.5	62.0	15.2
13.0	7273	38.2	50.3	11517	39.9	61.6	24.4
14.0	14662	60.8	77.4	17777	61.8	81.0	40.1
15.0	27798	107.8	138.2	27803	107.8	138.2	68.8
16.0	10476	194.9	242.2	10476	194.9	242.2	127.8
Q3							
Kp mag	No. dwarfs	10th prctile	Median	No. stars	10th prctile	Median	Noise model
9.0	54	7.9	21.0	223	11.3	43.1	3.8
10.0	169	12.3	31.1	711	13.8	55.4	6.0
11.0	655	17.4	29.0	2004	19.6	67.6	9.5
12.0	2312	24.2	34.3	4812	25.7	59.6	15.2
13.0	7251	35.9	46.4	11500	37.4	57.8	24.4
14.0	14679	56.6	71.3	17789	57.4	74.6	40.1
15.0	27779	100.8	127.7	27784	100.8	127.7	68.8
16.0	9834	183.8	225.4	9834	183.8	225.4	127.8
Q4							
Kp mag	No. dwarfs	10th prctile	Median	No. stars	10th prctile	Median	Noise model
9.0	56	8.2	21.0	184	8.9	45.2	3.8
10.0	167	12.5	29.7	555	12.5	54.7	6.0
11.0	661	17.0	28.5	1601	18.3	55.1	9.5
12.0	2305	23.9	33.9	4047	25.0	47.9	15.2
13.0	7273	35.9	46.5	10295	36.9	52.8	24.4
14.0	14738	57.1	72.4	17255	57.8	74.8	40.1
15.0	29620	104.3	132.5	29624	104.3	132.5	68.8
16.0	15484	193.4	245.3	15484	193.4	245.3	127.8

4 Historical Events

In this Section, we discuss cadences that may not be useful for high-precision photometry due to planned or unplanned spacecraft events. There is no change in this section from the Data Release Notes compiled for previous releases of these data; it is maintained here for completeness.

4.1 Kepler Mission Timeline to Date

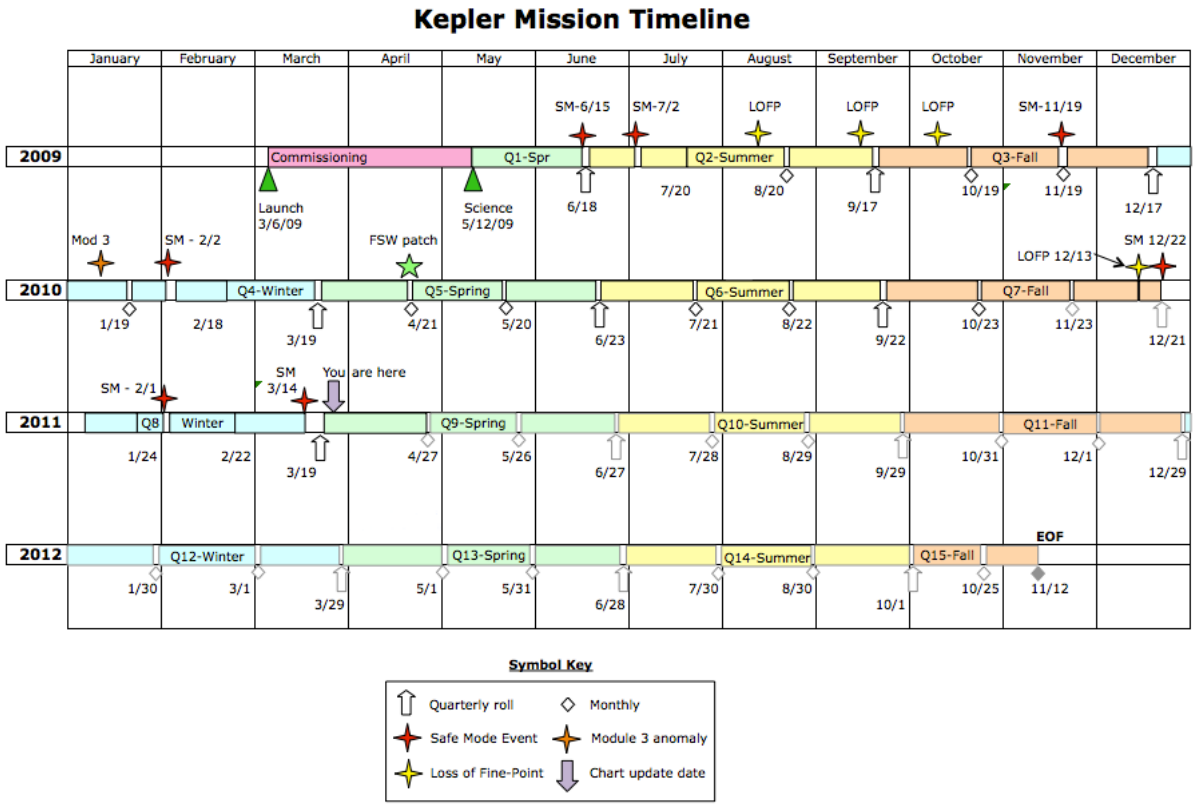


Figure 2: Kepler Mission Timeline as of the end of Q8.

4.2 Safe Mode

There were four Safe Modes in the period from Q0–Q4, shown in Figure 2. The Safe Modes that occurred on 6/15/2009 and 11/19/2009 coincided with planned data gaps (a quarterly roll and a monthly data downlink, respectively) and therefore did not introduce additional gaps.

4.3 Loss of Fine Point

The cadences obtained when the spacecraft was not in fine point are listed in Tables 5 and 6, the LC and SC anomaly summary tables respectively. These episodes of coarse pointing are also indicated in Figure 2.

4.4 Attitude Tweaks

The pointing history is shown in Figure 3; in particular, there were several attitude tweaks over the course of Q2 which should be noted carefully in any scientific analysis of the data. Also evident in the pointing history prior to Q3 is the approximately 3-day oscillation introduced by the heater cycling on-board—this was mitigated in later quarters.

4.5 Variable FGS Guide Stars

No changes from the Data Characteristics Handbook.

4.6 Module 3 Failure

No changes from the Data Characteristics Handbook.

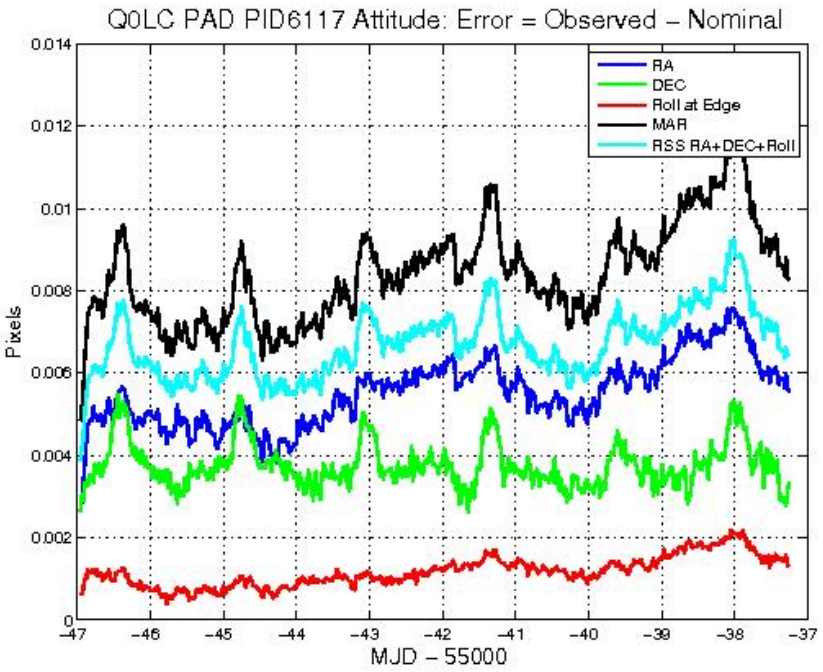


Figure 3: Attitude Error for Q0–Q4, calculated by PAD using Long Cadence data. Note that different quarters have different vertical and horizontal scales.

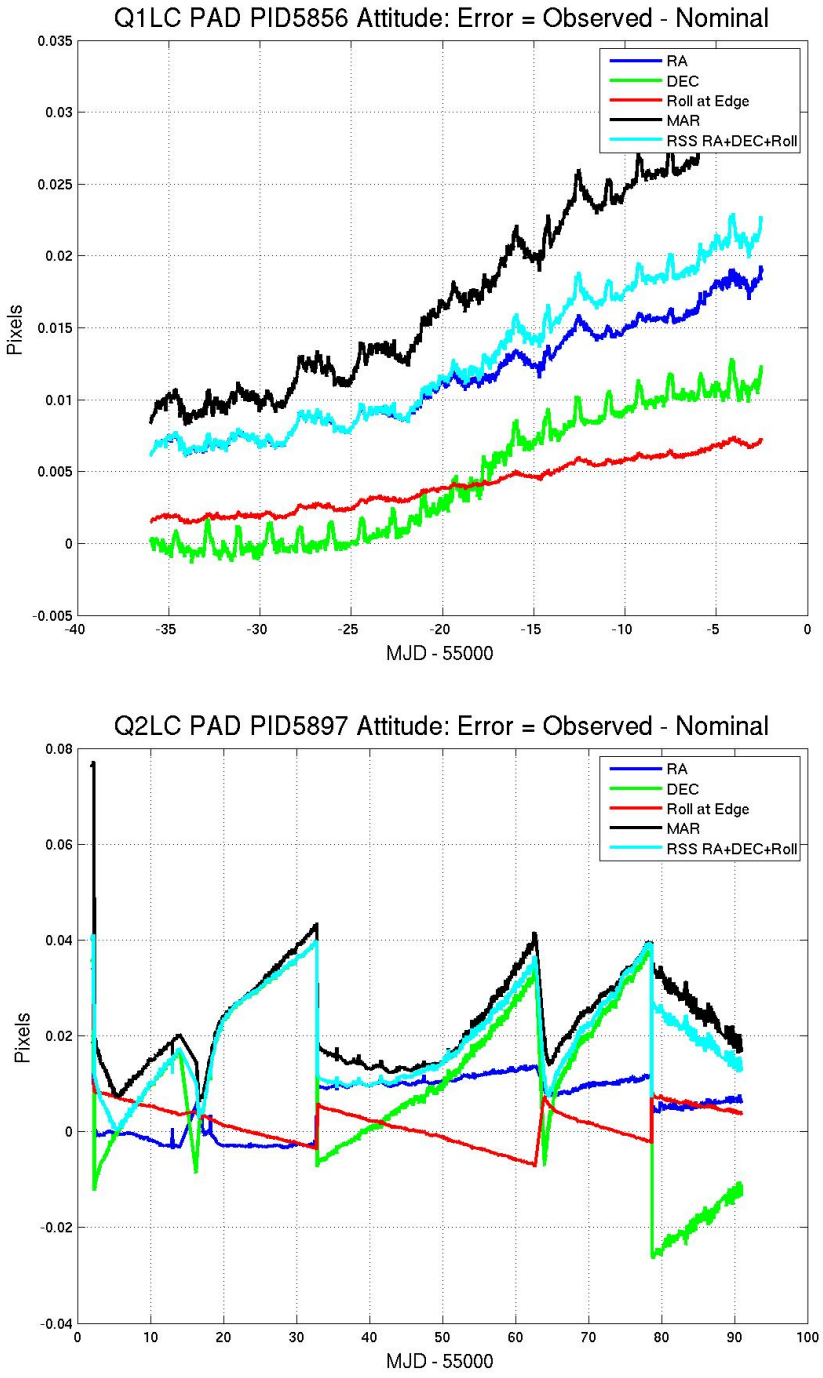
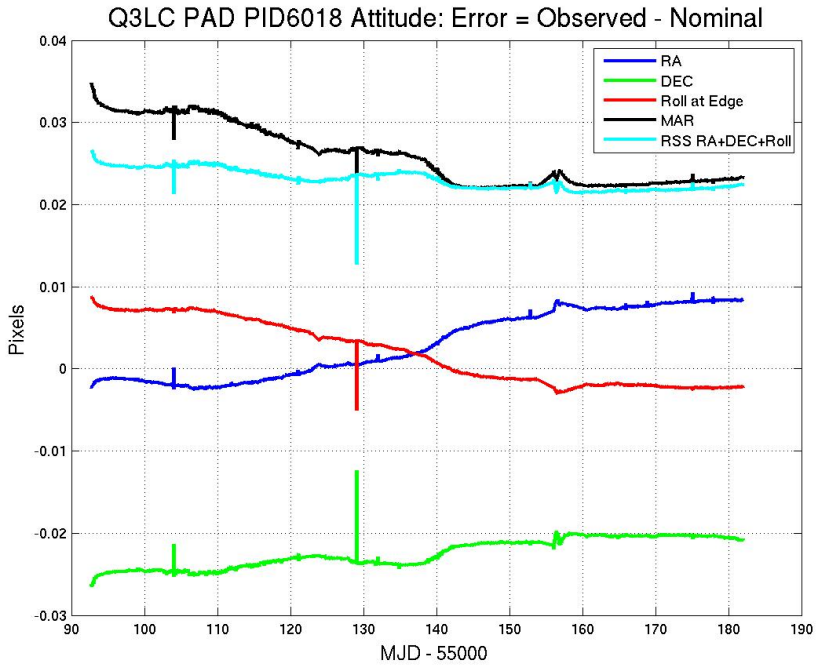


Figure 3: – continued from previous page.



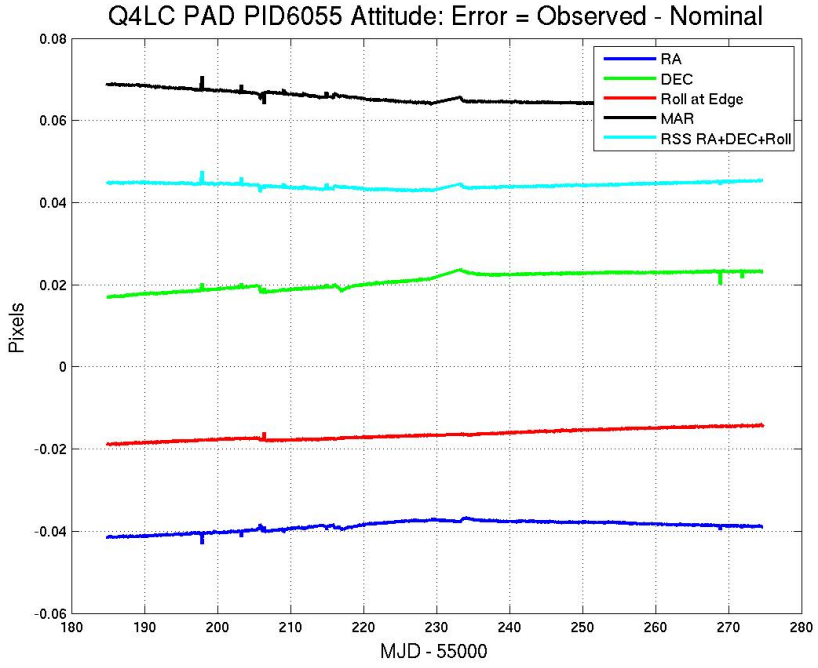


Figure 3: – continued from previous page.

5 Ongoing Phenomena

In this Section, we document the systematic errors arising in nominal on-orbit operations, most of which will be removed from the "corrected" flux time series by the scientific pipeline.

5.1 Image Motion

The image motion on a per-target basis is available in the FITS files at MAST via the POS CORR1 (column) and POS CORR2 (row) columns. The column and row motion time series are provided for each mod.out for each quarter in the Supplement.

5.2 Focus Changes

The change in width of the PRF with time is shown in Figure 4.

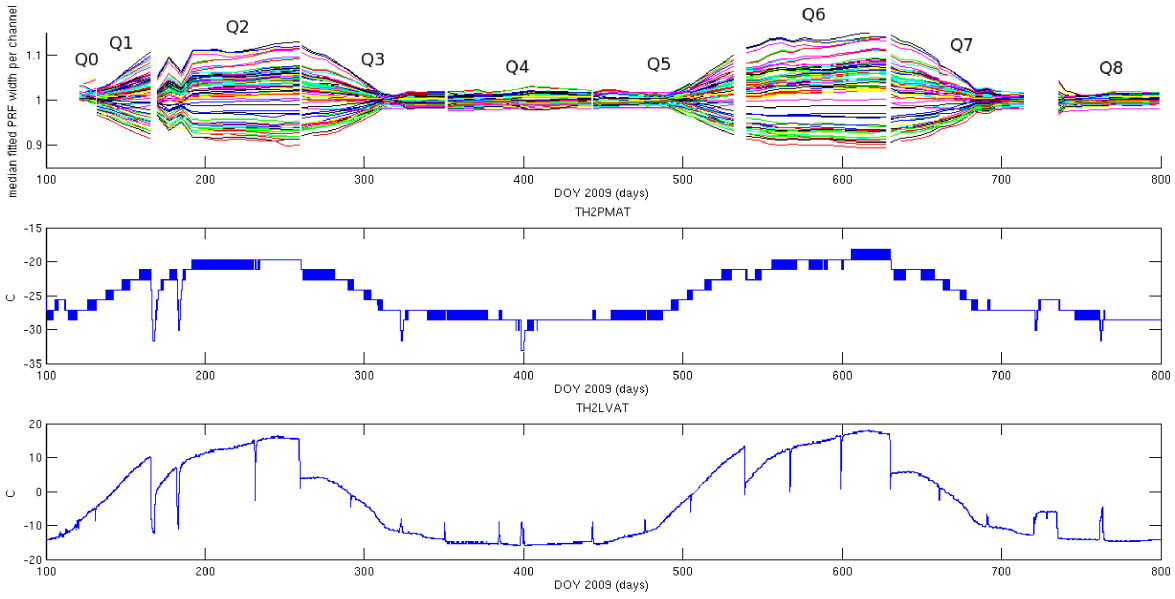


Figure 4: The correlation of the variation in PRF width with various spacecraft temperatures, demonstrating the seasonal nature of the focus and PRF changes.

5.3 Momentum Desaturation

Tables of the Long and Short Cadences affected by momentum desaturations in the reaction wheels are provided in the Data Release Notes Supplement; the cadences are also indicated in the quality flag column in the FITS files at MAST.

5.4 Reaction Wheel Zero Crossings

The cadences occurring during reaction wheel zero crossings are listed in Table 2.

Table 2: Zero crossing events in Q0–Q4, defined as the time from first to last zero crossing in the event, rounded to the nearest cadence. The corresponding Short Cadence numbers can be found in the Data Release 14 Supplement. CIN = cadence interval number, RCI = relative cadence index. Note that there were no zero crossing events in Q0.

Event no.	MJD start	MJD end	CIN start	CIN end	RCI start	RCI end
Q0						
-	-	-	-	-	-	-
Q1						
1	54985.221	54985.364	2143	2150	1039	1046
2	54985.405	54985.609	2152	2162	1048	1058
3	54994.110	54994.416	2578	2593	1474	1489
4	54994.396	54994.437	2592	2594	1488	1490
5	54995.131	54995.152	2628	2629	1524	1525
6	54995.131	54995.172	2628	2630	1524	1526
7	54995.152	54996.725	2629	2706	1525	1602
Q2						
1	55012.745	55012.786	3490	3492	526	528
2	55012.766	55013.133	3491	3509	527	545
3	55018.078	55018.262	3751	3760	787	796
4	55023.575	55023.698	4020	4026	1056	1062
5	55032.484	55032.545	4456	4459	1492	1495
6	55035.467	55035.508	4602	4604	1638	1640
7	55035.508	55035.590	4604	4608	1640	1644
8	55038.451	55038.553	4748	4753	1784	1789
9	55041.556	55041.638	4900	4904	1936	1940
10	55041.638	55041.720	4904	4908	1940	1944
11	55047.400	55047.462	5186	5189	2222	2225
12	55083.282	55083.302	6942	6943	3978	3979
13	55083.282	55083.793	6942	6967	3978	4003
14	55086.919	55087.328	7120	7140	4156	4176
Q3						
1	55103.961	55104.247	7954	7968	551	565
2	55121.002	55121.166	8788	8796	1385	1393
3	55131.914	55131.996	9322	9326	1919	1923
4	55134.897	55134.918	9468	9469	2065	2066
5	55137.880	55137.901	9614	9615	2211	2212
6	55140.864	55140.884	9760	9761	2357	2358
7	55152.797	55152.838	10344	10346	2941	2943
8	55152.838	55152.920	10346	10350	2943	2947
9	55165.874	55165.956	10984	10988	3581	3585
10	55168.878	55168.960	11131	11135	3728	3732
11	55174.988	55175.029	11430	11432	4027	4029
12	55175.008	55175.376	11431	11449	4028	4046
13	55177.828	55177.889	11569	11572	4166	4169
Q4						
1	55184.919	55184.939	11916	11917	3	4
2	55197.710	55197.730	12542	12543	629	630
3	55197.730	55197.955	12543	12554	630	641
4	55197.935	55197.976	12553	12555	640	642

Continued on next page

Table 2 – continued from previous page

Event no.	MJD start	MJD end	CIN start	CIN end	RCI start	RCI end
5	55199.835	55199.856	12646	12647	733	734
6	55203.145	55203.350	12808	12818	895	905
7	55203.329	55203.350	12817	12818	904	905
8	55208.989	55209.194	13094	13104	1181	1191
9	55211.768	55211.891	13230	13236	1317	1323
10	55214.874	55215.017	13382	13389	1469	1476
11	55215.937	55216.080	13434	13441	1521	1528
12	55268.676	55268.696	16015	16016	4102	4103
13	55268.717	55268.737	16017	16018	4104	4105
14	55268.717	55268.758	16017	16019	4104	4106
15	55268.737	55268.778	16018	16020	4105	4107
16	55268.778	55269.003	16020	16031	4107	4118
17	55271.761	55271.782	16166	16167	4253	4254
18	55271.782	55271.925	16167	16174	4254	4261

5.5 Downlink Earth Point

The cadences occurring during spacecraft Earth Point are listed in Tables 5 and 6.

5.6 Manually Excluded Cadences

No changes from the Data Characteristics Handbook.

5.7 Incomplete Apertures Give Flux and Feature Discontinuities at Quarter Boundaries

No changes from the Data Characteristics Handbook.

5.8 Argabrightening

The cadences affected by Argabrightening events, as described in the Data Characteristics Handbook, are listed in Tables 3 and 4 for LC and SC respectively.

Table 3: Q0–Q4 LC Argabrightening Events with amplitude $T_{\rm MAD} > 10$, and occurring on a number of channels $T_{\rm MCE} > 10$. The columns are (1) Cadence interval number (CIN) for Argabrightening cadences, (2) Relative cadence index (RCI) for Argabrightening cadences, (3) Argabrightening cadence mid-times (MJD), (4) Mean Argabrightening statistic over channels included in the Argabrightening event $< S_{\rm Arg} >_{\rm FPA}$, (5) Number of channels exceeding threshold for this cadence ($\rm N_{chan}$), (6) Number of channels exceeding the default pipeline threshold for this cadence ($\rm N_{pipe}$).

CIN	RCI	Mid-Times (MJD)	$< S_{\rm Arg} >_{\rm FPA}$	$\rm N_{chan}$	$\rm N_{pipe}$
Q0					
586	19	54953.40596	13.5	61	0
619	52	54954.08027	20.9	81	0
790	223	54957.57441	91.4	83	0
901	334	54959.84254	24.1	83	0

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Table 3 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
914	347	54960.10818	6.3	68	0
915	348	54960.12861	12.8	51	0
958	391	54961.00726	21.0	57	0
972	405	54961.29333	775.3	84	1
973	406	54961.31376	7.9	47	0
		Q1			
1149	45	54964.91007	5.0	17	0
1170	66	54965.33918	23.1	81	0
1271	167	54967.40297	8.6	12	0
1852	748	54979.27489	10.6	30	0
1943	839	54981.13435	13.1	51	0
2082	978	54983.97462	23.1	75	0
2091	987	54984.15852	289.3	84	1
2146	1042	54985.28237	25.3	66	0
2236	1132	54987.12139	18.4	55	0
2282	1178	54988.06134	235.7	84	1
2559	1455	54993.72144	21.0	81	0
2611	1507	54994.78399	35.3	11	0
		Q2			
2966	2	55002.03791	3.4	11	0
2969	5	55002.09921	2.8	12	0
2971	7	55002.14008	3.5	11	0
3010	46	55002.93699	3.8	16	0
3039	75	55003.52956	12.3	66	0
3150	186	55005.79769	7.1	38	0
3184	220	55006.49243	6.3	11	0
3252	288	55007.88192	7.8	18	0
4060	1096	55024.39226	3397.3	84	84
4128	1164	55025.78175	5.1	21	0
4403	1439	55031.40099	7.1	17	0
4474	1510	55032.85177	8.6	21	0
4652	1688	55036.48895	13.0	65	0
5059	2095	55044.80543	17.9	78	0
5245	2281	55048.60608	13.8	44	0
5513	2549	55054.08228	6.1	12	0
5538	2574	55054.59312	15.2	36	0
5567	2603	55055.18569	8.8	30	0
5767	2803	55059.27241	76.4	84	24
5851	2887	55060.98883	6.8	23	0
5887	2923	55061.72444	21.2	52	0
5920	2956	55062.39875	4.1	14	0
5998	3034	55063.99257	20.1	73	0
6150	3186	55067.09848	21.7	84	0
6260	3296	55069.34618	4.5	15	0
6266	3302	55069.46878	5.8	11	0
6432	3468	55072.86075	152.6	84	70
6447	3483	55073.16726	11.6	52	0
6670	3706	55077.72395	7.4	13	0

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Table 3 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
6796	3832	55080.29858	571.5	84	84
6797	3833	55080.31902	6.3	13	0
7017	4053	55084.81441	9.1	33	0
7045	4081	55085.38655	26.4	74	0
7216	4252	55088.88069	10.6	46	0
Q3					
7596	193	55096.64546	179.0	84	81
7857	454	55101.97863	7.6	19	0
7859	456	55102.01950	4.3	14	0
8157	754	55108.10871	7.7	28	0
8563	1160	55116.40475	14.4	78	0
8676	1273	55118.71374	11.9	55	0
8761	1358	55120.45060	8.0	16	0
8825	1422	55121.75835	13.2	56	0
9073	1670	55126.82588	6.2	11	0
9183	1780	55129.07358	107.7	82	40
9207	1804	55129.56398	2.7	15	0
9368	1965	55132.85379	175.5	84	81
9419	2016	55133.89591	15.2	68	0
9438	2035	55134.28415	13.9	75	0
9488	2085	55135.30583	7.6	17	0
9926	2523	55144.25574	10.8	34	0
9984	2581	55145.44089	11.0	42	0
10152	2749	55148.87373	8.5	22	0
10337	2934	55152.65395	47.3	83	0
10520	3117	55156.39330	527.5	84	84
10568	3165	55157.37411	6.5	26	0
10826	3423	55162.64598	17.5	76	0
10827	3424	55162.66642	6.8	33	0
11644	4241	55179.36066	124.8	84	73
11698	4295	55180.46408	6.3	16	0
Q4					
11966	53	55185.94028	69.6	84	0
11983	70	55186.28765	181.6	84	1
12053	140	55187.71801	42.3	59	0
12194	281	55190.59914	32.6	84	0
12422	509	55195.25800	25.7	83	0
12463	550	55196.09578	23.3	74	0
12550	637	55197.87350	28.8	80	0
12605	692	55198.99735	8.1	56	0
12783	870	55202.63453	-0.3	21	0
12918	1005	55205.39307	7.2	18	0
12967	1054	55206.39431	63.1	80	0
13321	1408	55213.62781	9.5	59	0
13337	1424	55213.95475	166.8	80	1
13396	1483	55215.16033	0.0	11	0
13397	1484	55215.18076	0.0	11	0
13398	1485	55215.20120	2.9	14	0

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Table 3 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
13399	1486	55215.22163	0.3	12	0
13401	1488	55215.26250	0.1	11	0
13402	1489	55215.28293	1.6	12	0
13403	1490	55215.30336	0.6	11	0
13404	1491	55215.32380	3.5	12	0
13405	1492	55215.34423	-0.6	12	0
13406	1493	55215.36466	-1.7	12	0
13407	1494	55215.38510	0.6	12	0
13490	1577	55217.08109	11.7	23	0
13642	1729	55220.18699	40.4	80	0
13643	1730	55220.20743	2.4	12	0
14293	2380	55233.48927	13.3	59	0
14755	2842	55242.92959	16.1	68	0
14979	3066	55247.50672	43.8	75	0
15103	3190	55250.04048	31.9	79	0
15390	3477	55255.90493	11.8	22	0
15536	3623	55258.88823	40.3	11	0
15637	3724	55260.95203	21.6	25	0

Table 4: Q0–Q4 SC Argabrightening Events with amplitude $T_{\mathrm{MAD}} > 10$, and occurring on a number of channels $T_{\mathrm{MCE}} > 10$. The columns have the same meanings as Table 3. Note consecutive detections of the largest events. A horizontal line separates the three months of the quarter; the relative cadence index (RCI) is reset at the start of each month.

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
Q0					
6058	559	54953.40834	2.0	47	0
6059	560	54953.40902	7.8	49	0
7034	1535	54954.07311	42.2	81	0
7870	2371	54954.64253	6.9	32	0
7911	2412	54954.67046	4.1	27	0
12179	6680	54957.57748	186.5	82	1
13029	7530	54958.15643	9.5	14	0
14282	8783	54959.00987	11.7	46	0
15509	10010	54959.84561	46.2	82	0
15898	10399	54960.11056	3.7	70	0
15932	10433	54960.13372	24.1	60	0
17205	11706	54961.00078	8.2	19	0
17206	11707	54961.00147	26.2	50	0
17207	11708	54961.00215	4.3	27	0
17647	12148	54961.30184	1084.1	82	1
17648	12149	54961.30252	359.0	82	1
17649	12150	54961.30320	31.6	78	0
17650	12151	54961.30388	3.4	42	0
17651	12152	54961.30456	6.1	18	0
Q1					

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Table 4 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
22952	1343	54964.91518	9.0	11	0
23586	1977	54965.34701	24.5	72	0
44038	22429	54979.27727	13.5	18	0
46769	25160	54981.13741	11.9	15	0
50932	29323	54983.97292	13.6	49	0
51205	29596	54984.15886	94.9	78	1
51206	29597	54984.15954	141.0	72	1
51207	29598	54984.16022	21.4	15	0
52852	31243	54985.28067	24.0	54	0
56921	35312	54988.05214	227.0	78	1
56922	35313	54988.05282	23.0	71	0
65246	43637	54993.72247	15.2	58	0
		Q2			
78773	1364	55002.93597	3.6	13	0
79635	2226	55003.52309	11.9	54	0
82759	5350	55005.65091	18.1	67	2
82971	5562	55005.79531	8.0	35	0
86044	8635	55007.88839	7.4	18	0
110275	32866	55024.39260	483.9	84	84
110276	32867	55024.39329	2666.2	84	84
110277	32868	55024.39397	114.6	84	74
110278	32869	55024.39465	9.1	25	1
112329	34920	55025.79162	4.8	16	0
128043	5394	55036.49474	12.4	56	0
140256	17607	55044.81326	17.5	72	0
145823	23174	55048.60505	5.5	20	0
154610	31961	55054.59005	13.2	36	2
161496	38847	55059.28025	55.2	83	36
161497	38848	55059.28093	13.5	51	0
164016	41367	55060.99667	6.3	25	0
165087	42438	55061.72615	4.0	14	0
165088	42439	55061.72683	8.0	26	0
165089	42440	55061.72751	7.3	25	0
166066	43417	55062.39296	2.6	11	0
168422	203	55063.99768	12.4	58	0
168423	204	55063.99836	6.6	17	0
172972	4753	55067.09678	18.9	79	0
176282	8063	55069.35128	4.7	14	0
181427	13208	55072.85565	127.9	84	75
181428	13209	55072.85633	28.7	81	0
181894	13675	55073.17373	11.2	46	0
192367	24148	55080.30710	489.5	84	84
192368	24149	55080.30778	57.4	84	32
192369	24150	55080.30846	6.9	19	0
198972	30753	55084.80589	7.5	25	0
199833	31614	55085.39234	11.6	37	0
199834	31615	55085.39302	14.8	63	0
204959	36740	55088.88376	9.4	34	0

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Table 4 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
Q3					
216350	5771	55096.64240	82.3	83	57
216351	5772	55096.64308	62.1	83	34
216352	5773	55096.64376	31.4	69	6
224185	13606	55101.97897	7.7	19	0
240439	29860	55113.04989	209.4	83	83
240440	29861	55113.05057	192.8	83	83
240441	29862	55113.05125	124.3	83	79
245366	34787	55116.40577	11.4	50	0
248755	38176	55118.71408	7.4	20	0
251318	40739	55120.45980	7.3	15	0
251737	41158	55120.74518	7.8	14	0
253235	42656	55121.76550	13.5	50	0
263955	7566	55129.06711	80.5	79	58
263956	7567	55129.06779	22.8	35	11
269511	13122	55132.85141	15.6	71	0
269512	13123	55132.85209	29.4	81	0
269513	13124	55132.85277	25.5	81	0
269514	13125	55132.85345	22.5	54	2
269515	13126	55132.85413	36.3	71	13
269516	13127	55132.85482	19.2	47	3
271039	14650	55133.89216	8.1	27	0
271629	15240	55134.29402	14.1	63	0
273119	16730	55135.30889	7.1	14	0
286266	29877	55144.26357	6.8	13	0
286267	29878	55144.26425	4.1	14	0
288006	31617	55145.44872	6.9	19	0
298578	42189	55152.64952	6.8	11	0
298579	42190	55152.65020	16.3	69	0
298580	42191	55152.65088	7.8	21	0
298581	42192	55152.65157	7.7	21	0
304081	562	55156.39773	146.6	82	82
304082	563	55156.39841	147.1	82	82
304083	564	55156.39909	73.7	82	53
304084	565	55156.39977	66.7	82	43
304085	566	55156.40045	34.1	80	11
304086	567	55156.40113	5.5	21	0
304089	570	55156.40318	4.6	12	0
305500	1981	55157.36424	6.8	20	0
313241	9722	55162.63679	18.4	72	0
313291	9772	55162.67084	7.3	33	0
337785	34266	55179.35419	13.4	61	0
337786	34267	55179.35487	46.1	82	12
337787	34268	55179.35556	28.2	82	1
337788	34269	55179.35624	20.9	72	0
Q4					
347458	1579	55185.94267	26.2	83	0
347459	1580	55185.94335	18.7	35	0

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Table 4 – continued from previous page

CIN	RCI	Mid-Times (MJD)	$< S_{\mathrm{Arg}} >_{\mathrm{FPA}}$	$\mathrm{N_{chan}}$	$\mathrm{N_{pipe}}$
347963	2084	55186.28663	106.9	84	1
347964	2085	55186.28731	11.6	12	0
350071	4192	55187.72243	21.8	43	0
354291	8412	55190.59676	21.1	84	0
361142	15263	55195.26311	13.9	84	0
362362	16483	55196.09408	11.5	60	0
364977	19098	55197.87521	17.3	81	0
366635	20756	55199.00450	2.3	51	0
377476	31597	55206.38852	30.1	80	0
388597	42718	55213.96326	93.0	80	1
388598	42719	55213.96394	12.6	64	0
391351	45472	55215.83906	1.8	11	0
391352	45473	55215.83975	3.9	35	0
393189	420	55217.09096	10.0	24	0
397748	4979	55220.19619	32.4	79	0
397749	4980	55220.19687	2.1	12	0
417255	24486	55233.48280	5.5	18	0
431117	38348	55242.92448	6.0	62	0
437838	2499	55247.50229	23.8	70	0
437839	2500	55247.50297	0.6	14	0
441550	6211	55250.03061	17.2	79	0
450176	14837	55255.90595	7.5	11	0
457577	22238	55260.94692	12.7	21	0

5.9 Background Time Series

The background flux time series for Q0–Q4 are shown in Figure 5.

5.10 Pixel Sensitivity Droputs

No changes from the Data Characteristics Handbook.

5.11 Short Cadence Requantization Gaps

No changes from the Data Characteristics Handbook.

5.12 Spurious Frequencies in SC Data

No changes from the Data Characteristics Handbook.

5.13 Propagation of Uncertainties

No changes from the Data Characteristics Handbook.

5.14 Onboard Spacecraft Errors

No changes from the Data Characteristics Handbook. Note, there were no spacecraft errors reported in Q0 in LC, nor in Q0–Q4 in SC.

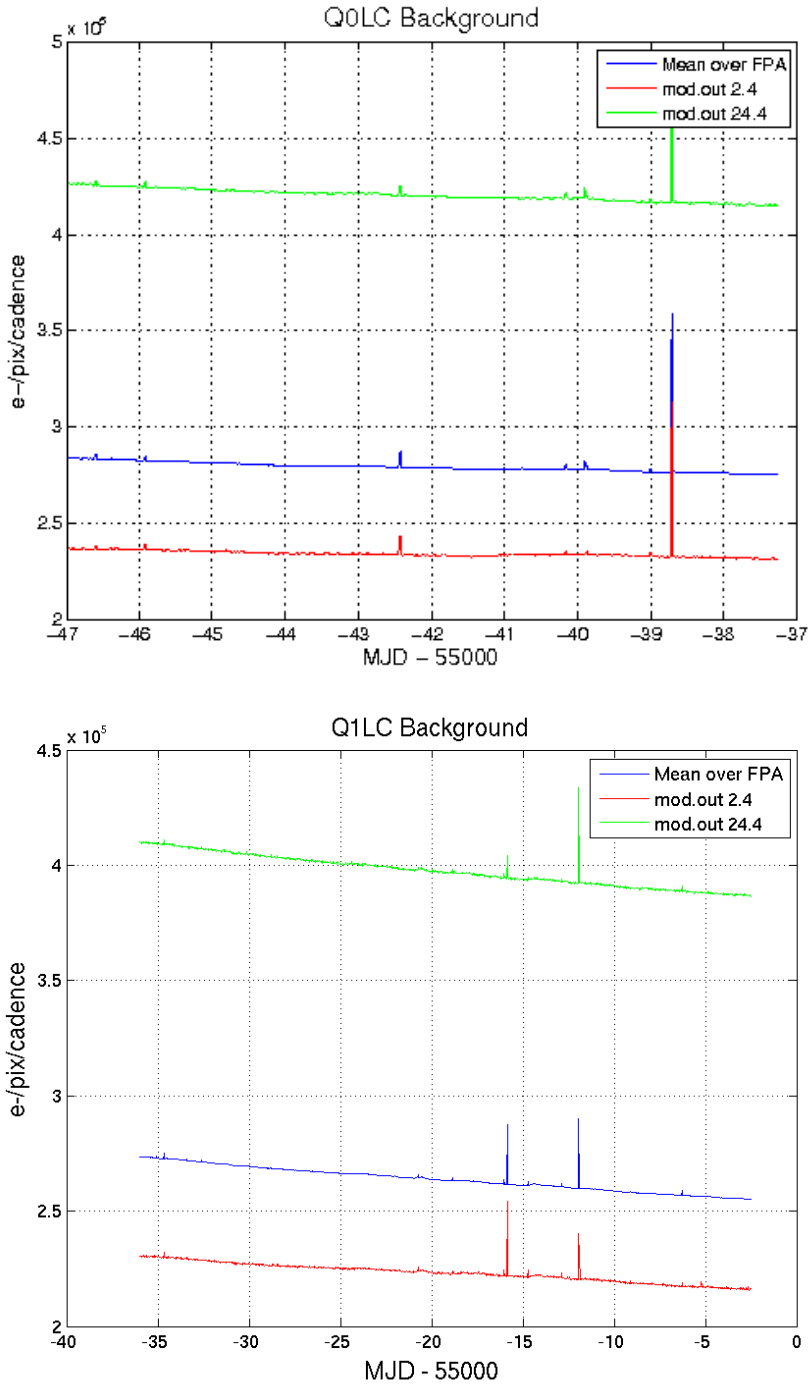

Figure 5: The background flux time series for Q0–Q4 showing the average over all the modules, and two individual modules. The narrow spikes are Argabrightening events.

5.15 Anomaly Summary Tables

The complete list of affected cadence interval numbers (CINs) for Tables 5 and 6 below are included in the Data Release 14 Supplement.

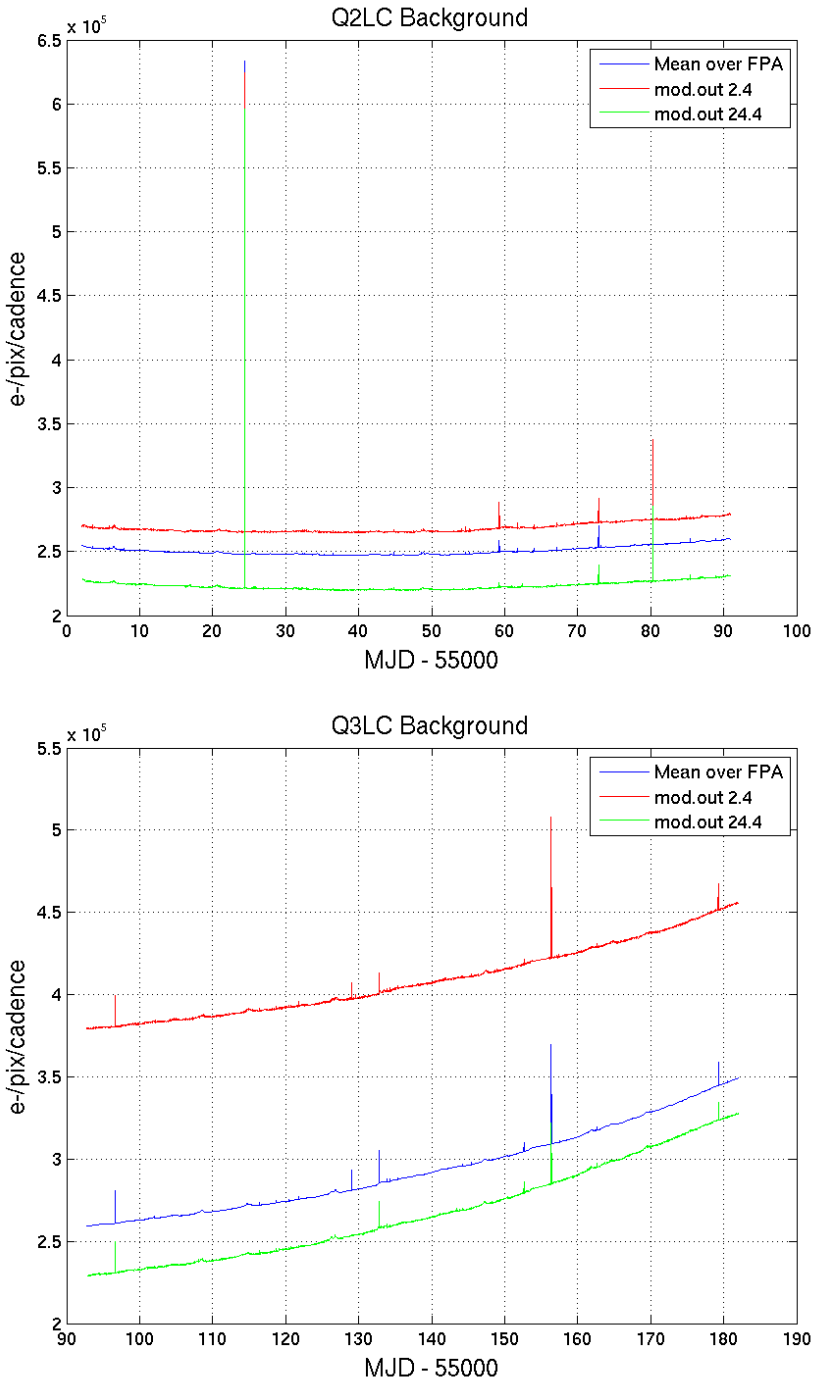

Figure 5: – continued from previous page.

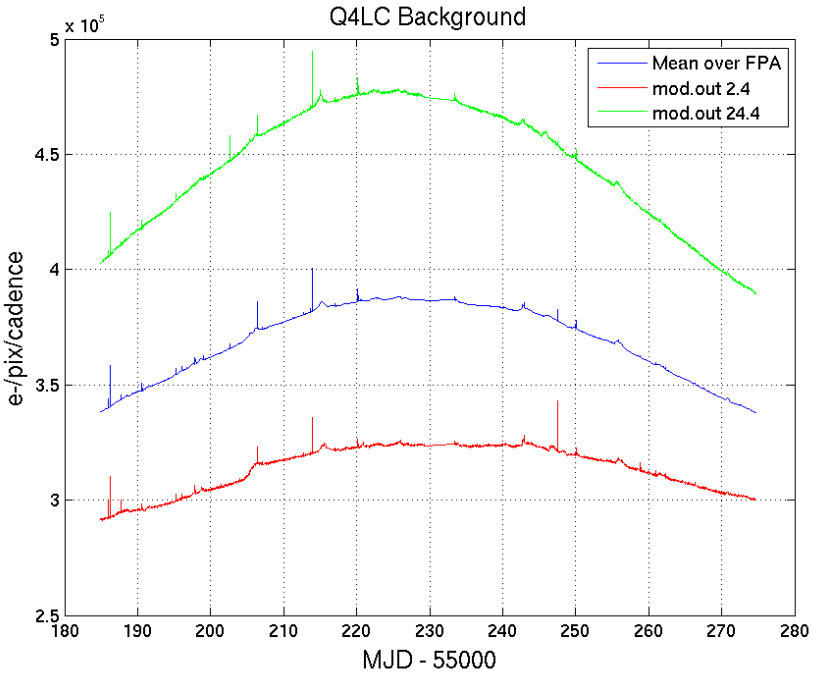

Figure 5: – continued from previous page.

Table 5: Q0–Q4 LC Anomaly Summary Table

LC CIN start	LC CIN end	Anomaly Type	Note
Q0			
790	790	ARGABRIGHTENING	See Section 5.8
914	915	ARGABRIGHTENING	
972	972	ARGABRIGHTENING	
Q1			
1907	1907	MEMORY ERROR	See Section 5.14
2091	2091	ARGABRIGHTENING	
2140	2140	MEMORY ERROR	
2282	2282	ARGABRIGHTENING	
Q2			
2965	2976	EXCLUDE	See Section 5.6
3239	3239	MEMORY ERROR	
3448	3448	MEMORY ERROR	
3553	3659	SAFE MODE	See Section 4.2
4060	4060	ARGABRIGHTENING	
4361	4361	MEMORY ERROR	
4472	4472	ATTITUDE TWEAK	See Section 4.4
5606	5624	COARSE POINT	
5767	5767	ARGABRIGHTENING	
5940	5991	EARTH POINT	
6432	6432	ARGABRIGHTENING	

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Table 5 – continued from previous page

LC CIN start	LC CIN end	Anomaly Type	Note
6717	6717	ATTITUDE TWEAK	
6796	6797	ARGABRIGHTENING	
7168	7213	COARSE POINT	
Q3			
7404	7404	EARTH POINT	
7596	7596	ARGABRIGHTENING	
7756	7762	COARSE POINT	
7957	7958	COARSE POINT	
8230	8230	MEMORY ERROR	
8392	8584	MEMORY ERROR	
8399	8437	COARSE POINT	
8584	8584	MEMORY ERROR	
8670	8670	MEMORY ERROR	
8759	8759	MEMORY ERROR	
8889	8930	EARTH POINT	
9183	9183	ARGABRIGHTENING	
9368	9368	ARGABRIGHTENING	
10401	10501	EARTH POINT	
10520	10520	ARGABRIGHTENING	
11644	11644	ARGABRIGHTENING	
Q4			
11944	11944	MEMORY ERROR	
11983	11983	ARGABRIGHTENING	
12315	12315	MEMORY ERROR	
12783	12783	ARGABRIGHTENING	
12839	12839	MEMORY ERROR	
12936	12936	ATTITUDE TWEAK	
12967	12967	ARGABRIGHTENING	
13337	13337	ARGABRIGHTENING	
13434	13476	EARTH POINT	
13642	13642	ARGABRIGHTENING	
14091	14284	SAFE MODE	
14293	14293	ARGABRIGHTENING	
14979	14979	ARGABRIGHTENING	
16026	16026	EXCLUDE	

Table 6: Q0–Q4 SC Anomaly Summary Table

SC CIN start	SC CIN end	Anomaly Type	Note
Q0			
9564	9575	COARSE POINT	See Section 4.3
12179	12180	ARGABRIGHTENING	See Section 5.8
13913	13925	COARSE POINT	
15898	15898	ARGABRIGHTENING	
16969	16981	COARSE POINT	
17647	17651	ARGABRIGHTENING	

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Table 6 – continued from previous page

SC CIN start	SC CIN end	Anomaly Type	Note
Q1			
25850	25861	COARSE POINT	
30229	30241	COARSE POINT	
34610	34621	COARSE POINT	
38990	39001	COARSE POINT	
43370	43381	COARSE POINT	
47750	47761	COARSE POINT	
51205	51207	ARGABRIGHTENING	
52130	52141	COARSE POINT	
56510	56521	COARSE POINT	
56921	56922	ARGABRIGHTENING	
60890	60901	COARSE POINT	
65270	65281	COARSE POINT	
69650	69661	COARSE POINT	
Q2			
77740	77769	ATTITUDE TWEAK	See Section 4.4
95050	98259	SAFE MODE	See Section 4.2
110275	110278	ARGABRIGHTENING	
156662	157201	COARSE POINT	
161496	161497	ARGABRIGHTENING	
181427	181428	ARGABRIGHTENING	
189970	189999	ATTITUDE TWEAK	
192367	192369	ARGABRIGHTENING	
203519	204872	COARSE POINT	
Q3			
210580	210580	EARTH POINT	
212419	212430	COARSE POINT	
216350	216352	ARGABRIGHTENING	
216800	216811	COARSE POINT	
221150	221321	COARSE POINT	
225530	225541	COARSE POINT	
229910	229921	COARSE POINT	
234290	234301	COARSE POINT	
238670	238681	COARSE POINT	
240439	241599	COARSE POINT	
243050	243061	COARSE POINT	
247430	247441	COARSE POINT	
251810	251821	COARSE POINT	
255020	255031	COARSE POINT	
256390	256390	EARTH POINT	
259370	259381	COARSE POINT	
263750	263761	COARSE POINT	
263955	263956	ARGABRIGHTENING	
268130	268141	COARSE POINT	
272510	272521	COARSE POINT	
276890	276901	COARSE POINT	
281270	281281	COARSE POINT	
285650	285661	COARSE POINT	

Continued on next page

Table 6 – continued from previous page

SC CIN start	SC CIN end	Anomaly Type	Note
290030	290041	COARSE POINT	
294410	294421	COARSE POINT	
298790	298801	COARSE POINT	
303520	303520	EARTH POINT	
304081	304086	ARGABRIGHTENING	
304880	304891	COARSE POINT	
309260	309271	COARSE POINT	
313670	313681	COARSE POINT	
318020	318031	COARSE POINT	
322400	322410	COARSE POINT	
326750	326761	COARSE POINT	
331160	331170	COARSE POINT	
335540	335551	COARSE POINT	
339889	339901	COARSE POINT	
341570	341581	COARSE POINT	
Q4			
345950	345961	COARSE POINT	
347963	347963	ARGABRIGHTENING	
350330	350341	COARSE POINT	
354710	354721	COARSE POINT	
359090	359101	COARSE POINT	
363470	363482	COARSE POINT	
367850	367861	COARSE POINT	
372230	372241	COARSE POINT	
392770	392770	EARTH POINT	
395720	395731	COARSE POINT	
397748	397751	ARGABRIGHTENING	
400100	400111	COARSE POINT	
404480	404491	COARSE POINT	
408860	408872	COARSE POINT	
411190	416980	SAFE MODE	
419030	419041	COARSE POINT	
423410	423421	COARSE POINT	
427790	427801	COARSE POINT	
432170	432181	COARSE POINT	
433640	433651	COARSE POINT	
437838	437842	ARGABRIGHTENING	
438020	438031	COARSE POINT	
442400	442411	COARSE POINT	
446780	446791	COARSE POINT	
451160	451171	COARSE POINT	
455540	455551	COARSE POINT	
459920	459931	COARSE POINT	
464300	464311	COARSE POINT	
468680	468691	COARSE POINT	
473060	473071	COARSE POINT	
477440	477451	COARSE POINT	

6 Time and Time Stamps

No changes from the Data Characteristics Handbook.

7 Ensemble Cotrending Basis Vectors

NEW: CBVs from clean reference ensembles are now generated directly by Pipeline instead of by the offline tool originally used for Q1-Q8; users are provided with both the set of CBVs in the FITS files at the MAST website, and a quantitative measure of the goodness of those CBVs in the Supplement accompanying these Notes.

7.1 Introduction

No change from the Data Characteristics Handbook

7.2 Generation of CBVs

No changes from the Data Characteristics Handbook.

7.3 Using CBVs

No changes from the Data Characteristics Handbook.

7.4 Quality of CBVs

No changes from the Data Characteristics Handbook.

7.4.1 Caution: Q0

Many Q0 CBVs are unrepresentative and may produce unexpected results

Review of Quarter 0 shows that a large fraction of strong vectors (i.e CBVs 1-4) have anomalously low entropy, meaning that these vectors represent the behavior of only a few stars and are not representative of the module as a whole. At least three quarters of the mod-outs have at least one strong vector in Q0 with an entropy < -1.

The low entropy Q0 CBVs should therefore be used with extreme caution, if at all. If these vectors are fit to data in a least squares sense they may incompletely estimate systematics, while removing genuine astrophysical signal. We include them in released products because the problem does not affect all mod-outs (see Fig 6), and in the hope that users with more sophisticated tools can automatically correctly weight their importance in the fitting process, or manually omit them from the basis set used by simpler tools like PyKE.

This problem only affects Q0, and is believed to be related to the short duration (10 days) of this quarter. As the bottom left panel of Fig 6 shows, the problem is worst in mod-outs with the largest number of stars, where the ratio of number of stars to number of cadences is largest. Note that the pipeline produced detrended photometry (PDCSAP_FLUX) is not affected by this issue as the MAP algorithm correctly weights the vectors during fitting.

7.5 Cautions

No changes from the Data Characteristics Handbook.

7.6 Obtaining CBVs

No changes from the Data Characteristics Handbook.

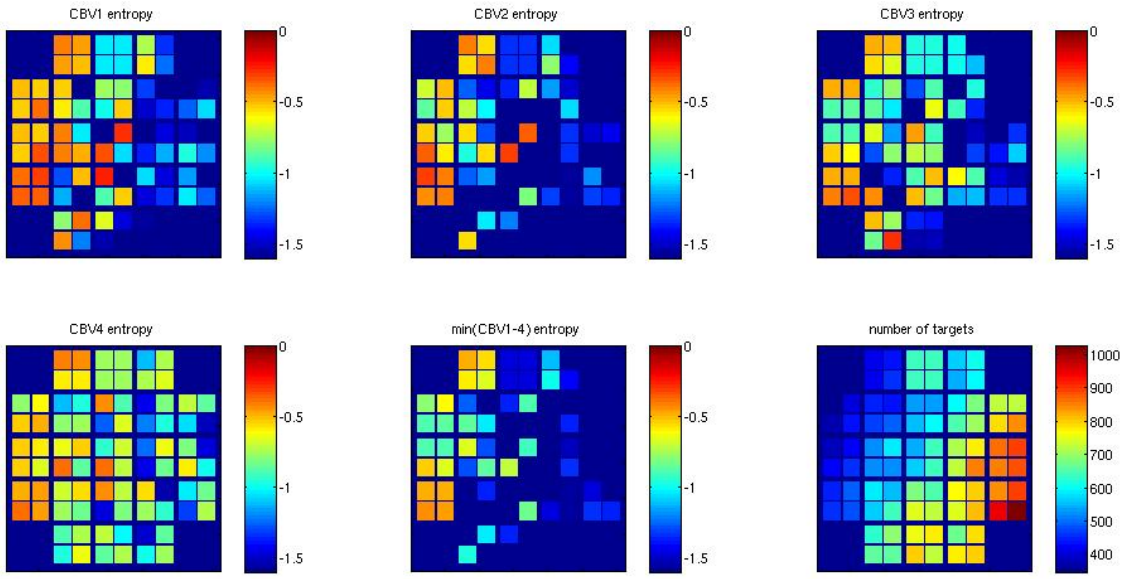

Figure 6: The entropy map for Q0, showing the entropy for first four CBVs for each channel across the focal plane in the first four panels. In the fifth panel, we show the worst of the first four CBVs in terms of entropy, which demonstrates that across more than three-quarters of the focal plane, at least one of the first four CBVs has bad (< -1) entropy. The final panel shows the total number of targets used for each channel.

Table 7: Cotrending basis vectors in Q1–Q4 with relative entropy < -1, which are not representative of the systematics in the data. There are numerous (> 100) unrepresentative CBVs in Q0; these are given in the Supplement.

Channel	Module	Output	CBV #	Relative Entropy
Q1				
3	2	3	8	-1.0925
67	19	3	5	-1.0673
Q2				
4	2	4	6	-1.0301
6	3	2	8	-1.3733
11	4	3	8	-1.0775
28	9	4	7	-1.0446
31	10	3	7	-1.5072
32	10	4	8	-1.1457
33	11	1	8	-1.2796
40	12	4	8	-1.0365
63	18	3	6	-1.1830
84	24	4	6	-1.0465
Q3				
17	7	1	7	-1.6643
20	7	4	6	-1.0342
36	11	4	5	-1.1348
48	14	4	6	-1.3582
72	20	4	8	-1.5329
Q4				
39	12	3	5	-1.5957
39	12	3	6	-1.0617
52	15	4	6	-1.0082
54	16	2	5	-1.2411
54	16	2	6	-1.1836
56	16	4	6	-1.0751
70	20	2	5	-1.4520
70	20	2	8	-1.3776
71	20	3	6	-1.0466
72	20	4	7	-1.0953
76	22	4	5	-1.0961
82	24	2	8	-1.0123
83	24	3	6	-1.3530

8 Contents of Supplement

The Supplement is available as a full package or smaller set for each quarter, described below.

8.1 Q0 Supplement Files

8.1.1 Full Supplement Package

The large supplement package (DataReleaseNotes14Q0SupplementFull.tar) contains the files described below.

Pipeline Instance Detail Reports

```
q0-lc-pa-through-ppa-ksop1007-as-run-pipeline-instance-detail-report-120207.txt
q0-sc-pa-through-pdc-ksop1007-as-run-pipeline-instance-detail-report-120208.txt
```

Data Anomaly Types

```
DataAnomalyTypes_Q0LC_LC_PID6117.txt
DataAnomalyTypes_Q0SC_SC_PID6135.txt
```

Mod.out central motion

```
Q0LC_central_column_motion.txt
Q0LC_central_row_motion.txt
```

Thermal Telemetry

```
Q0_LDE_averageBoardTemp.txt
Q0_TH12LVAT_MJD_gap.txt
Q0_TH1RW34T_MJD_gap.txt
```

Background Flux Time Series

```
Q0LC_background.txt
Q0SC_background.txt
```

Argabrightening Detections

```
Q0LC_LC_ArgAgg_Summary.txt
Q0SC_SC_ArgAgg_Summary.txt
```

Out of Fine Point Cadence Lists

```
Q0LC_LC_isNotFinePoint.txt
Q0SC_SC_isNotFinePoint.txt
```

Zero Crossing Events

```
Q0LC_ZeroCrossings.txt
Q0SC_ZeroCrossings.txt
```

Cotrending Basis Vector Entropy and Principal Values

```
Q0-8.0-KSOP-1007_bad_entropy_CBVs.txt
Q0_8.0-KSOP-1007-principal_values.txt
```

8.1.2 Small Supplement Package

The Supplement also contains a small package suitable for emailing (DataReleaseNotes14Q0SupplementShort.tar). The small package does not contain the following files:

```
Q0LC_background.txt
Q0SC_background.txt

Q0LC_central_column_motion.txt
Q0LC_central_row_motion.txt

Q0_TH12LVAT_MJD_gap.txt
Q0_TH1RW34T_MJD_gap.txt
```

8.2 Q1 Supplement Files

8.2.1 Full Supplement Package

The large supplement package (DataReleaseNotes14Q1SupplementFull.tar) contains the files described below.

Pipeline Instance Detail Reports

```
q1-lc-pa-through-ppa-ksop1008-as-run-pipeline-instance-report-20111222.txt
q1m1-sc-pa-pdc-ksop1008-as-run-pipeline-instance-report-20111223.txt
```

Data Anomaly Types

```
DataAnomalyTypes_Q1LC_LC_PID5856.txt
DataAnomalyTypes_Q1SC_SC_PID5875.txt
```

Mod.out central motion

```
Q1LC_central_column_motion.txt
Q1LC_central_row_motion.txt
```

Thermal Telemetry

```
Q1_LDE_averageBoardTemp.txt
Q1_TH12LVAT_MJD_gap.txt
Q1_TH1RW34T_MJD_gap.txt
```

Background Flux Time Series

```
Q1LC_background.txt
Q1SC_background.txt
```

Argabrightening Detections

```
Q1LC_LC_ArgAgg_Summary.txt
Q1SC_SC_ArgAgg_Summary.txt
```

Out of Fine Point Cadence Lists

```
Q1LC_LC_isNotFinePoint.txt
Q1SC_SC_isNotFinePoint.txt
```

Zero Crossing Events

```
Q1LC_ZeroCrossings.txt
Q1SC_ZeroCrossings.txt
```

Cotrending Basis Vector Entropy and Principal Values

```
Q1-8.0-KSOP-1008_bad_entropy_CBVs.txt
Q1_8.0-KSOP-1008-principal_values.txt
```

8.2.2 Small Supplement Package

The Supplement also contains a small package suitable for emailing (DataReleaseNotes14Q1SupplementShort.tar). The small package does not contain the following files:

```
Q1LC_background.txt
Q1SC_background.txt

Q1LC_central_column_motion.txt
Q1LC_central_row_motion.txt

Q1_TH12LVAT_MJD_gap.txt
Q1_TH1RW34T_MJD_gap.txt
```

8.3 Q2 Supplement Files

8.3.1 Full Supplement Package

The large supplement package (DataReleaseNotes14Q2SupplementFull.tar) contains the files described below.

Pipeline Instance Detail Reports

```
q2-lc-pa-through-ppa-ksop1009-as-run-pipeline-instance-detail-report-120103.txt
q2m1-sc-ksop1009-as-run-pipeline-instance-detail-report-120104.txt
q2m2-sc-ksop1009-as-run-pipeline-instance-detail-report-120104.txt
q2m3-sc-ksop1009-as-run-pipeline-instance-detail-report-120105.txt
```

Data Anomaly Types

```
DataAnomalyTypes_Q2LC_LC_PID5897.txt
DataAnomalyTypes_Q2SCM1_SC_PID5915.txt
```

```
DataAnomalyTypes_Q2SCM2_SC_PID5935.txt
DataAnomalyTypes_Q2SCM3_SC_PID5936.txt
```

Mod.out central motion

```
Q2LC_central_column_motion.txt
Q2LC_central_row_motion.txt
```

Thermal Telemetry

```
Q2_LDE_averageBoardTemp.txt
Q2_TH12LVAT_MJD_gap.txt
Q2_THRW_MJD_gap.txt
```

Background Flux Time Series

```
Q2LC_background.txt
Q2SCM1_background.txt
Q2SCM2_background.txt
Q2SCM3_background.txt
```

Argabrightening Detections

```
Q2LC_LC_ArgAgg_Summary.txt
Q2SCM1_SC_ArgAgg_Summary.txt
Q2SCM2_SC_ArgAgg_Summary.txt
Q2SCM3_SC_ArgAgg_Summary.txt
```

Out of Fine Point Cadence Lists

```
Q2LC_LC_isNotFinePoint.txt
Q2SCM1_SC_isNotFinePoint.txt
Q2SCM2_SC_isNotFinePoint.txt
Q2SCM3_SC_isNotFinePoint.txt
```

Zero Crossing Events

```
Q2LC_ZeroCrossings.txt
Q2SCM1_ZeroCrossings.txt
Q2SCM2_ZeroCrossings.txt
Q2SCM3_ZeroCrossings.txt
```

Cotrending Basis Vector Entropy and Principal Values

```
Q2-8.0-KSOP-1009_bad_entropy_CBVs.txt
Q2_8.0-KSOP-1009-principal_values.txt
```

8.3.2 Small Supplement Package

The Supplement also contains a small package suitable for emailing (DataReleaseNotes14Q2SupplementShort.tar). The small package does not contain the following files:

```
Q2LC_background.txt
Q2SCM1_background.txt
Q2SCM2_background.txt
Q2SCM3_background.txt

Q2LC_central_column_motion.txt
Q2LC_central_row_motion.txt

Q2_TH12LVAT_MJD_gap.txt
Q2_THRW_MJD_gap.txt
```

8.4 Q3 Supplement Files

8.4.1 Full Supplement Package

The large supplement package (DataReleaseNotes14Q3SupplementFull.tar) contains the files described below.

Pipeline Instance Detail Reports

```
q3-lc-pa-through-ppa-ksop1010-as-run-pipeline-instance-detail-report-120117.txt
q3m1-sc-ksop1010-as-run-pipeline-instance-detail-report-120210.txt
q3m2-sc-ksop1010-as-run-pipeline-instance-detail-report-120210.txt
q3m3-sc-ksop1010-as-run-pipeline-instance-detail-report-120210.txt
```

Data Anomaly Types

```
DataAnomalyTypes_Q3LC_LC_PID6018_Summary.txt
DataAnomalyTypes_Q3SCM1_SC_PID6036_Summary.txt
DataAnomalyTypes_Q3SCM2_SC_PID6037.txt
DataAnomalyTypes_Q3SCM3_SC_PID6038.txt
```

Mod.out central motion

```
Q3LC_central_column_motion.txt
Q3LC_central_row_motion.txt
```

Thermal Telemetry

```
Q3_LDE_averageBoardTemp.txt
Q3_THRW_MJD_gap.txt
Q3_TH12LVAT_MJD_gap.txt
```

Background Flux Time Series

```
Q3LC_background.txt
Q3SCM1_background.txt
Q3SCM2_background.txt
Q3SCM3_background.txt
```

Argabrightening Detections

```
Q3LC_LC_ArgAgg_Summary.txt
Q3SCM1_SC_ArgAgg_Summary.txt
Q3SCM2_SC_ArgAgg_Summary.txt
Q3SCM3_SC_ArgAgg_Summary.txt
```

Out of Fine Point Cadence Lists

```
Q3LC_LC_isNotFinePoint.txt
Q3SCM1_SC_isNotFinePoint.txt
Q3SCM2_SC_isNotFinePoint.txt
Q3SCM3_SC_isNotFinePoint.txt
```

Zero Crossing Events

```
Q3LC_ZeroCrossings.txt
Q3SCM1_ZeroCrossings.txt
Q3SCM2_ZeroCrossings.txt
Q3SCM3_ZeroCrossings.txt
```

Cotrending Basis Vector Entropy and Principal Values

```
Q3-8.0-KSOP-1010_bad_entropy_CBVs.txt
Q3_8.0-KSOP-1010_principal_values.txt
```

8.4.2 Small Supplement Package

The Supplement also contains a small package suitable for emailing (DataReleaseNotes14Q3SupplementShort.tar). The small package does not contain the following files:

```
Q3LC_background.txt
Q3SCM1_background.txt
Q3SCM2_background.txt
Q3SCM3_background.txt

Q3LC_central_column_motion.txt
Q3LC_central_row_motion.txt

Q3_THRW_MJD_gap.txt
Q3_TH12LVAT_MJD_gap.txt
```

8.5 Q4 Supplement Files

8.5.1 Full Supplement Package

The large supplement package (DataReleaseNotes14Q4SupplementFull.tar) contains the files described below.

Pipeline Instance Detail Reports

```
q4-lc-exclude-mod3-pa-through-ppa-ksop1011-as-run-pipeline-instance-detail-report-120127.txt
```

q4-lc-mod3-only-pa-through-ppa-ksop1011-as-run-pipeline-instance-detail-report-120130.txt
q4m1-sc-exclude-mod3-ksop1011-as-run-pipeline-instance-detail-report-120131.txt
q4m1-sc-mod3-only-ksop1011-as-run-pipeline-instance-detail-report-120131.txt
q4m2-sc-ksop1011-as-run-pipeline-instance-detail-report-120201.txt
q4m3-sc-ksop1011-as-run-pipeline-instance-detail-report-120201.txt

Data Anomaly Types

DataAnomalyTypes_Q4LC_LC_PID6055.txt
DataAnomalyTypes_Q4SCM1_SC_PID6097.txt
DataAnomalyTypes_Q4SCM2_SC_PID6098.txt
DataAnomalyTypes_Q4SCM3_SC_PID6099.txt

Mod.out central motion

Q4LC_central_column_motion.txt
Q4LC_central_row_motion.txt

Thermal Telemetry

Q4_LDE_averageBoardTemp.txt
Q4_TH12LVAT_MJD_gap.txt
Q4_TH1RW34T_MJD_gap.txt

Background Flux Time Series

Q4LC_background_mod3.txt
Q4LC_background_nomod3.txt
Q4SCM1_background_mod3.txt
Q4SCM1_background_nomod3.txt
Q4SCM2_background_nomod3.txt
Q4SCM3_background_nomod3.txt

Argabrightening Detections

Q4LC_LC_ArgAgg_Summary.txt
Q4SCM1_SC_ArgAgg_Summary.txt
Q4SCM2_SC_ArgAgg_Summary.txt
Q4SCM3_SC_ArgAgg_Summary.txt

Out of Fine Point Cadence Lists

Q4LC_LC_isNotFinePoint.txt
Q4SCM1_SC_isNotFinePoint.txt
Q4SCM2_SC_isNotFinePoint.txt
Q4SCM3_SC_isNotFinePoint.txt

Zero Crossing Events

Q4LC_ZeroCrossings.txt
Q4SCM1_ZeroCrossings.txt
Q4SCM2_ZeroCrossings.txt

```
Q4SCM3_ZeroCrossings.txt
```

Cotrending Basis Vector Entropy and Principal Values

```
Q4-8.0-KSOP-1011_bad_entropy_CBVs.txt
Q4_8.0-KSOP-1011_principal_values.txt
```

8.5.2 Small Supplement Package

The Supplement also contains a small package suitable for emailing (DataReleaseNotes14Q4SupplementShort.tar). The small package does not contain the following files:

```
Q4LC_background_mod3.txt
Q4LC_background_nomod3.txt
Q4SCM1_background_mod3.txt
Q4SCM1_background_nomod3.txt
Q4SCM2_background_nomod3.txt
Q4SCM3_background_nomod3.txt

Q4LC_central_column_motion.txt
Q4LC_central_row_motion.txt

Q4_TH12LVAT_MJD_gap.txt
Q4_TH1RW34T_MJD_gap.txt
```

9 References

No changes from the Data Characteristics Handbook.

A SOC 8.0 Improvements

The Release 14 data have all been re-processed with the SOC 8.0 Pipeline, with significant improvements over the original processing; these data replace the previous data at the MAST website. The improvements are summarised here.

A.1 Improvements to PDC

The Presearch Data Conditioning (PDC) module for long cadence data has been completely redesigned since the original processing of the Q0–Q4 data. The old PDC would occasionally distort astrophysical signals. In the new PDC this problem has been significantly reduced, however there are still some targets where astrophysical signatures have been removed or instrumental signatures have been retained. In particular, some instrumental signatures due to the multiple safe modes and pointing tweaks that occurred during Q2 are not well corrected. Hence, the present SOC 8.0 results are better at preserving astrophysical signatures, but also may retain some instrumental signatures that were better corrected by SOC 7.0. Future reprocessing efforts are likely to bring further improvements to the light curves produced by the Kepler pipeline.

For details on the new PDC data, see the Archive Manual. Also, please note that even though new PDC keywords are populated in the FITS headers of short cadence data, the improvements to PDC do not apply to short cadence light curves at this time. We anticipate a future version of PDC that will correct the short cadence light curves. For now, users are encouraged to use the GO tool designed for this purpose and the released CBVs.

A.2 New FITS header keywords

Many new keywords can be found in the headers of the version 2.1 FITS files. For details of these, please see the Archive Manual. 3-, 6- and 12-h CDPP, flux fraction, and crowding have been extracted from the FITS files and are available via the data search page at MAST. Values are also provided for all past quarters.

A.3 Improved World Coordinates in Full Frames Images

See Section 1 for a discussion of the improved WCS.