

XMM-Newton CCF Release Note

XMM-CCF-REL-201

Further refinement of EPIC-pn frame times and clock sequences

M. Kirsch

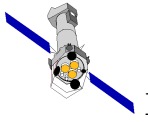
November 8, 2006

1 CCF components

Name of CCF	VALDATE	List of Blocks changed	XSCS flag
EPN_TIMECORR_0011	1998-01-01T00:00:00	FRAMETIME	NO
EPN_TIMECORR_0012	1998-01-01T00:00:00 2000-02-09T11:00:00	FRAME_TIME	NO
EPN_TIMECORR_0013	2000-02-09T22:00:00 2000-03-01T00:00:00	FRAMETIM	NO
EPN_TIMECORR_0014	2000-03-04T12:00:00 2000-03-08T15:00:00	EFRAME_TIME	NO
EPN_TIMECORR_0015	2000-03-11T00:00:00 2000-03-18T00:00:00	FRAMETIME	NO
EPN_TIMECORR_0011	1998-01-01T00:00:00	FRAME_TIME	NO
EPN_TIMECORR_0012	1998-01-01T00:00:00 2000-02-09T11:00:00	FRAMETIME	NO
EPN_TIMECORR_0013	2000-02-09T22:00:00 2000-03-01T00:00:00	FRAME_TIME	NO
EPN_TIMECORR_0014	2000-03-04T12:00:00 2000-03-08T15:00:00	FRAMETIME	NO
EPN_TIMECORR_0015	2000-03-11T00:00:00 2000-03-18T00:00:00	FRAME_TIME	NO
		TIMECOR	NO
		FRAME_TIME	NO
		TIMECOR	NO
		FRAME_TIME	NO
		TIMECOR	NO
		FRAME_TIME	NO
		TIMECOR	NO
		FRAME_TIME	NO

2 Changes

Frame times and values to determine the correct photon arrival times have been calibrated using in orbit data.



3 Scientific Impact of this Update

The new CCFs will not significantly effect the timing accuracy as such, but will help to identify still present time jumps in the data more accurately. Before, the time jump detection algorithm of the OAL using the not perfect timing parameters needed to be operated with a higher margin in order to avoid drift effects created by the non fully correct frame times, especially for long observations and counting mode intervals.

4 Estimated Scientific Quality

The changes in the frame times are of the order of less then 20 clocks ($20 \cdot 40 \text{ ns} = 800 \text{ ns} = 0.8 \text{ micro sec}$). This is not affecting at all the timing properties of the EPIC-pn camera as it is shown in section 6.

5 Expected Updates

With the new CCFs the OAL time jump detection algorithm will be refined.

6 Test procedures & results

The the new EPN_TIMECORR_00011 -EPN_TIMECORR_00015 CCFs have been tested on all available archive data comparing the differences of 2 consecutive events. This differences should be near to a multiple of the frame time and be constant with the observation time.

Figure 1 shows the evolving differences between consecutive events, plotting the slope of a linear fit to the time differences of consecutive events modulo the frame time. In the upper panel with the old and in the lower panel with the new frame times.

The CCFs have been verified using all calibration Crab data from the relative timing monitoring. As expected the timing results are not affected at all by the refined frame times.

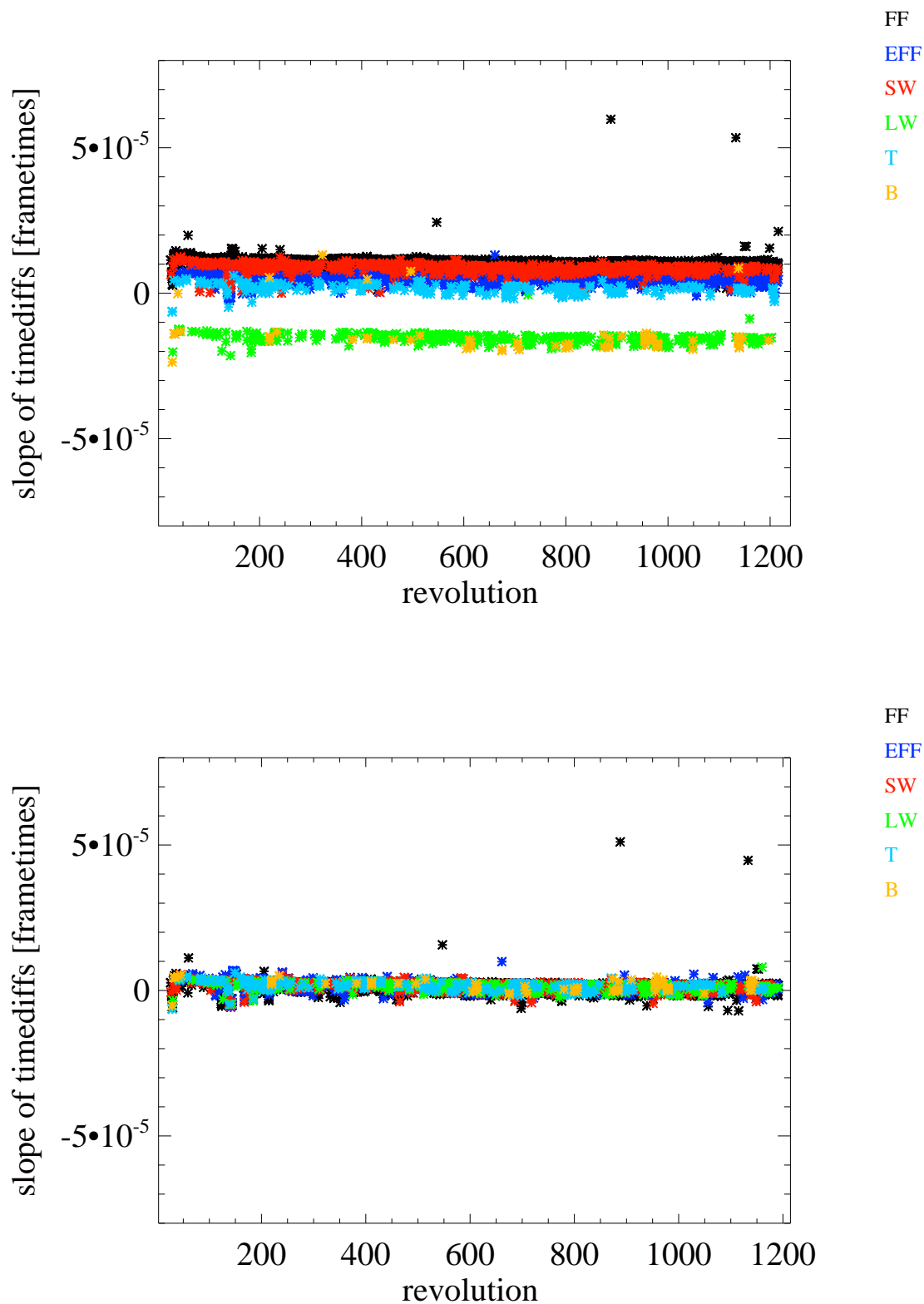
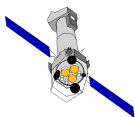


Figure 1: Evolving differences between consecutive events, plotting the slope of a linear fit to the time differences of consecutive events modulo the frame time. Upper with old frame times, lower with refined ones.