LinoSPAD erratum: Incorrect pixel sequence

Scope

I was contacted by one of the users of LinoSPAD about an intriguing issue, that appeared when making 2D intensity images with LinoSPAD, across a striped target pattern. The resulting image showed distortion for the lines recorded with pixels 166-218.

The issue was investigated and the error traced down to the assignment between pixel location an output pads on the CMOS sensor. Due to how the pixel outputs are distributed to the pads a limited number of pixels were affected. **Pixel data for even pixels from 166 to 218 are assigned the wrong position.** (Pixel numbers starting at 1.)

Correction

To correct data recorded with firmware versions prior to 20150722 pixel data needs to be swapped as indicated in the figure below. (Data given for pixel 166 belongs to pixel 168, 168 to 170, ..., 218 to 166.)

Only the data from the 27 even pixels between 166 and 218 inclusive need to be circularly shifted as indicated.

A firmware version 20150722 that fixes the problem has been synthesized and is available for download at:
https://documents.epfl.ch/groups/l/li/linospad/www/LinoSPAD_firmware_20150722.bit.zip (FPGA firmware file.)
https://documents.epfl.ch/groups/l/li/linospad/www/LinoSPAD_firmware_20150722.mcs.zip (SPI flash image.)

The firmware can be programmed through the Xilinx Impact software using a Xilinx JTAG programmer connected to the JTAG header (J2) on the LinoSPAD board. A dot indicates pin number 1 corresponding to the marked side on the flat cable. The attached flash is a S25FL128S in 4-bit mode.

Successful programming of the SPI flash can be tested by checking the reported firmware version in the debug tab after starting the LinoSPAD software.

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