Problem Report   **Report Number: 2**

Project Name: TeraPixel APS for CALICE   (v1.1)

Item: Charge injection from MSO power supply to preamplifier

Problem
Injection from the MSO power supply is observed in the test pixel preamplifier.

Bulk pixels are reset and a small signal is seen in the test pixel – this might lead to runaway/avalanche/crosstalk if sufficicient bulk pixel fire to cause more local hits or unexpected behaviour during a reset of all bulk pixels.

The likely cause is attributed to the fact that the logic buffers that generate the RST and RSTB signals (per pixel) are supplied with VDD1V8MSO – hence any significant disturbance on this power net can be seen on RST (or RSTB, whichever is held high) and therefore can couple into the preamplifier.

A similar (but small) effect is seen in simulation if series resistance is added to the MSO power net, although this doesn't fully account for the injection seen under test.

Originator (Sign/Date)

JC

Project Manager (Sign/Date)

Remedial Action

No remedial action is possible post manufacture

It remains to be seen whether this effect causes noticeable effects in the bulk performance – the most likely occurrence of this phenomena is when all the bulk pixels are reset, hence everything that could be coupled to is also in reset – although some odd effects might be seen while coming out of reset, this is before a bunch train and should not impact normal operation.

If pixel monostables are biased with a very high current, or a great many fire at once, coupling of this nature may also be observed.

For any future design the power supply for these buffers should be considered carefully, to ensure it is clean.

Project Manager (Sign/Date)

JC