Towards Beetle 1.3

(lessons learned from the 22.01.03 Beetle review)

1. Some comments on the report

(2)   W.R.T. noise and pulse shape a good agreement was found between lab measurements and simulation results. However, the results were not shown during the review.

(5)   We agree to JC's point of view for designs with moderate area utilisation. For rather packed designs, however, additional circuitry can be most probably not placed close to the patch nodes and will thus introduce additional problems. A new place and route from scratch will not be affected by these problems. Thus the feasibility of an incremental layout has to be verified beforehand.

(7)   The FE architecture is always a compromise. For the Beetle the topology of the front end was fixed in an early design stage. It is not feasible to change it in the last phase of the project.

(17)   This is expressis verbis stated in the manual.

(26, 27)   The test pulse injection circuit features an adjustable amplitude. However, the absolute value of the test signal is depending on process parameters and thus has to be calibrated itself.

2. Missing measurements and simulations

The third column indicates the type of characterisation (measurement or simulation) missing.

1	Overvoltage test	M, S
2	Sticky Charge	M, S
3	Power routing	M (1.2_MA0)
4	Detailed ENC & Pipeline characterisation	M
5	DAC radiation hardness	M
6	X-coupling between channels (w. mockup of strip-strip cap.)	M, S
7	PSSR	M, S
8	Comparator characterisation	(M), S

3. Changes on Beetle 1.3

The last column of the table quotes a risk estimate liked to the particular modification. In fact the required fix of the sticky charge problem dominates the failure risk.

1	5V compatible I2C pads	low
2	Pipeamp fix (sticky charge)[1] simulation with delayed clocks required	moderate
3	Daisy chain controller[2]	moderate
4	Power routing (FE, pipeamp, power pads)[3]	very low
5	Comparator changes have to be decoupled from analogue path[4]	very low
6	Fix of overvoltage problem and output driver depending on 2.1	low
7	include DAC probe pads[5]	very low

[1]   Change of the pipeamp's control sequence requires a re-synthesis of the control circuit
[2]   Part of the control circuit, thus closely linked to 2
[3]   Change already implemented on Beetle 1.2_MA0
[4]   The FE signal only connects to a single gate inside the comparator
[5]   Feasibility (space) has to be checked first

4. Beetle 1.3 time schedule

The earliest date, up to which the above characterisations and modifications can be accomplished is probably by May 2003. However, the actual deadline for these changes is defined by the date of the MPW11 run, which might be a few weeks later.