UNIVERSITÄT
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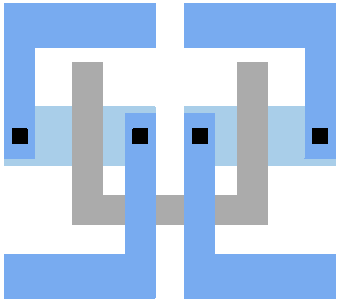
DCD and SWITCHER



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Software Meeting

Garching

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DCD - Global Register

- The configuration data is written through JTAG.
  - the global configuration register can directly be accessed
  - the bits in the ADC have to be selected for access in the global configuration register
- It is not possible to read back the configuration data.
- There are a total of 970 bits of the configuration data for each DCD.
  - 202 bits in a global configuration register
  - three bits in each of the 256 ADC pixels
- For the detailed layout of the registers, please refer to the reference manual.

DCD – Control Bits

The main groups of control bits control:

- the pedestal calibration gain.
- global DEPFET offset correction current.
- various bias currents for the current-mode ADC.
- gain and bias currents of the input trans-impedance amplifier
- selection of the voltage on the monitoring bus.
- the sampling mode (single-/double-sampling).
- various test circuits, including test-injections for calibration.

The local bits in the pixels control

- the test injection to the pixel
- the monitoring of the pixel on the global bus
- the operating mode of the pixel (common mode compensation)
  - not used for single-sampling

DCD – Run Control

Data taking is started by

- loading the correct settings to the control registers
  - includes powering up the ASIC
- and sending clock and reset signals.
  - Handled by the DHP ASIC.

DCD - Monitoring

- The voltage on the analog monitoring bus can be monitored.
- Wrong setting of the ADC bias currents often shows up as missing bins in the ADC data.
  - can be monitored online from standard physics data
- Test injection can be used to characterize a channel.

SWITCHER - User Register

- The SWITCHER user register contains control bits to control the bias DACs.
- The control register is accessed through JTAG.
- Every bit must be written identically in three locations, so that a majority voter can produce a SEU tolerant information.
- SEUs can be detected by reading back the register.

The control bits control

- the termination resistors at the LVDS inputs.
- the bias current in the output buffers (and therefore their speed)

SWITCHER – Run Control

Data taking is started by

- loading the correct settings to the control registers
- executing the power supply ramp-up sequence
- and sending the correct strobe sequence
  - Handled by the DHP ASIC.

} interleaved

SWITCHER - Monitoring

- An analog monitoring pad is present on the chip
  - presently not connected in the ASIC
  - but on the Kapton (one bus for all SWITCHER)
- Readback of config data to check for SEU.