SPP Isolation Flagging Module

Progress Update

Dónal Murray

donal.murray@cern.ch

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The University of Manchester

Presentation Overview

Concept

- Function of the SPP isolation flagging module
- Block Diagrams

Implementation

- Implementation in VHDL
- Testing in Modelsim
- Incorporation into the full AMC40 Firmware

Dónal Murray donal.murray@cern.ch

MANCHESTER 1824
The University of Manchester

The SPP isolation flagging module

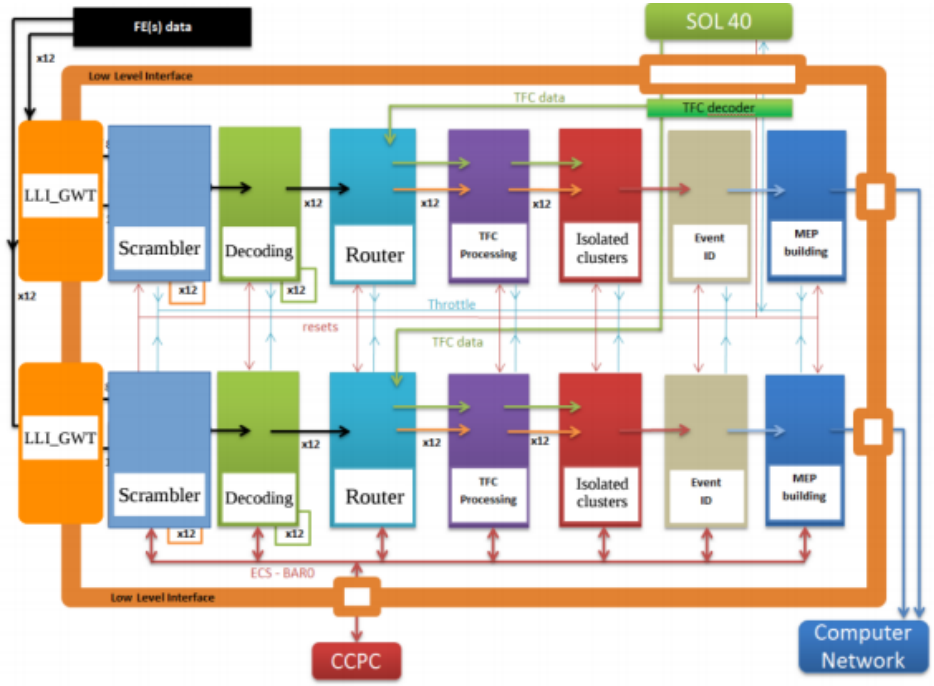

Figure : Drop in module (shown as "Isolated Clusters" in this image) to check for isolated clusters.

Dónal Murray donal.murray@cern.ch

The event isolation flagging module

Columns in the SPP

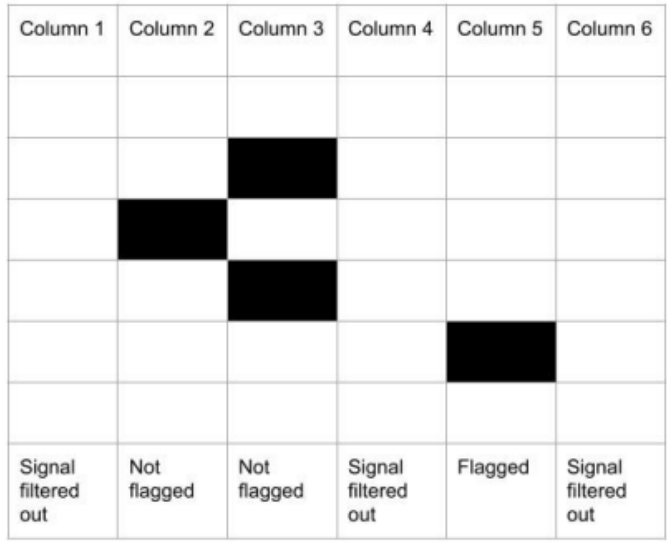

Figure : Columns with no neighbours are flagged. Doing this in the FPGA reduces load on CPU in software stage.

Dónal Murray

donal.murray@cern.ch

The University of Manchester

The event isolation flagging module

Top level block Diagram

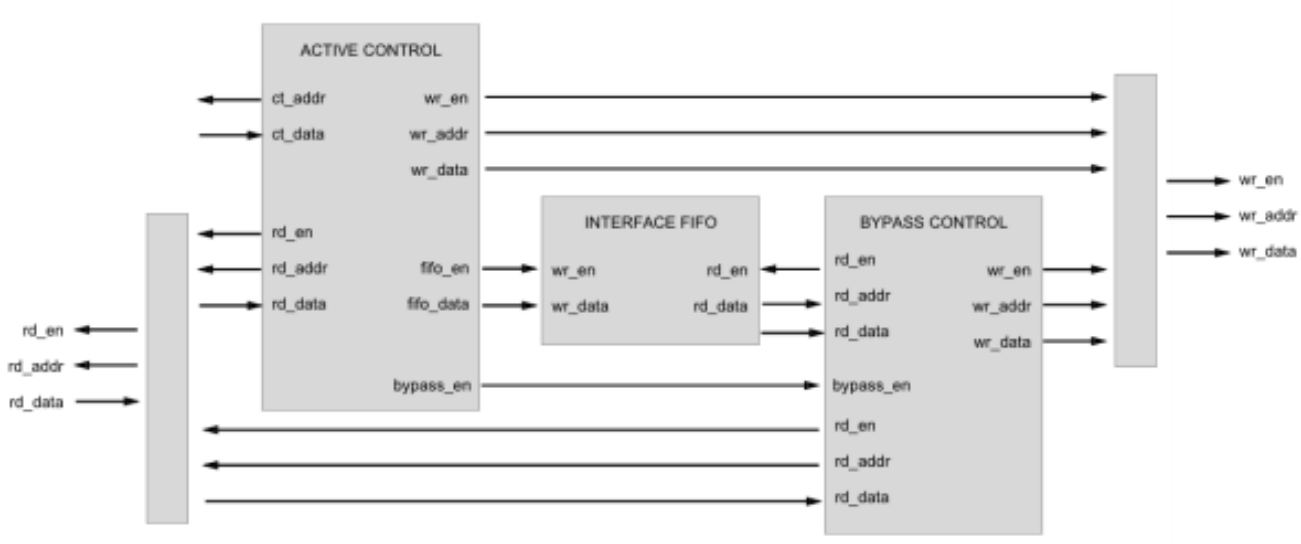

Figure : Checks each column in SPP to see if it is isolated.

Implementation in VHDL

- Building on code started by masters students last year
  - Active controller did not compile
  - Only implemented one data processor, needed sixteen
  - Blocks did not interface together: length mismatches
  - Data was expected in a different format from the actual format
- Existing blocks fixed and all functionality added
- The code now compiles and simulates in Modelsim.

Testing in Modelsim

- Designed tests for all low level blocks individually
  - Counter, sorter, flagger blocks all tested and working
  - Wrote a program in C++ to generate random data packages to test data processors, which function as intended
- Mid level blocks
  - Some issues with the active controller
  - Bypass controller functioning as expected
  - FIFO functioning as expected
- Top level cannot be tested until active controller is working

Incorporation into the full AMC40 Firmware

- Cloned the full AMC40 firmware repository (velo24 branch)
  - Not working with data processing block - vhd file containing entity definition missing
  - Fixed problem and compiled – need to check this fix with Karol
- Currently working on simulating the AMC40 firmware in Modelsim

Summary

- Implementation in Modelsim is complete; mid way through testing
- A few issues, mostly with active controller

- Outlook
  - Complete testing in Modelsim with realistic data
  - Test as a standalone module in Quartus
  - Incorporate into full AMC40 firmware.